An abridgment [sic] of the second edition of a work, written by Dr. Currie, of Liverpool in England : on the use of water, in diseases of the human frame ; and fever, opium, strong drink, abstinence from food, and the passages through the human skin ; with occasional remarks.

Contributors

Currie, James, 1756-1805.
Vaughan, Benjamin, 1751-1835.
Edes, Peter, 1756-1840
Bass, George
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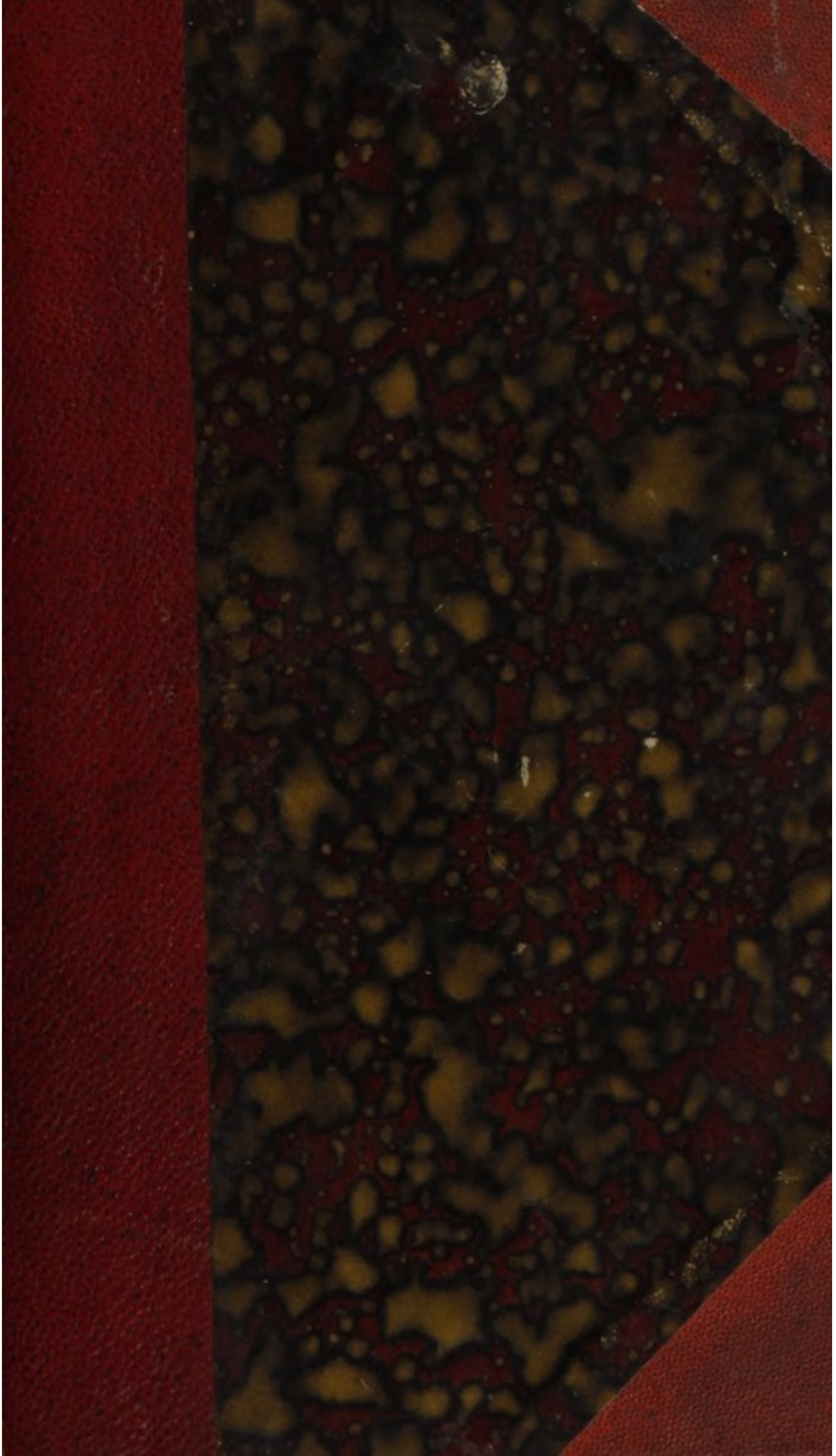

AN

ABRIDGMENT

OF THE SECOND EDITION OF A WORK, WRITTEN BY DR. *CURRIE*, OF *Liverpool* IN *England*,

ON THE USE OF WATER,

IN DISEASES OF THE HUMAN FRAME;

AND ON

FEVER, OPIUM, STRONG DRINK, ABSTINENCE FROM FOOD,

AND THE

PASSAGES THROUGH THE HUMAN SKIN;

WITH OCCASIONAL REMARKS.

* * *
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Printed by *PETER EDES* of *Auguſta*, in the Diſtrict of Maine.

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PREFACE.

THE following abridgment, with the remarks accompanying it, first appeared in succeſſive numbers in the Kennebec Intelligencer for November 17 and 24, and December 1, 8, and 15, 1798. It was conceived that advantage might reſult from the whole being reprinted in the form of a pamphlet, to inſure both its preſervation and its circulation among new readers. The author has availed himſelf of this opportunity to make a few corrections and improvements. There was the more room for this, owing to the extreme haſte of the firſt publication, which was precipitated in order to put the American public into the earlieſt poſſible poſſeſſion of ſuch important materials.

That the facts reſpecting the uſe of *cold water* in certain diſeaſes, as detailed in theſe ſheets, may ſeem applicable to the caſe of the inhabitants of the United States; the author of this abridgment has judged it proper to cite the following evidence of ſome eminent phyſicians of America, on this ſubject.

In the 'Hiſtory of the *yellow fever*, as it appeared in 'the city of New-York in 1795, by Dr. Alexander Ho-'ſack, jun. of that city,' we are told that 'the moſt cer-'tain and ſucceſsful means [of cure] were, to waſh the 'whole ſurface of the body with *cold* vinegar and wa-'ter; and, immediately after, covering the patient with 'blankets, to adminiſter ſuch medicines as poſſeſs the 'effect of bringing on ſweating. Of theſe, the ſpiritus 'Mindereri and ſaline draughts of Riverius ſucceeded 'well; more eſpecially if the warm drinks were conti-'nued;

'nued ; ſuch as the infuſion of ſnake-root, gruel, toaſt 'water, tamarind water, lemonade, &c. Theſe were 'much aided by applying to the feet of the patient a 'warm brick, ſteeped in vinegar and covered in a flan-'nel cloth wet with vinegar or ſpirits : the ſteam, thus 'emitted and diffuſed through the bed, had a wonder-'ful effect in ſoftening the ſkin and exciting ſweat ; 'eſpecially where the *cold* waſhing had been previouſly 'employed.

'Some practitioners have preferred the practice of 'plunging the patient ſeveral times in a cold bath, and 'violently daſhing the body with cold water. But 'ſimply waſhing the patient with cloths dipped in *cold* 'vinegar and water, was found much preferable to im-'merſion† ; bothbe cauſe it more effectually diminiſhed 'the heat of the ſyſtem and was leſs fatiguing to the 'patient. Experiments have proved, that repeatedly 'wiping and waſhing with water, in the ordinary way 'in which the operation is performed ; diminiſhed the 'heat 7 or 8 degrees more than ſimple immerſion, or 'daſhing it over the body with pails.

'The practice of cold bathing in fevers of this type, 'is not a new one, but was very commonly employed 'at Breſlaw in Sileſia ; and of late years has been very 'ſucceſsfully applied in the Weſt Indies,* as well as in 'different parts of Europe, where diſeaſes of this type 'prevail.

'Profeſſor Gregory of Edinburgh, and Dr. Currie 'an eminent phyſician at Liverpool, have alſo preſcri-'bed it with great advantage in the low typhus fevers 'of thoſe cities. But its great ſucceſs in the *New-York* '*hoſpital* as employed by Dr. Samuel Bard, and in the

'private

† *Before deciding here, we muſt conſult Dr. Currie.*

* *See Dr. Jackſon on the Diſeaſes of Jamaica.*

'private practice of my *brother*, have fully convinced
'me of its uſe.

'It is alſo proper to remark, that where the phyſi-
'cian was not called to the patient in the firſt ſtage of
'the diſeaſe, and putrid ſymptoms had appeared and the
'patient had become much debilitated, the cold bath
'was injurious: and from the abuſe of cold bathing,
'by employing it in the *laſt* ſtage of the diſeaſe, it has
'fallen into diſrepute with ſome practitioners. But as
'the abuſe of a thing is no argument againſt its uſe, I
'repeat my obſervation, that in the *firſt or inflammato-*
'*ry* ſtage of the diſeaſe, it was one of the moſt uſeful
'remedies that was employed.

'When the cold bath had been thus made uſe of,
'and immediately after followed by the ſpiritus Min-
'dereri or ſaline mixture, with plentiful dilution, it
'rarely failed to produce ſweating in the courſe of 15
'minutes; and when once induced, it was eaſily con-
'tinued by the repetition of the ſudorific medicines and
'drinks, until a ſolution of the fever was obtained. In
'ſome inſtances, where the patient refuſed his drink
'and medicines, or from the careleſſneſs of the nurſes
'they had not been ſupplied as frequently as was pro-
'per, and the perſpiration had been ſuppreſſed, it be-
'came neceſſary to repeat the cold bathing; which ſel-
'dom failed to procure a return of the *ſweating*. By
'the continuance of this diſcharge, an abatement of all
'the ſymptoms took place. It appeared to operate as
'a ſpecific in the diſeaſe; the pulſe in a ſhort time be-
'came moderate; the heat of the ſkin diminiſhed; the
'pain in the head and back, before ſo diſtreſſing, was
'alſo relieved; the ſickneſs of ſtomach and vomiting
'were removed; and in the courſe of two or three
'days from the attack, the patient had little elſe to
'contend with but mere debility.'

Thus

Thus far Dr. A. Hoſack, jun. who, as we perceive, cites the authority of his brother Dr. D. Hoſack, and of Dr. G. Bard, both of New-York, in addition to his own. We muſt obſerve, that neither of theſe gentlemen, at the time of the publication of Dr. A. Hoſack's pamphlet, had ſeen the larger work of Dr. Currie; of which the firſt edition appeared at the cloſe of 1797, and the ſecond in 1798. This work therefore merits an examination by itſelf, even by the phyſicians of New-York.—One of them, whoſe name has not yet been mentioned, but whoſe own productions are read even in the centre of Germany, mentions in a private letter, that Dr. Currie's work did not reach New-York till the preſent year (1799.) He himſelf ſays of it, that 'it appears to be a judicious and intereſting practical work.' But not to dwell upon an opinion given incidentally only, however weighty may be the judgment of the party; we proceed to other evidence.

An American phyſician, whoſe name is known in every part of the civilized world, ſtates that 'he can 'from the experience of five years, ſubſcribe to all 'Dr. Currie's remarks upon the uſe of cold water in the 'diſeaſe which has lately afflicted * * * Philadelphia.' He adds, 'Its efficacy is now admitted by nearly all our 'phyſicians.—It is ſo far from interfering with, that it 'aids the operations of bleeding, and mercury. Where 'cold water has been too feeble to compoſe the inordi-'nate actions of the blood veſſels, I have uſed *ice* with 'great advantage. When the head is much afflicted, I 'confine the ice in a bladder and apply it to the fore-'head. In a few minutes I have ſeen it abate pain, re-'move a delirium, and ſometimes induce the moſt ſalu-'tary ſleep.—Its effects are equally obvious when ap-'plied to the ſeats of *violent* diſeaſe in other parts of 'the body; provided none of thoſe circumſtances for-

'bid

'bid its application, which are mentioned by Dr. Cur-
'rie.'

Whoever wiſhes to ſee farther information upon this ſubject, may conſult ſome of the medical publications, periodical and other, which have lately appeared at Philadelphia and New-York.

The *ſimplicity* of applications of this kind will not ſuperſede the neceſſity of employing medical practitioners. They are the beſt judges when to uſe, and when to avoid certain remedies; as likewiſe how to guard againſt thoſe many unforeſeen or difficult circumſtances, which cannot be ſubmitted to general rules.

It were to be wiſhed however, and particularly in the country parts of the United States, that more of theſe ſimple applications were attented to. Theoriſts have ſometimes conſidered the diſeaſed affections of the human body, as depending upon the chemical ſtate of the humors (as they have been called;) ſometimes upon the extreme fulneſs of the veſſels; ſometimes upon the morbid powers of the living animal, and ſo on. But it were to be wiſhed, that theoriſts would ſometimes alſo conſider the body, in *life*, as open to the influence of ſome of thoſe principles, which produce effects upon it when *dead*. Gargles made of vinegar, of ſalt, of pepper or of aſtringent ſubſtances, ſeparately employed or elſe combined together; have been highly uſeful in ſore-throats, where putridity has threatened; and they might equally be employed in other inſtances. Bark in like manner, has been exhibited to the outſide of the body, with evident benefit, in other putrid caſes. Salt has not perhaps been tried externally in caſes tending to putridity, or in other words to *mortification*; but it certainly merits an experiment. But what moſt promiſes ſucceſs is the powder of *freſh*-made charcoal; on account of its aſtoniſhing powers not only in delaying putrefaction.

putrefaction in dead flesh, but even in restoring its sweetness, when a taint of putrefaction has manifested itself. It removes putridity even from water rendered green by corruption; and water is supposed to be the basis of many fluid substances, not excepting a number of those in the human body.

These hints are offered with diffidence; but the trials to which they lead, may be made with safety, and especially where other remedies have failed of the desired operation. One single successful practice resulting from them, will abundantly compensate for the trouble of bestowing a little thought upon them; and the life and ease of man, and we may add of beasts, (for these practices may be extended to beasts) merit some exertion; not only as objects of our immediate concern, but as preparing relief in case of accidents to ourselves.

April, 1799;
Kennebec County, Maine.

N. B. For some addenda, &c. see the end.

An Abridgment of a work intitled, 'Medical Reports on the Effects of '*Water*, cold and warm, as a remedy 'in fever and other diſeaſes, whether 'applied to the ſurface of the body or 'uſed internally; including an enquiry 'into the circumſtances that render cold 'drink or the cold bath dangerous in 'health:—To which are added, obſer-'vations on the nature of *fever;* and on 'the effects of *opium*, *alcohol* and *ina-'nition*.—The *ſecond* edition, corrected 'and enlarged. By JAMES CURRIE, 'M. D. F. R. S. Phyſician in Liverpool, 'and Fellow of the Royal College of 'Phyſicians, Edinburgh. Printed at Li-'verpool, 1798.'

N. B. Some remarks are intermixed with this Abridgment, written in 1798.

DR. CURRIE has publiſhed a work in medicine apparently of the utmoſt importance, and particularly ſo to the United States; for whoſe now reigning diſeaſe, it flatters us with ſome appearance of relief, if not of cure. The veracity of the author in all ſituations, is as well eſtabliſhed as his reputation for ſolid and ingenious talents.

Dr. William Wright, F. R. S. formerly of Jamaica, and well known for his writings in medicine and botany, ſeems to have furniſhed a caſe to our author, which, joined to his own previous opinions, led him to the train of practice and obſervation of which we are about to give the account.—Dr. Wright, while on a voyage from Jamaica in 1777, being attacked with fever, on the third day of it, ordered three buckets of ſalt water to be thrown upon himſelf, which gave him inſtant relief; and this, being repeated on the two following days, removed every ſymptom of diſeaſe. Another paſſenger, whoſe attack from fever had begun on Auguſt 9, copied the example, and was reſtored to health. A ſeaman, who originally communicated the fever to Dr. Wright, refuſing proper aſſiſtance, died. Encouraged by theſe incidents, and finding that Dr. Brandreth of Liverpool, had employed cold water externally in caſes of fever, with happy effects; Dr. Currie reſolved upon a ſeries of experiments.

In December 1787, Dr. Currie, in ſeven caſes of contagious fever, threw cold water from a bucket upon the body of each patient; and the whole recovered. An eighth patient died, with whom the practice was omitted. The cure was *chiefly intruſted to this remedy* in 153 caſes, of which the author kept a regiſter; beſides many *ſubſequent* caſes, of which he kept no regiſter, unleſs where the application failed of ſucceſs.

The 30th regiment of Britiſh infantry, in particular, while quartered at Liverpool in 1792, afforded him an opportunity of trying this application with ſome preciſion; and the reſult of the experiment is inſtructive. A guard-room, priſon-room, two ſick-rooms, and a cellar, had, by their foulneſs, either cauſed or increaſed a fever, which ſoon affected a number in the regiment. Dr. Currie being called in, the primary cauſes of the diſaſ-

ter were removed, and the patients all cleanſed. Thoſe whoſe ſtrength was not greatly reduced, had cold ſalt-water poured upon them; and the reſt were ſponged over with tepid vinegar. The remainder of the regiment was drawn up in its ranks, and ſeventeen others who had marks of the diſeaſe were ſeparated, and ſubjected to the cold affuſion;* which cut the diſeaſe ſhort in all but two of theſe. Thoſe who were yet well, were ordered to bathe in the ſea; being regularly muſtered for that purpoſe. The number infected in the whole was 58; of whom 26 had the diſeaſe, by theſe means, brought ſuddenly to a cloſe; but in the remaining 32 it ran its courſe. It was fatal, however, only to two; who had been weakened by viſiting the Weſt-Indies and by being bled, and who beſides had not received the cold aſperſion, not having been viſited by Dr. Currie till the 12th or 14th day of the diſeaſe. The fever broke out about the beginning of June, but no new attack occurred after the 13th of that month. The water employed was taken from the river Merſey; having in it 1-32 or 1-33 part of ſea-ſalt; and being of the temperature of 58 or 60 degrees of Fahrenheit's, which is our common, thermometer.

When Dr. Currie ſpeaks of fever ſimply, he means the low contagious fever; which frequently is called the nervous, and in certain caſes the putrid, fever; being the common fever of England, and prevailing chiefly among the poor, who are moſt expoſed to the cauſes producing it. Dr. Cullen gives it the name of *Typhus*; terming it *a contagious fever; in which the heat is but little increaſed; the pulſe ſmall, weak, and moſtly quick; the*

* *By* affuſion *or* aſperſion, *the author means the pouring of water upon a patient, as for example, from a bucket.*

the urine ſcarcely changed ; the functions of the brain and ſenſes much diſturbed ; and the ſtrength greatly reduced.

In fevers called *continued*, there is nevertheleſs (ſee Dr. Cullen and others) at leaſt one increaſe and one abatement in each day. This increaſe of the fever is known by thirſt, reſtleſſneſs, and increaſed fluſhing; and alſo by the heat in the internal parts of the body, raiſing the thermometer one or two degrees beyond the average obſerved during other moments of the fever. As this increaſe (or paroxyſm) uſually occurs in the afternoon or evening, Dr. Currie prefers this period (other things being equal) for the cold affuſion ; thinking it moſt *ſafe*, as well as moſt *uſeful*, to apply the water at the height of the fit or immediately after it has begun to decline. But he ſays, that the remedy may be ſafely uſed, *when there is no ſenſe of chilline/s preſent, when the heat of the ſurface is ſteadily above what is natural, and when there is no general or profuſe perſpiration ;* which he obſerves, are particulars of the utmoſt importance.

During the cold ſtage of the fever, the cold water nearly ſuſpends the reſpiration, greatly diſturbs the pulſe, increaſes the chill, and ſeems to bring on the ſtruggles of death ; and really would do ſo, if repeated. The thermometer therefore is never to govern the practitioner, where the chillineſs of the patient contradicts its indications. On the other hand, the abſence of chillineſs is no guide, unleſs the thermometer concurs to ſhew a heat more than natural. Laſtly, profuſe perſpiration, in fever, muſt for the time, deter from the operation ; and eſpecially in proportion to its continuance. Though perſpiration is in itſelf a cooling proceſs, yet the load of heated bed-cloaths may prevent an *internal* diminution of the heat from being immediately perceived.

ceived. Under theſe reſtrictions, Dr. Currie thinks, that the cold affuſion may be uſed at any period of fever; but preferably in the beginning.

The author ſeems after each affuſion to have rubbed the body *haſtily* with towels.

The cold affuſion generally reduces the heat from 2 to 6 degrees of Fahrenheit's thermometer; and the pulſe ſinks by it from 2 to above 20 beats in the minute; and in one caſe, ſomewhat dubious indeed as to its iſſue, it fell at leaſt 40 beats.

Where the heat is reduced and the debility great, ſome cordial ſhould be given immediately after the affuſion; and the author thinks that warm wine is the beſt. In caſe the affuſion produces effects unuſually ſevere, then to the *cautious* uſe of warm cordials in ſmall quantities, friction and eſpecially of the extremities, is to be added, and a bladder of hot water applied to the pit of the ſtomach.

Several examples are given of the effect of the cold affuſion in the firſt, ſecond, third, fourth, and ſucceeding days of fever. On the firſt and ſecond days, the diſeaſe often inſtantly vaniſhes with one aſperſion; and ſometimes on the third day; but on the fourth day this is rare. Each aſperſion however inſtantly removes the ſymptoms; and a few repetitions of it on the ſucceſſive returns of the paroxyſm, in two or three days happily terminate the diſeaſe, with none or trifling aid from medicine.

In advanced periods of the diſeaſe, the author commonly employs water only 15 or 20 degrees below the natural heat of the human body. After the 8th or 9th day he often ſimply ſponges the whole body with tepid vinegar, to which he ſometimes adds water. But where the heat has remained conſiderable, and where the *ſole object* has been its removal, he has ſtill perſiſted in the tepid aſperſion. Hence

Hence another limitation occurs to the author's general doctrine; for the cold affuſion is to be changed after a certain number of days for the tepid, and the tepid affuſion in various caſes is to give way after a time to moiſtening and waſhing the body.

Since cold, cool, and even tepid water, employed externally, each reduce the patient's heat; we ſee why this heat ſhould not be too low at the moment, leſt too great a chilline's ſhould follow. Hence alſo the ſame patient, whoſe diſeaſe has been removed by cold water judiciouſly applied, would often ſuffer from repeating the application in his convaleſcent ſtate. But if we think we perceive why this rude remedy anſwers ſo happily at the delicate moment of the hot fit; we are ſtill to enquire, whence it often removes the *whole of the diſeaſe*, of which the heat ſeems to conſtitute only a part?

Dr. Currie, as might be expected, has extended his trials with water to other ſpecies of fever. One ſpecies and one alone, he has found in every ſhape inſenſible to his great remedy, of aſperſion with *cold* water; but this ſpecies was generally inſenſible alſo to every other remedy, and was *not made worſe by cold water*. This fever occurs, he ſays, chiefly in the winter ſeaſon; and in perſons who are in the flower or vigor of life, and who are alſo poſſeſſed of conſiderable ſenſibility of mind, and are in habits of more than ordinary mental exertions. Other particulars of this complaint muſt be looked for in Dr. Currie; who is the firſt perhaps who has noticed it, as a diſtinct ſpecies of fever; to which indeed it ſeems to lay claim, not merely by its refuſing to yield to his applications, but by its ſymptoms; and particularly by the acuteneſs which prevails in all the ſenſes of the patient, beyond perhaps the ſtate of nature, and certainly beyond what occurs in common fever.

In

In *intermittents*, the cold affuſion with vigorous patients, applied *before* the period of the *cold* fit, has prevented the whole of the fit; but where weakneſs made the attempt hazardous, the cold fit was ſuffered to arrive and paſs, and the affuſion was applied to the hot fit when thoroughly formed. The diſeaſe was ſometimes cured in the firſt caſe; but in the ſecond, there was only a ſolution of the pending fit; though four or five repetitions of the practice finally removed the diſeaſe. In any event, opportunity was given for throwing in medicines.

Dr. Currie has found not only that eruptions on the ſurface of the ſkin, but that ſalivation, are no obſtacles to the cold affuſion, under the reſtrictions before mentioned.

A friend of his has tried it alſo in the firſt commencements of *ſcarlet fever* (ſcarlatina,) and with complete ſucceſs. The efflorescence on the ſkin and the affection of the throat were even prevented; which has led Dr. Currie to conſider the tendency to theſe ſymptoms as being the *effect*, and not the *cauſe*, of this fever. Dr. Currie having had no late opportunity of treating the ſcarlet fever in its early ſtages, has contented himſelf with preſcribing for it in its later ſtages, immerſion in the tepid bath, heated from 92 to 96 degrees of Fahrenheit.

In the eruptive fever of the *ſmall pox*, Dr. Currie has found a new object for the ſucceſsful uſe of the cold affuſion; regulating himſelf as uſual by the actual ſtate of the patient's heat, as appearing from the thermometer, provided the indications of the thermometer are confirmed by the patient's *ſenſation* of heat. In the confluent ſmall pox, after the eruption is completely formed, he is diffident of its benefit. But he is the more anxious to apply it in the eruptive fever, ſince he

ſays

ſays that the aſſimilation of the quantity of contagious matter produced from the firſt contagion, is invariably found to bear an exact proportion to the eruptive fever. He declares that in the eruptive fever, he has inſtantly abated the ſymptoms however ſevere, and that the diſeaſe has aſſumed a benignant form. He tells us, that the Chineſe are ſtated to have long followed this practice with ſucceſs. It were to be wiſhed that Dr. Currie had looked into the *Memoires ſur les Chinois*, in 4to. publiſhed at Paris, under the patronage of M. Bertin, from the papers of the French miſſionaries; in order to notice a very malignant ſpecies of ſmall pox at Pekin, which baffled (as is there ſaid) all common treatment, even that of inoculation; and which perhaps was in truth the ſmall pox complicated with ſome other diſeaſe, or with ſome peculiar habit of body then prevalent in Pekin.

Dr. Currie treats of *cold water applied internally* in fevers. He ſays that in the cold ſtage, it is never to be employed, however urgent the thirſt; which ought only to be gratified in this ſtage of the fit, or paroxyſm, with warm liquids. When the hot ſtage is fairly formed, and the ſurface of the body *dry and burning*; cold water, he ſays, may be drank with the utmoſt freedom; and if it ſucceeds in lowering the pulſe and heat, as is uſual, perſpiration and ſleep commonly follow. Its effect however is never ſo powerful, according to his experience, as to diſſolve even the exiſting fit of the fever, and much leſs the fever itſelf. But he holds draughts of cold water as an uſeful auxiliary in theſe caſes, and ſays that they may be uſed more freely in proportion as the heat is more advanced above the natural ſtandard. He allows cold water to be drank, tho' more ſparingly, even in the *beginning* of the ſweating ſtage; ſince it may promote the flow of perſpiration; which

after it has commenced, ſeems to be checked, if a freſh *increaſe* of animal heat occurs. But after the perſpiration has become general and profuſe, the uſe of cold drink is ſtrictly forbidden; the rule being, in all other reſpects, the ſame as laid down for cold water uſed externally.

In caſe of *injury from drinking cold water*, the author recommends hot water to be applied in a bladder to the pit of the ſtomach; and ſmall and frequent doſes of tincture of opium to be adminiſtered, which Dr. Ruſh recommends in caſes of injury from cold water drank in warm weather.

Though Dr. Currie is perſuaded that injury has ſometimes followed from cold water drank in hot weather and from cold bathing uſed after ſtrong exerciſe; yet he denies that any inconvenience is *neceſſarily* to follow. He affirms, that inconvenience ariſes only from the want of making proper diſtinctions. In ſituations where the body, after having been much heated and enfeebled by ſevere exertions, is loſing its ſurplus heat by perſpiration, and in general by a ceſſation of the exertions which cauſed the heat; he allows that cold water, whether applied inwardly or outwardly, may often be injurious and ſometimes even fatal. But while the ſurplus heat is kept up by a continuance of the exertion, he ſays that cold water may be drank ſafely in moderate quantities. The ſame he aſſerts reſpecting the cold bath; and therefore he has for ſome years conſtantly directed infirm perſons to uſe ſuch a degree of exerciſe before plunging into the cold bath, as would produce ſome increaſed action of the vaſcular ſyſtem, with ſome increaſe of heat; and thus ſecure reaction under the ſhock. It will appear, however, that the patient here ought not to perſpire; or if perſpiring, ought not to ſtand ſtill, either dreſſed or undreſſed, ſuffi-

ciently long to become chilled from the effect of the act of perſpiration, or from the evaporation following it.

Under the above perſuaſions our author contends againſt Dr. Ruſh; that where the party is warm, *no* attempt ſhould be uſed to reduce the heat, previous to drinking cold water. It follows however from Dr. Currie's own premiſes, that no objection occurs either againſt removing the chill from the water, by means of the ſun, of common fire, or of animal heat; or againſt continuing the exerciſe for a ſhort time after the draught: and as either of theſe expedients are ſimple, it would be well to employ one or both of them; as the ſole object in view is quenching the thirſt, and not curing a diſeaſe upon ſpeculative principles. We may here alſo obſerve the benefit of wearing cotton or even woolen next to the ſkin, where perſpiration is probable from hot weather or violent exerciſe, eſpecially where both are combined; ſince wet linen aided by evaporation, conducts away the heat of the body ſo rapidly, in certain ſituations, as often to occaſion ſevere chills. Few however are the caſes, in which it will not be ſafe and highly adviſeable to throw off the wet linen, rub or wipe from the ſkin the matter perſpired with ſomething dry, and put on a freſh and dry covering next to the body; as thoſe who have had experience in the caſe, will cheerfully teſtify.

As to uſing the cold bath when the body is warm, there are ſo many facts on both ſides of the queſtion that it requires an expedient to reconcile them; and this Dr. Currie certainly ſeems to offer. By his means, we perceive whence the Roman youth could plunge in the *courſe of their daily exerciſes* into the river Tyber, and yet Alexander ſuffer from throwing himſelf into the river Cydnus, after being fatigued and chilled with

perſpiration;

perſpiration; as well as whence the Ruſſians and others jump from a vapour or hot bath into the ſnow or into a cold bath; while merely to ſit in a cold ſtream of air after violent exerciſe, is ſufficient to bring others, nay the very ſame people, to the grave. A number of other ſeemingly contradictory, and yet authentic relations, receive here alſo a ſimilar ſolution. Hence we may aſſure ourſelves, that if the waters of the Miſſiſippi never injure thoſe who drink them in ſummer, whatever be their ſtate as to perſpiration or fatigue; it is not owing to the *quality* of theſe waters, but to their *warmth*, in conſequence of their long expoſure to the ſun. In like manner, if the water iſſuing newly from the ground in Abyſſinia, is harmleſs in all caſes; it is becauſe the ſpring-water of that country (which every where nearly correſponds with the average temperature of the weather of the place) is never very cold.

But we paſs on to new caſes of diſeaſe.

Before and ſince the year 1790, the author has witneſſed thirteen caſes of tetanus (that is, ſtiffneſs accompanied at intervals with convulſion, as inſtanced in the diſeaſe known by the name of the locked jaw.) This diſeaſe is diſtinguiſhed into the proper or primary, called idiopathic; and the concomitant or ſecondary, called ſymptomatic, being an occaſional attendant upon wounds, eſpecially in hot countries. The author from his later experience, is diſinclined to uſe the cold bath in any of its forms in the *ſymptomatic* tetanus; unleſs in the earlier ſtages of the diſeaſe, when the vigor is leſs impaired, and the diſeaſe leſs rooted. One reaſon is, that change of poſture is required for the purpoſe, in a caſe where the mere action of the will on the muſcles is often alone ſufficient to bring on a general convulſion. He rather prefers wine given in large quantities, a remedy firſt introduced by Dr. Ruſh; but wiſhes it com-

bined

bined with very large doſes of opium. Wine, it ſeems, has in this diſorder been given with ſucceſs alſo to horſes; but it is queried, whether other ſtrong or ſpirituous liquors would not anſwer as well. It is obſerved that the conſtitution under this diſeaſe, powerfully reſiſts the intoxicating quality of the wine and opium. In tetanus alſo, Dr. Currie has applied preſſure, with evident good effect; moiſtening at the ſame time the bandages with ether, but taking care leſt inconvenience ſhould ariſe from too great an evaporation, the natural conſequence of ether being expoſed to a current of air. In the *idiopathic* or ſimple tetanus, the author has applied water of an exceedingly cold temperature (exhibited in a bath where the effect was ſudden and the limbs could be ſtretched out,) with a very marked ſucceſs, though all other applications had failed. Let us obſerve here, that ſince to rub in ſweet oil has been found a powerful remedy with many, in caſes of *cramp* of the external muſcles; it might be well always to try it in tetanus, though medical perſons often ſlight it. In any event, thoſe ſubject to this painful affection of the cramp, eſpecially pregnant women and ſwimmers, may do well to remember this uſe of oil. Oily ſubſtances may alſo be tried by the mouth or clyſter, in caſes of cramp or ſpaſm in the ſtomach or inteſtines.

The author has applied a very cold bath to more than one caſe of inſanity, with brilliant ſucceſs; but it was when the fit was at the higheſt. The ordinary delirium of fever is acted upon by cold water in different ſhapes, in common with all the other ſymptoms of fever.

In children's convulſions, it is alſo ſerviceable; ſtopping the fit, and giving time for other remedies. When the author mentions that convulſions may ſometimes ariſe from worms or other cauſes; perhaps he

ought

ought to have added, that teething is one of these causes, and that John Hunter has given instant relief, by cutting the gum over a young tooth with a lancet. On the whole, Dr. Currie recommends caution in the applications of water in early infancy; sometimes tempering his water, and sometimes only pouring it on, in preference to bathing in it; but making the operation sudden and transient and providing means ready for securing the re-action, and even omitting it altogether when little vigor is left. But with these precautions he has seen great benefit resulting from the application of cold water.

In cases of St. Vitus's dance he has found no encouragement, for a reason hereafter to be mentioned; but he recommends electricity in this complaint, as one of the few in which this operation seems advantageous.

He promises us little from his remedy in the case of epilepsy, where his experience does nor seem indeed to have been extensive. Instead however of his own favorite remedy, he mentions benefit derived, in a case of periodical epilepsy, from a plaister formed chiefly of tobacco, applied near the pit of the stomach before the expected attack. He has used tobacco also in two desperate cases of convulsion, followed by continued coma (that is, sleepiness and loss of sense;) but it was in the form of a decoction applied, as a clyster, which he prefers to the fumes of tobacco; the quantity for the decoction being half a drachm of tobacco in four ounces of water. In epilepsy also he applies oxyd of zinc (that is the calx of the semi-metal zinc;) and still more efficaciously the *digitalis purpurea*, or purple fox-glove, concerning which Dr. Withering and others have lately written largely. The author might have added, that hartshorn or ether mixed with water and given during the epileptic fit, tend powerfully to shorten it.

But

But let us close the author's account of his treatment of convulsive diseases with the following general remarks, extracted from his work. The efficacy of the cold bath in convulsive disorders, is much promoted by its being employed *during the moment of convulsion*; or (as he afterwards chooses to express himself,) its chief benefit depends on its being used in the paroxysm of convulsion; its efficacy consisting in resolving or abating this paroxysm, by which means the return is greatly retarded, if not entirely prevented. This law or principle in the disease, the author tells us, bears analogy to the fact, that madness is best treated in the height of phrenzy. He also remarks, that the cold bath seems without effect in any spasmodic disorder (as St. Vitus's dance,) which does not rise to the height of convulsion. Lastly, he observes that in cases of madness and convulsion, there must be no considerable wound or other lesion of structure; that the disease should not be too habitual, and especially so as to produce insensibility to impression; that the fit should have a *general influence on the frame*; and that the digestion should not be too much impaired nor the vigor of the circulation much debilitated, lest the action of the cold be too strong for the living powers.

'Cold water (says our author) cannot be used as a '*drink* during the paroxysm of *convulsions*; and of 'course we cannot shew the analogy between its exter-'nal and internal use in these, as in other diseases.

'That its effects (he adds) taken internally, are most 'salutary, in a numerous class of *chronic* diseases, is 'however well known; though perhaps not acknowledg-'ed to the full extent of the truth. A considera-'ble part of the virtue of mineral waters is doubtless to 'be attributed either to the diluting quality of the pure 'element itself; or to the invigorating effect of cold

'on

'on the ſtomach, and through it, on the ſyſtem at 'large. * * * In hypochondriacal, hyſterical and dyſ-'peptic* affections, cold water taken internally has 'produced the moſt ſalutary effects. Hoffman praiſes 'it in head-ach, whether ariſing from indigeſtion or 'ſome primary affection of the nerves of the head. 'The following caſe will ſhew the uſe of cold drink in 'certain convulſive affections.' Here the author cites from Hoffman the caſe of a Jew boy, cured of violent convulſions in a fortnight, by drinking cold water frequently every day.

Dr. Currie applies the term *tepid*, to water heated from 87 to 97 degrees of Fahrenheit, where it is uſed for affuſion; though water will ſeem to be warm to the body at ſome degrees lower, if uſed as a bath, for in this caſe the evaporation is excluded. The cold from evaporation is ſo conſiderable, that water in the warmeſt climates will chill the perſon moiſtened with it, if ſtanding in a current of air in the ſhade.

The author finds the coolneſs remaining from the *warm* affuſion (ſtrange as it may be thought) as great, as that from the cold affuſion; and perhaps greater; but the cold is leſs ſudden and ſtimulating. Without inquiring into the author's reaſonings, let us obſerve that he applies the tepid affuſion to certain other caſes where there is fever; provided the chief view is to diminiſh the heat, and provided there is no contagion preſent, nor any foul matter in the bowels, as likewiſe no local inflammation; for we muſt never forget that affuſion is only recommended where the heat is *general*. Under theſe impreſſions, the author employs the warm affuſion frequently with children; and he has uſed it alſo where the

**Dyſpepſia, in general includes the obvious diſeaſes ariſing from indigeſtion.*

the lungs were affected ; and eſpecially in his *own* caſe, during the hectic fit, in hereditary conſumption. But independent of the poſſibility of the reſpiration being affected, he remarks that in hectic caſes, the body ſoon parts with its heat, which is then ſeldom great, even in the extremities. He recommends, however, in any event to moiſten the inſide of the hands and feet ; ſince from the ſenſation of heat in the extremities, great irritation follows to the ſyſtem.

Dr. Currie every where inſiſts, that when the patient feels chilly, neither affuſions not wet ſponges, of any kind, are to be applied : but he repeats, that the cold affuſion (which he calls an *energetic* remedy) is not only the moſt effectual, but *ſafeſt* application, in many of the caſes where it can be uſed ; ſince the ſyſtem often accommodates itſelf to a ſudden cold which is general and ſtimulating, but ſhrinks from a cold which is ſlow and ſucceſſive.

Water tempered from 75 to 87 degrees, (which the author terms *cool*) is recommended for febrile diſeaſes ; but more frequently for palſy and other caſes of debility. If the ſyſtem is to be ſtrengthened, or if diſeaſed aſſociations (or habits) are to be broken through, the application is to be quick and brief ; but if it is merely to allay heat and there is no danger of indirectly affecting the reſpiration, it may be uſed more ſlowly.

Such are the principal uſes of water here to be mentioned from Dr. Currie.—We may be permitted to add one or two to his liſt. In caſes of ſtrains, diſlocations, or fractures, *cold water* employed externally has had the happieſt effects : operating in the firſt caſe like a charm ; and in the others, allaying inflammation and preventing ſwelling, till the arrival of the ſurgeon, who then finds leſs impediment in examining the bones. With bruiſes and burns, ſimilar advantages perhaps may be expect-

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ed. But in all caſes, it muſt be remembered, that the application muſt be *immediate* and long continued, and uſed merely to the part affected; and the water be changed whenever, notwithſtanding a variation in the poſition, the cold goes off.

Electricity has ſimilar good effects with cold water in ſtrains and burns; and might be uſeful poſſibly in the other caſes here referred to, if applied with equal ſpeed; but this can ſeldom happen. Yet it is in ſome caſes perhaps an application leſs diſagreeable than cold water, which is often attended with pain in caſes where it is moſt effectual.

As ſea-bathing has become univerſal in England, (eſpecially for ſcropulous complaints) we add to our author's remarks, that *waſhing* the whole body with ſea-ſalt and common water, made of a ſtrength ſufficient to ſupport a new-laid egg, is commonly found to be an excellent ſubſtitute; and perhaps in ſome caſes this proportion of ſalt might be increaſed. If the complaint is local, then a ſalt poultice is alſo applied to the part; that is, moiſtened ſalt is kept cloſe to the part by encloſing it in wet rags, or by any other ſimilar contrivance. The expence and inconvenience of reſorting to the ſea is hence often removed. The ſalt poultice has many other uſes; as for example in the mumps, a diſorder conſiſting of a painful ſwelling in the cheek and round the jaw, which commonly it eaſily removes.

Various

Various individuals and nations have poſſeſſed detached practices conformed to Dr. Currie's ſyſtem; practices however, which were little extended, and which finally have often been forgotten. Accident alone, it is true, would formerly, as now, have ſhewn the uſe of theſe practices, even in fevers and other diſeaſes equally critical; as where delirium led a patient to plunge into cold water, or where an impetuous ſick man indulged himſelf in cold drink, each at fortunate moments. Phyſicians alſo, as well as the vulgar, would often ſeek to counteract certain ſymptoms in diſeaſes by their contraries, or follow nature in its other indications. But miſchief in ſome caſes ariſing from want of due diſcriminations, theſe hints from nature, though confirmed by experience, would frequently be abandoned for modes of cure more myſterious, and therefore better ſuited to the crafty phyſician and to the prejudices of the people. This would be the more natural in diſeaſes which, like fever, commonly paſs through the ſtage of cold to arrive at that of heat, and which ſeem to be relieved by critical ſweatings reſulting apparently from heat; eſpecially as theſe diſeaſes in many caſes ſeem even to originate from cold. But as in other purſuits, ſo it happens in medicine; that men, after quitting one extreme in order to try another, often ultimately find not only all the evil, but all the good inherent to each; and thence diſcover the happy medium conſiſting of the good of each, abſtracted from its evil. To this fortunate point perhaps, we are proceeding in the caſe of fever and ſome other diſeaſes; and in no ſmall degree, as it ſeems, by the help of Dr. Currie's diſtinctions, which ultimately form the chief value of his work; for his practices in general are in themſelves

themſelves familiar, the great queſtion being where and how to apply them.

In various eaſtern countries, we find cold water uſed as an inſtrument in medicine; the cuſtom probably being derived to them from ancient times. Dr. Currie not only cites the example of the Chineſe, but of others; and he eſpecially refers to the treatment of the ſickneſs of Sir John Chardin in Perſia; and Dampier ſays,* that he himſelf was cured of a flux, by bathing daily in a river in ſome of the eaſtern parts of Aſia. But it is not from the rude practice of the orientals, nor even from Hippocrates or Galen, who each employed cold water medicinally; that we are to expect nice diſtinctions in theſe caſes. Such do not in general offer themſelves ſuddenly even in our own times.

Dr. Wright made his experiment in 1777, and (as every phyſician ought to do where he has the opportunity) he made it upon himſelf. He has great merit; but that merit does not conſiſt in having given us *ſufficient rules*. In 1788, a part of the practice in queſtion was eſtabliſhed in the Liverpool infirmary; whence it ſpread into the town of Liverpool and its ſurrounding county. In 1791, Dr. Currie's colleague publiſhed an account of theſe methods in Dr. Duncan's medical commentaries for that year. Dr. Currie himſelf publiſhed another partial account in 1792. Dr. Gregory (the younger) of Edinburgh has ſpoken on the ſubject in his public lectures; and even in 1737 it was uſed in a vague manner in Sileſia, though it is now probably neglected there. Various practitioners alſo have reſorted to cold water in the Weſt-Indies, and ſome likewiſe in the United States. But as the practice has not gained

* *This fact is ſtated upon memory only.*

gained ground generally, and chiefly for want of the rules neceſſary to prevent miſtakes, eſpecially in the caſe of fever; we have ſufficient proof of our obligations to Dr. Currie. What thanks would not be due to him, who ſhould teach with certainty when to employ and when to avoid *blood-letting*; and eſpecially ſhould he give ſo accurate a guide as a thermometer and the feelings of the patient as to heat, when confirming each other?*

The thermometer indeed cannot always be uſed by the country practitioner, to whom we ſhall ſoon ſuggeſt a ſubſtitute; but to others, who can more eaſily obtain this uſeful aſſiſtant, we addreſs the following information.

Mr. John Hunter, in the London Philoſophical Tranſactions for 1778 (ſee alſo thoſe for 1779) deſcribes a thermometer of his own invention and of Mr. Ramſden's

* *This was written before ſeeing Dr. Ruſh's late brief and ſimple rules for blood-letting.*

The members of the three learned profeſſions in America, notwithſtanding the worth and well known talents of many among them, have long been liable to the reproach, of having contributed little to the progreſs of their reſpective ſciences, by means of their publications. *The American profeſſors of medicine have lately relieved themſelves from this charge, by ſome valuable works. Among the earlieſt of theſe* authors *we muſt certainly place the amiable and reſpectable Dr. Ruſh, who has ſo eminently contributed to excite an emulation among the medical ſtudents in his own ſtate. Profeſſor Mitchell, and others have moſt happily introduced a like emulation into the ſtate of Newyork; which it is hoped will ſoon ſpread itſelf.*

den's workmanſhip ; which was ſhort, ſlender, and with ſo ſmall a bulb, that he could upon occaſion put the whole into a peacock's quill ; even including the ſcale, which was moveable* and of tranſparent ivory, being in the form of a hollow tube and no were touching the bulb. The reſults of this thermometer, differed from thoſe of others before uſed by John Hunter, and even from his own expectations. It was this ſort of thermometer which Dr. Currie employed with his patients ; taking care to make the ſtem bend backwards in order to admit of his ſtanding behind the ſick, to avoid infection from their breath. Dr. Currie recommends as a farther improvement to add a guage like that uſed by My. Six, in his thermometers made upon the plan of thoſe invented by Lord C. Cavendiſh. (See London Phil: Trans: for 1782 and 1757.) But a thermometer with ſpirits of wine (which ſufficiently correſponds with one of mercury in the high temperatures here in queſtion) would probably be viſible enough to anſwer every purpoſe, were the ſpirits as is uſual, *colored* ; and it does not appear, why exceſſive diminutiveneſs is ſo neceſſary a quality in mere medical thermometers.

We have hinted that country practitioners muſt often be content, and may do ſufficiently well, without thermometers ; and eſpecially in theſe parts of the United States, where thermometers are ſo ſeldom found correſponding with each other ; and where, even if good, they are with difficulty replaced in caſe of accidents. The uſes of the thermometer in Dr. Currie's ſyſtem of practice

* *A moveable ſcale admits the application of the naked thermometer in certain caſes ; and the obſerver by a mark on its tube, is eaſily enabled when the ſcale is afterwards reſtored to its place, to aſcertain where the mercury has ſtood during his experiments.*

practice are chiefly two; one to ſhew the heat of the patient, and the other the temperature of the water to be applied to him.

Let us begin with the latter ſubject. It is known to every practitioner, that boiling water is always of the ſame heat in the ſame ſtate of the atmoſphere. Next, it will ſoon be ſhewn, that water can always eaſily be found at hand at certain other known degrees of temperature. Laſtly, rules may be given, for producing *any intermediate temperature* between that of boiling water and of water of any other known temperature, *merely by mixing them in certain proportions and with certain precautions.*

We ſhall now ſhew that water may generally be found of ſeveral temperatures, which are eaſily aſcertained without the aid of thermometers. 1° In winter, water which has remained a certain time filled with ice or pounded ſnow, after it is poured off, will ſtand at the freezing point; or at 32 degrees of Fahrenheit's thermometer. Water will alſo ſtand at the freezing point; when taken from underneath a ſurface of thick ice, formed upon it in winter in a veſſel of moderate ſize.* 2° The average temperature of the air throughout the year may be known for any place; and this temperature is one and the ſame with that of the ſprings of the place when firſt iſſuing from the ground, and alſo of the earth of the place at a few feet below the ſurface. 3° The average temperature of each month alſo may eaſily be known for any place; and when known, it will commonly nearly mark the temperature of the water accidentally found in any conſiderable veſſel, placed under ſhelter from the wind and ſun, but expoſed to the

* *Mr. Nairne, inſtrument maker at London, firſt noted his fact, in itſelf ſo evident.*

the open air ; eſpecially upon making certain obvious allowances.

We ſtop for a few remarks. 1° The average temperature of the air in any place is found with great trouble, by the common method, of obſerving the thermometer two or three times in every day, throughout ſeveral years ; but whoever in the neighborhood of Salem, wiſhes for ſuch obſervations, cannot do better than refer to thoſe by Dr. Holyoke ; who gives in this manner the temperature of each month, as well as of the whole year : (See the Boſton Philoſophical Tranſactions Vol. 2.) But perhaps the following method with a little management may equally anſwer. Take a large and tight caſk with wooden hoops, and pitch or varniſh its outſide in order to keep it from moiſture ; fill it with dry earth ; place it firmly on its *ſide* above the ground, with a thermometer in it, which ſhall reach to its middle and ſtill leave enough of the ſtem on the outſide, for obſerving the changes, the bulb being large ; and keep the whole ſheltered from the ſun, wind, rain and ſnow. This caſk will never ſhew the temperature of any one day ; but only the average of a number of days, reckoning *backwards* from the day of the obſervation. The larger is its ſize, the greater is the number of days whoſe temperature it will include ; alſo the ſlower will be its variations ; and conſequently, *the leſs frequently need it be conſulted*, in order to collect from it the average temperature of the ſeaſons and of the year. Though it muſt always be reckoned backwards, yet in this it agrees with the maſſes of water whoſe temperature we may wiſh to learn.—2° It may here alſo be uſeful to obſerve ; that in this climate, from December to February incluſive, there is no very important variation in the average temperature of the months ; and as little from June to Auguſt incluſive ; but in the other

months,

months, taking an average of ſeven years, each month differs from its neighbors from 8 to 12 degrees of the thermometer.—3° Wells are leſs ſteady in their temperature than cloſe pumps, eſpecially if the laſt are much uſed; nor are cellars or caves more conſtant than wells. But wells and caves vary leaſt in ſummer; becauſe the air in them, being then cooler and heavier than that of the atmoſphere, remains for a conſiderable time unchanged; whereas, during the reſt of the year, it is often changed for heavier air from the atmoſphere. Good cellars are more uniform in winter, becauſe then ſhut up. But water buried for a time four or five feet under ground, will ſoon come to the average of the temperature of the place.

Having thus ſpoken of fixed points of temperature at which water may be found, it may be expected that we ſhould give rules, according to which waters of certain temperatures may be mixed with boiling water; in order to produce intermediate temperatures. It would be poſſible to refer to authors on this ſubject; particularly to Dr. Crawford's work on animal heat, 2d edition; but it is believed, that nothing of this kind has been done in a form ſufficiently popular. Some benevolent perſon is therefore called upon, who is more favorably circumſtanced reſpecting thermometers and books than is the writer of this; to make the neceſſary experiments, and publiſh in our newſpapers the neceſſary rules, that this branch of practical knowledge may no longer be neglected.—Precautions muſt be added, as to the veſſels holding the water, whether cold, boiling, or mixed; and alſo for placing the boiling water loweſt in the veſſel when about to be mixed, and then ſtirring it immediately along with the cold water, with other circumſtances which will naturally preſent themſelves.

Enough

Enough then has been ſaid as to the fixed points of heat at which water may be found and the methods by which it may be tempered by being mixed in different proportions at different temperatures, for the purpoſe of bathing, aſperſing, or moiſtening the bodies of different patients according to their reſpective caſes. Happily very great nicety is not found to be requiſite; and perhaps the gueſs of the practitioner will always abundantly ſuffice. In this caſe, what has been ſaid on theſe ſubjects will not be loſt, ſince it will find its place with thoſe attentive to *meteorology* and other branches of natural philoſophy.

As to calculating the patient's heat, without help from a thermometer, in general, we may depend on the patient's feelings, the rapidity of the pulſe, the precedence of the cold ſtage of fever, the color of the ſkin, its freedom from perſpiration, the fulneſs of the face, and the marks of *univerſal* heat to the touch of the obſerver. That the practitioner may not be miſled by the remains of heat which the bed clothes may have kept in the patient from a preceding hot fit; let the bed clothes be thinned with judgment and for a ſhort time; and if the patient ſtill remains hot, he will offer a new criterion as to his temperature. If other rules are wanting, the following are ſome which preſent themſelves.

Take a ſhort tube of glaſs, exceedingly thin and with a very ſmall bore, having one end open and the other cloſed. Having firſt heated it gradually by placing its *outſide* in heated water, plunge its open mouth into a ſmall quantity of ſpirits colored with cochineal, or of aqua-fortis made blue by vitriol or copper; or if quickſilver is at hand, put it into a little quickſilver. As the air cools in the tube, fluid will riſe into it; and when a very ſhort column (amounting only to a drop

or two) has been taken up, we have an inſtrument ſuited to our purpoſe.—A cork may be placed in the open end, when this inſtrument is not in uſe, to prevent dirt entering, or the evaporation of the ſpirit or water; but the cork muſt be carefully withdrawn, to preſerve the connection with the atmoſphere, when the inſtrument is employed. Let the practitioner place it during ſome time under his arm-pit, when at the ſick bed; and, marking the ſpot then occupied by the column or fluid, let him wipe the inſtrument, and place it under the arm-pit of his patient. If the patient's heat be *greater* than his own, the air behind the column of fluid confined by the cloſed end of the tube, will now be moſt rarified, and drive the fluid farther out than with himſelf; if the contrary, the reverſe will happen. This inſtrument muſt at ſome one time be compared with a thermometer, merely to ſhew how its ſcale of variation agrees with that of the thermometer, unleſs this can be gueſſed at by other methods. But the degree in which an inſtrument of this ſort will be affected by the changes in the weight of the atmoſphere, (for it is a ſpecies of barometer) render it neceſſary that the compariſon of it with the heat of a healthy perſon, ſhould always take place. An object to be farther attended to is, that the patient's heat be not only greater than natural, but at a high pitch even for *fever* heat.

Perhaps chemiſts may invent ſome compoſitions, which by their melting or effervеſcence may indicate fixed degrees of heat, which may be contrived to ſerve as ſtandards for the heat of fever.

With reſpect to the ſtandard heat of the human ſubject taken *internally* in a *ſtate of health*; it varies with age, conſtitution, exerciſe, fulneſs from meals, and other circumſtances, independent of diſeaſe. The uſual average temperature is perhaps at 97; but eating for example,

example, increaſes it one or more degrees. In diſeaſe, according to Dr. Currie's obſervations, it ſometimes in extraordinary caſes, ſinks as low as 92; and ſometimes in caſes equally extraordinary, it riſes to 105. Repeated doſes of the *purple fox-glove* have reduced the heat to 89, and the pulſe to 32 in the minute. Dr. Currie conſtantly treats the heat under the tongue when the mouth is ſhut, and the heat under the armpit when the body is properly covered, as one and the ſame; and takes them for his ſtandard of the internal heat. The experiments of John Hunter, Dr. Crawford, and others, upon animals whoſe bodies have been opened during life, prove that the heat within, near the heart and lungs, is greater than in the other parts of the body. But it is needleſs to repeat theſe cruel experiments, which can offer no guide with patients; the ſtations aſſigned by Dr. Currie for receiving the inſtruments to meaſure the internal heat, anſwering every purpoſe in the caſes here in view.

Dr. Currie ſays, in a note; 'I intended to have introduced one or two regiſters of the heat and pulſe, 'taken every half hour, during the paroxyſm of intermittent; but this is delayed, till I am enabled to 'ſpeak from more numerous obſervations.' Dr. Currie, it is to be hoped, will feel himſelf bound to fulfil this taſk. If theſe lines ſhould chance to meet his notice he is requeſted by one who reſpects his benevolent zeal, as well as his abilities, to extend his views; and to favor us with a more accurate account of the internal heat of the human ſubject in all caſes referred to in the preceding paragraph, ſhort of *living* diſſections.

To encourage him or others to labors of this kind (which are beſt purſued in large towns, particularly if poſſeſſed, as they are generally, of infirmaries;) we may be allowed to ſtate ſomething concerning the

ſtandard

ſtandard rate of the *pulſe* in the human ſubject. The pulſe offers an important criterion in fever; and the pulſe of perſons under given circumſtances, when in health, furniſhes a neceſſary point of compariſon for the pulſe of the *ſame* claſs of perſons during *diſeaſe*. We ſhall follow in this, the good Dr. William Heberden; obſerving that he ſpeaks of the pulſe as it is found in England*.

Rates of the beats of the pulſe in the human ſubject, during the courſe of one minute.

During ſleep.	On the day of birth,	130 to 140;
	Through the firſt month,	108 to 140;
	Thence, during the firſt year,	108 to 120;
	Through the ſecond year,	90 to 100;
Thence to the ſixth year, decreaſing,		80 to 108;
During the ſeventh year,		72 and upwards;
Thence to the twelfth year,		70 and upwards.

N. B. The pulſe up to this age is more eaſily quickened by illneſs than afterwards.

Afterwards the pulſe is from 60 to 80; but in men, it ſometimes goes to 90, and in women even beyond 90. Sometimes the pulſe is below 40. It frequently likewiſe intermits.

After a full meal the pulſe increaſes ten or twelve beats. But if it has ten pulſations beyond the natural rate of the patient's pulſe, viewed as varying according to accidental circumſtances; it indicates diſorder.

In *diſorder* during the firſt year, the rate may paſs from 140 to 160; but want of ſleep and appetite, with thirſt and the ſtate of the infant's breathing, are here better indications. Sometimes

* *See Medical Tranſactions publiſhed by the College of Phyſicians in London, Vol. 2.*

Sometimes 144 is a rate fatal at two years; but with others, 156 and 152, are not fatal rates, at the ages of 4 and 9 reſpectively.

With children a reduction of 15 or 20 beats of the pulſe, accompanied with ſigns of conſiderable illneſs, mark an affection of the brain. With adults, a ſudden abatement of pulſe in fever, and an aggravation of other ſymptoms, equally indicate diſeaſe in this organ.

With adults, 100 beats denote commonly no evident danger; but danger begins at 120, and unleſs there be delirium, all beyond is commonly fatal. The author excepts caſes of acute rheumatiſm and caſes previous to a depoſit of matter; when there have been recoveries even at 150 and 120 reſpectively. He excepts alſo caſes of *low fever* at 90 or 100; for here may ſtill be danger.

It is hard to count 140 beats, unleſs diſtinct; but where diſtinct we may count 180 in a minute.

Schirrous and ulcerous caſes, with a hectic, are often for a long time from 90 to 120.

Great pain in certain caſes, does not quicken the pulſe; as is inſtanced with gall-ſtones.

It muſt not be forgotten in diſeaſe, as well as in health, that women ſometimes have quicker pulſes than men, other things being equal.

Thus far we collect from Dr. Heberden.

A practitioner wiſhing to purſue obſervations of this kind, may not always be provided with a watch beating ſeconds; and, in theſe parts of the United States, he cannot always be certain of acceſs even to a pendulum clock. It may therefore be convenient to know, that in theſe latitudes, a pendulum beating ſeconds, may be made of a *very fine* thread and a *ſmall* leaden ball; extending in the *whole* about 39 inches and two tenths, from the point of ſuſpenſion; which point we will ſuppoſe formed by a very ſtrong dreſſing pin. Theoretically,

cally, a pendulum ſhould be ſomewhat ſhorter in theſe latitudes; but the above total length will anſwer for practice with a pendulum of the above deſcription. The habits of aſtronomers ſhew, that it is eaſy to learn to *count ſeconds* by memory. The practitioner who is able to do this, may, in certain caſes, ſtation one upon whom he can depend, to note the pulſations which have occurred in a patient, while he has been counting apart a certain number of ſeconds. It can be of no diſſervice alſo for a patient to learn the ordinary rates of his own pulſe, to tell to his phyſician in caſe of diſeaſe.

With reſpect to other indications of the pulſe, in which not only certain individuals, but certain nations pretend to a peculiar nicety, we refer to the various authors who have written more or leſs expreſsly on the ſubject.

We do not follow Dr. Currie in his *hiſtory* of the theory of fever. We rather give his *own* account of the leading *ſymptoms of this affection*, when viewed independent of circumſtances and under general characters, in order to accompany it with his remarks.

Fever begins with a languor of a *peculiar* kind ſeen even in the countenance, and is followed by paleneſs, cold, and trembling, and (he ſhould have added here) by a ſhrinking of the ſurface of the body; the action of the mind and of the whole ſyſtem being enfeebled. The heart and lungs, being roufed by the fluids now crowding inwards, ſoon preſs them outwards. A tightneſs or ſpaſm however in the veſſels at the ſurface oppoſing, the internal re-action becomes increaſed. If in the ſtruggle, the ſtomach becomes affected by ſympathy, a tendency to ſickneſs enſues. At laſt, the powers of life prevailing, heat appears, firſt in one part of the ſurface and then in another, but with ſome fluctuation; till the hot ſtage becomes univerſal, when the veſſels on the

ſurface

ſurface finally yield a paſſage to perſpiration, though not always without a check. Such is the courſe of a ſingle fever fit, when it obtains a regular termination. But in caſes of *continued* fever, both the ſpaſm and heat remain longer; till at length as the patient weakens, the ſpaſm decreaſes ſo as to admit of perſpiration, and the heat is ſometimes brought almoſt to its natural ſtate; the quickneſs of the pulſe alone perſiſting, as the *effect of a habit* produced in the courſe of the diſeaſe. Thus he ſays, when a hot room or bath raiſes the heat in the human ſubject 4 or 5 degrees, and moſt of the other ſymptoms of fever appear; yet after the external heat is removed and the internal heat becomes natural, the increaſed pulſe ſtill continues; which he attributes to the principle of aſſociation, peculiar to life and pervading the vital phenomena intellectual and corporeal. The author from the ſame caſe of artificial heat proves the exiſtence of *ſpaſm*; ſince perſpiration follows this heat ſo plentifully, as to make it difficult to increaſe the internal heat beyond 100 or 101; whereas at the ſame temperature in fever, perſpiration is often refuſed. He obſerves alſo, that both in hot fever and in the ſudden increaſe of heat in health, the tightneſs of the veſſels at the ſurface often exiſts; but when the heat abates, it diſappears ſo as to admit of perſpiration; the ſpaſm in the caſe of health being the reſult of a reſiſtance to a violent ſtimulus. This reſiſtance he calls another law of the living ſyſtem, belonging to every ſpecies of vital action whether of mind or of body.

In theſe circumſtances, he conceives that the general and powerful ſpur or ſtimulus of cold water diſſolves the ſpaſm or tightneſs; perſpiration and evaporation now ſucceeding, which naturally tend to reduce the heat and pulſe. Whether the cold as a new ſtimulus *aids* the ſtimulus already exiſting in the blood veſſels;

or whether the cold acts by diſpelling or by *counterbalancing* the ſpaſm on the ſurface; or whether theſe cauſes ſtand more leſs combined; will not here be diſputed. Certain it is, that the *cold* of the water operates more than its *moiſture*; becauſe warm water in general leſs eaſily effects a cure, even when producing a greater coolneſs through its longer application; though it is poſſeſſed of thoſe additional chemical powers for diſſolving or penetrating ſubſtances which are derived from heat. On the other hand, even ſudden cold reduces the animal heat, chiefly by affecting the body as conſiſting of organized living matter. Hence a variation in the effects, both temporary and permanent, of the cold and other affuſions, &c. whether we compare theſe effects with themſelves or with each other, in caſes ſimilar in a mere mechanical view.

As to the diminution of *thirſt* following the cold affuſion on the ſurface, Dr. Currie by no means admits that much water is ever abſorbed by the ſkin; and therefore attributes this diminution of thirſt to the removal of a ſpaſm in the mouth, jaws, and ſtomach. Whether it be the removal of ſpaſm or ſomething elſe which is effected within, will not be diſcuſſed: it ſuffices, that *a ſympathy obtains between all theſe parts.* It is no leſs true, that thirſt is allayed by a draught of fluid before it can have entered the circulation; as likewiſe, that perſpiration often as immediately follows.

The author (as has been hinted) attributes the reduction of heat by the tepid affuſion, to cold ariſing from evaporation; but as this ſtimulus is always ſlight and neceſſarily tranſient, the heat ultimately returns and the effect becomes merely palliative. Even the cold affuſion cures at once, only in the early ſtages of diſeaſe; and though uniformly advantageous while the morbid

morbid *heat* continues, its effects are leſs deciſive when morbid aſſociations have once been produced.

What then, ſays Dr. Currie, ought to be the *indications in the cure of fever?* To diminiſh the cold in the cold ſtage; to moderate the heat in the hot ſtage; to reſolve the tightneſs or ſpaſm on the extreme veſſels; and, where the inordinate action of the vaſcular ſyſtem ſtill continues, to ſupport the powers of life, till the diſeaſed aſſociations die away from the ceaſing of their cauſes. It is alſo eſſential, to ſecure the proper action of the bowels; and, in every caſe, to unload them of their morbid contents, whether theſe are the effect or the cauſe of the diſeaſe.

It is a ſerious error, according to Dr. Currie, to ſuppoſe that febrile poiſon received into the ſyſtem, is the principal cauſe of the *ſymptoms* of fever; and that theſe ſymptoms conſiſt in a ſtruggle of nature to expel the poiſon. It is ſafer to conſider the poiſon, as an agent that *excites the ſyſtem into fever*; the fever being afterwards carried on, not by the agency of this poiſon, but of the principles which regulate the actions of life. We are not therefore to wait for a reſtorative proceſs, by which nature is conceived to throw off the poiſon; but to oppoſe the fever in every ſtage with all our ſkill, and bring it to as ſpeedy a termination as is poſſible. By the powerful means of the cold affuſion applied in time, the whole of the feveriſh ſymptoms vaniſh. Hence the ſafety and wiſdom of deciſive meaſures before the ſtrength is materially impaired or diſeaſed habits eſtabliſhed.

Thoſe who practice within the *tropics*, where fever runs its dreadful courſe with ſuch rapidity, ought eſpecially, he ſays, to be aware of this truth. They ought alſo to combat the diſeaſe not merely by cold affuſions,

(which whether ſupplied by ſprings or by the ſea, can ſeldom there be below the temperature of 77 or 78;) but by actual immerſion of the patient in a bath, or in the ſea, ſuppoſing this at hand. The duration of the immerſion he thinks muſt be governed by the pulſe, by the ſenſations of the patient, and by the thermometer. He refers for the ſucceſs of this practice to the caſe of Sir John Chardin; and to that of perſons, who in the delirium of fever and chiefly in warm climates, have plunged into the ſea, and who in every inſtance within his knowledge (where they have been ſaved from drowning) have recovered. To increaſe the cold of water in hot climates, he refers to the well-known artificial modes of cooling water. He alſo hints at the practice of alternately plunging the patient in water and then raiſing him into the air, where the wind blows over his naked body, farther to cool it; but he ſays that the utmoſt care is neceſſary to guard againſt fatigue; and we venture to add, that it will be prudent to have means at hand to remove both chillineſs and faintneſs, ſhould either occur. In the northern and middle latitudes of the United States, the effects of cold winters upon ſprings, furniſhes cold water at all times; and ice-houſes admit of rendering it ſtill colder.

In hot climates, to cold water for the ſurface, the author would add cold *drink* in large quantities, where the patient's heat will bear it, eſpecially the heat within at the ſtomach; and he conſiders a tendency to vomit as no objection. He confirms his opinion by the practice of the ancients, by the treatment uſed in the Hungarian fever (which he holds as reſembling the yellow fever), and by the recommendations of Hoffman in bilious vomitings and dyſentery.

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We now proceed to glean a few other *detached particulars* from the author's work, which are either theoretical or conjectural; or have no immediate relation to the uſe of water; or have not before been ſufficiently noticed.

The author wiſhes both cold water and cold drink to be tried in the caſe of the *plague*, ſhould the heat in that diſeaſe be conſiderable; but if it is no greater than in the confluent ſmall pox, which is little, if at all above the natural ſtandard, he has little hope.

The beſt explanation which he can give of the ſucceſs of his favorite remedy, in *convulſive diſeaſes and in inſanity*, if applied at the moment of their *height*, is taken from John Hunter and Dr. Darwin; namely, that no *two* great actions ſeem to take place in the human conſtitution at the ſame time; and that if the balance of vital energy can be turned in favor of a ſhock from cold, it will ſuperſede the diſpoſition to the diſeaſes in queſtion at their critical moments, and thus break through their aſſociations. Tobacco uſed in the *criſis* of epilepſy, is another inſtance with him of the benefit of employing, in theſe caſes, the balance of power in one ſtimulus over that in another. From both theſe remedies thus reſpectively applied; the good effect he ſays, has repeatedly been *permanent*.

In *cooling the ſurrounding air*, or in any other application of cold, in fever; care muſt be taken to watch the limits within which it is grateful to the ſenſations; in which caſe the author's experience has *uniformly* ſhewn it to be advantageous.

It is believed that the author ſomewhere ſpeaks of a wet blanket having been uſed with ſucceſs. Dr. Crawford certainly gave temporary relief even from delirium, to a patient in fever, by this means; and noth-

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ing but its being uſed too late, ſeemed to have made it a palliative rather than an effectual remedy.

The author ſays, that the action of cold may be conveyed over the whole ſyſtem by its application to a ſingle part; as when cold ſubſtances are applied to ſome ſingle part, *to ſtop bleedings*. Hence, for bleeding from the lungs, he has dipped the feet in cold water; though he thinks that it might perhaps have been better to have applied cold permanently to the ſcrotum, &c.; and he has often here found it ſafe and efficacious to plunge the patient into cold water up to the hips. In all theſe inſtances, the application of cold muſt be both powerful and permanent.

The ſame rule as to permanency and degree, is neceſſary for cold applied *locally* to parts which are *inflamed*. Thus even ice, ſnow, and the clay-cap, are ſucceſsfully employed, not only for reducing, but for *preventing* inflammation; the ſenſation of cold in the parts acted upon, ſpeedily ſubſiding.

He does not apply cold to local inflammation, *if attended with fever*; chiefly, becauſe in ſuch caſes there is too great a ſenſibility to cold and indeed to other ſtimulants; but this is a ſubject which he avoids treating at length.

He extends this objection however to *meaſles*, *catarrhs* (or colds,) &c. and he is not purſuaded that cold can be uſeful in *plueriſy or peripneumony*. Yet in inflammations of the *brain*, *ſtomach*, *inteſtines*, &c. and eſpecially if deſperate, he thinks the cold bath ſhould be hazarded. But *in all inflammatory caſes*, he inclines to judge it proper to moderate the cold, if employed. Beſides ſinking for example, gradually, into the cold bath; the ſtate of the pulſe and of the heat is to be examined; though the author remarks from his own caſe, while in health, that the heat within the trunk of

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the body is wonderfully ſuſtained in the cold bath, notwithſtanding it is ſpeedily and permanently leſſened at the extremities.

The *Houſe of Recovery* inſtituted in May, 1796, at Mancheſter in England, affords a ſingular inſtance of ſucceſs in preventing infection throughout a large town; and merits a ſhort abſtract from our author. Into this aſylum on the firſt notice of fever, the patient is removed; and proper methods (being in part chemical) are taken to purify his habitation. The prevalence of fever has hence diminiſhed to a degree beyond all rational expectation; and the fears that the inſtitution might ſpread contagion in its particular neighborhood, are found groundleſs; ſince not one caſe of fever appears there for 10 or 15 caſes which prevailed there before. About one in nine only of thoſe admitted, die; and as the reſult has made conſiderable impreſſion, it will ſtill farther greatly reduce both the deaths and the danger of contagion, ſhould the poor apply in the *early* ſtages of the diſeaſe. The importance of ſuch an inſtitution, in great towns, may be known from two other facts related by Dr. Currie. Firſt: the apartments for fever-caſes, in the Liverpool work-houſe, are in the very centre of the building, and cannot be entered except through the common ſtair-caſe; and yet not a ſingle inſtance is known of contagion ſpreading thence, to the other patients in the houſe. Secondly the number of fever caſes annually preſented to the medical attendants at the Diſpenſary at Liverpool (a town with a population reſembling that of Philadelphia) is above *three thouſand*; and the average duration of the fever is about 14 days, beſides 14 days conſumed in the recovery, where the recovery happens. The fever-caſes, in ſhort, make nearly one fourth of the whole number of maladies; the loſs to the public occaſioned by which may eaſily be conceived.

conceived. In Liverpool (and this is another remarkable fact) 1800 cellars are inhabited by about 7000 perſons, beſides 9000 who live in cloſe and confined houſes and many of theſe perſons taſte no animal food; tea being generally drank, once, if not twice in the day; from which cauſes principally and the uſe of ſpirits, above 500 patients who are chiefly females, are annually found among thoſe applying to the diſpenſary on account of *diſeaſed digeſtion*.

When our author however in ſpeaking of the above inſtitutions, affirms with Dr. William Heberden, that cold winters are unhealthy in England; and ſtates that the moſt unhealthy moment is that when they are exchanged for warmer weather; an inhabitant of theſe northern parts of the United States cannot but indulge a ſmile. Perhaps in no part of the civilized weſtern world, is the entire ſeverity of a cold winter *actually* more fully braved, than in theſe parts; nor can a more ſudden tranſition from heat to cold eaſily offer; and yet *in no one country in the known world*, is there leſs of diſeaſe, or fewer deaths, upon a given number of inhabitants. This fact, and eſpecially in a comparative view, merits a particular attention, which will perhaps be given to it on a future occaſion.

The common treatment of fever by the gentlemen belonging to the Liverpool diſpenſary (which is diſtinct from the infirmary) conſiſts in giving firſt, antimonial emetics; and then, bark, opium, and wine; nouriſhing food being occaſionally adminiſtered; but ſeldom waſhing with cold water (which would indeed be difficult in the cellars where this diſeaſe is uſually found.)

Dr. Currie will now offer ſome more particular and intereſting information on the uſe of opium and ſtrong liquors in fever.

Dr.

Dr. Currie, treats of *opium*, purſuant to the engagement in the title to his work; viewing it as adminiſtered in health and in fever.

In a ſtate of *health*, if the mind is vacant and external objects excluded, and provided alſo that the ſtomach is empty; opium uſually procures ſleep. This ſleep is preceded by agreeable ſenſations, happy ſlumbers, and gentle perſpiration; the ſurface and extremities of the bodies acquiring the ſame heat with the internal parts. As the full ſleep approaches, the pulſe quickens, and the breath becomes ſlightly irregular; but when profound ſleep has actually arrived, the pulſe abates to its ſloweſt rate; while the breathing, beſides growing ſlow, becomes regular alſo, and deep.

In *fever*, if the heat reaches or exceeds 100 degrees of the thermometer, with a dry ſkin; opium *commonly* ſeems to add to the heat and reſtleſſneſs. When the ſkin has ſoftened, and the heat though ſtill great, is yet ſubſiding, opium often accelerates the perſpiration; and by this means, diminiſhes the heat; in which caſe tranquility and ſleep generally follow.

Hence, in the caſe of *continued* fever, which is commonly greateſt in the evening, and is then accompained with two or more additional degrees of heat; an opiate (or anodyne) may injure at night, and yet do ſervice at two or three o'clock in the morning. Hence alſo in continued fever, it may be proper to lower the temperature of the ſurface and prepare for perſpiration, by cold or tepid affuſion or drink, (applied according to rules) before giving, or even after giving, the opium. In *intermittents*, on the other hand, where the diſpoſition to perſpire is more eaſily excited; opium may be given with fewer precautions; though if adminiſtered in the hot ſtage, its ſalutary effects may be much promoted by moderate draughts of liquids; which ſhould be cold, if the heat is great.

The

The author conceives water to be a better aſſiſtant to opium in procuring perſpiration, than ipecachuana or antimonials; except in inflammatory diſeaſes and in dyſentery. His doſe of opium is 2 or 3 grains of the extract, or from 10 to 60 drops of the tincture; for he finds that a very ſmall quantity judiciouſly applied, will produce conſiderable effects; and he thinks that whatever is beyond neceſſity, it would be unwiſe to employ.

Alcohol is another of the topics ſtanding in the title to Dr. Currie's work; by which term, he does not mean with common chemiſts, ſpirits of wine; but vinous and ſpirituous drinks. Alcohol (or ſtrong drink) he ſays, is more heating than opium, and has leſs tendency to produce perſpiration and ſleep; but yet has a ſtriking reſemblance to opium in its effects.

In *health*, like opium, if the mind is vacant and external objects excluded, and the ſtomach empty; ſtrong drink inclines to ſleep. But as ſleep approaches, the heat of the body riſing throughout and the pulſe quickening, an agitation follows, which is often oppoſed to ſleep. If the doſe however has for the moment ſtupified all ſenſe, ſtill on the firſt return of ſenſe, the drunkard is rouſed from his apoplectic ſlumbers by intolerable heat; amounting in one caſe (that of Dr. Alexander, who tried the experiment on himſelf) to 107 degrees; and this is accompanied with thirſt, agitation, and conſequent weakneſs, as alſo with obſtructed perſpiration. The author here, as perhaps in all other caſes, where there is heat and a dry ſkin *without* local inflammation, would preſcribe large draughts of water, or the affuſion; which is likely to prove more effectual, if cold, than if warm. Opium, where the ſkin ſoftens, favors perſpiration in the drunkard; and ſometimes, and perhaps by this very means, affords remarkable relief.

In

In *fever*, ſtrong drinks muſt be given with the ſame precautions, as opium ; that is, be avoided in caſes of great heat and a dry ſkin ; and reſerved for thoſe caſes, where the heat is only a little above the natural ſtandard ; unleſs perſpiration is certain, when they may be uſed in a heat ſomewhat beyond the natural.

Such are the author's remarks on opium and ſtrong drinks. They are offered only with a view to fever; and he ſo little conſiders them as complete, that he propoſes to reſume the ſubject.

In the author's title page ſtands another topic yet unnoticed by us ; namely *inanition*, or abſtinence; and along with it, he handles another important, as well as long diſputed point ; namely, whether fluids, and conſequently nouriſhment if wanted, can *paſs through the ſkin*.

A part of his concluſions on the ſubject of inanition or ſtarving, are drawn from a caſe where a ſchirrous tumour took away the power of ſwallowing. The heat and in general the pulſe were natural to the laſt ; the ſpirits even ; the intellect good ; the ſtrength ſufficient for walking about the houſe ; neither hunger nor thirſt on the whole troubleſome ; but after a certain number of weeks, a diſtortion of viſion was followed by delirium and other ſymptoms, which cloſed the ſcene. Nouriſhing clyſters gradually increaſed, in which liquid laudanum was largely mixed, eſpecially in the evening ; together with a warm bath of water and of milk ; were the only applications. Another patient whoſe power of ſwallowing was deſtroyed by a different diſeaſe, uſed the clyſters, but omitted the bath ; and never complained of hunger, nor always, nor very much of thirſt ; his pulſe being good, unleſs previous to death, which in him was eaſy and accompanied with the perfect uſe of all the faculties.

Hence the author remarks as follows ; 1° A regular pulſe is no certain indication of the ſyſtem being in order. 2. Vital heat is not principally owing to digeſtion ; the increaſe of heat after food appearing to ariſe from the influence of the ſtomach on *other* parts. 3°. As the firſt patient did not eaſily recruit his heat, when heat was taken from him, the power of doing this is to be held in proportion to the force of the living principle ; (and this is a fact which might before have been inferred from the experiments of John Hunter in the papers already cited, in the caſe both of vegetables and animals ; which Dr. Currie at the moment ſeems to have forgotten.)

We come now to ſome particularities reſpecting the *paſſage through the ſkin*, to which the firſt caſe leads us. The patient, in a balance ſenſible to the amount of a drachm, was found to have had *no difference produced in his weight by uſing the warm bath*, in three inſtances where the trial was made. According to the rate at which his body waſted from day to day, during many days, he ought to have loſt five ſixths of an ounce during the time he ſpent in the bath : but he appeared neither to have loſt nor gained. He ſeemed indeed to perſpire ; but the author conceives the appearance to have been owing to the vapour of the bath reſting on his forehead. At the heat of 82 in the public baths at Buxton in England, the author (with various others) has found no change of weight : in other experiments he has found no change in himſelf in baths variouſly heated between the temperatures of 87 and 95 ; and in ſeveral caſes of the diabetes, (where indeed a diſeaſe in the ſkin according to him uſually occurs) the warm bath has produced no change of weight.

Theſe

Theſe experiments do not countenance the common ſuppoſition, that in caſe of a deficiency of liquids at ſea, thirſt may be prevented by wet penetrating *inwards* through the ſkin. The author is indeed aware of ſeveral conjectures to be urged in favor of this ſuppoſition; as for example that what is taken inwards may not ſhew itſelf in the weighing machine, from being counterbalanced by what eſcapes outwards; and that fluid may be taken inwards at lower temperatures than thoſe of the warm bath. But he inclines to overlook theſe conjectures; and he likewiſe diſſents from the experiments of Dr. Falconer and Mr. Abernethy, as made only on a part of the human body at once.

He is ſtrongly inclined to think, that though certain veſſels * in the ſkin afford a paſſage *outwards*; yet that the abſorbent veſſels lie below the ſkin, and never take up any thing from *without*; unleſs in conſquence of mechanical preſſure, or of a wound or a diſeaſe in the ſkin, or of the deſtructive nature of the matter applied to it. He explains therefore the benefit derived in certain caſes from wetneſs at ſea, either to the coolneſs produced; or to its preventing the waſting effects which would attend evaporation, could the air have acceſs. The removal of the thirſt, he attributes to a relaxation

* *He conceives with Dr. G. Fordyce and Mr. Cruikſhanks of London, that the matter of the perſpiration is ſeparated from the blood by the capillary arteries, and then thrown out by organic pores exiſting in the cuticle (however difficult to be diſcovered) which are connected with the extremities of theſe arteries; and he ſuppoſes that in this proceſs, there is not a ſeparation merely, but a new combination; during which a loſs of heat may take place, accounting for a part of the coolneſs attending ſweating.*

laxation of thoſe veſſels in the ſkin which paſs outwards, having effect on the veſſels of the ſtomach by ſympathy; juſt as perſpiration in fever abates the thirſt, without the aid of drinking.

But ſome experiments made in France by M. Seguin, the coadjutor of the celebrated Lavoiſier, which are related by M. Fourcroy, prove the neceſſity of a new examination of the whole ſubject. In low temperatures, as from about 54 to 59 degrees of Fahrenheit, the loſs of weight in the human body, ſays M. Seguin, is much greater when the body is expoſed in air, than when it is expoſed in water; becauſe, according to him the *air* in the latter caſe, cannot purſuant to its office, diſſolve the perſpirable matter on the ſkin; ſo that a loſs of weight can now only ariſe from what eſcapes through the lungs. At about 70 degrees, the diſproportion of loſs ſomewhat increaſes; as the air entering the lungs, from having been previouſly loaded with the moiſture of the bath, does not ſo rapidly diſſolve the perſpirable matter in the lungs. At 90 and upwards, by the increaſed action of the heart and arteries, ſweat flows from the ſkin, and leſſens the above diſproportion; which from being about 3 to 1 in favor of the air, becomes now only as about 2 to 1. But in no circumſtances, does M. Seguin find any abſolute increaſe of weight in the bath.

To decide however more preciſely whether abſorption through the ſkin occurred in water, M. Seguin diſſolved in water a preparation of mercury, in which different venereal patients bathed their feet, and apparently without taking any of the mercury into circulation; unleſs where the ſkin was broken, as in the itch, &c. At laſt he directed his experiments upon himſelf, as a perſon in health; bathing a part of his arm in water containing a preparation of mercury; and covering the

glaſs

glaſs which held it, as alſo his whole body, his *mouth* excepted, with gummed or with waxed ſilk according to the caſe. In low temperatures, he found no effect. At about 72 degrees of Fahrenheit, mercury was taken into the body, but no water; whence he concludes, that the lymphatic veſſels did not perform this abſorption, ſince they would more readily have imbibed the water. When the heat of the bath was puſhed on nearly to blood heat, even mercury was no longer taken up. Hence the author ſuppoſes that the mercury when the water was at 72, penetrated into the drops of ſweat ſlowly moving outwards and thence into the body; which could not happen, when the drops of ſweat rolled out faſter, in greater heats.

When other ſubſtances act through the ſkin, M. Seguin in effect explains the caſe nearly as Dr. Currie. He decides alſo from theſe experiments, that contagion acts through the air and lungs, and not through the ſkin by contact; that the diabetes ariſes from water left in the lungs; and that dropſies occur from the abſorbing being ſtronger than the exhaling veſſels, (the abſorbing being ſuppoſed to operate only on what is *within* the body, including what is found in the lungs.) Some of his other concluſions do not ſeem to regard our purpoſes.

Upon a *compariſon*, it will appear, that in Dr. Currie's experiments, no weight was loſt in the warm bath, at leaſt that was diſcoverable by his weighing machine; but that in thoſe by M. Seguin, weight was actually loſt in the bath, though leſs than was loſt under the ſame circumſtances in the air. Surely theſe matters require elucidation, and happily they may be purſued by any perſon in any country. Indeed our inquiries demand to be extended to many other objects ſtill more familiar. So ſimple a fact as the ſtate of heat in ſtarving perſons,

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(ſuppoſing the cauſe of the ambiguity not to be in the nouriſhing clyſters) is ſtill the ſubject of diſpute ; and the ſame as to the heat in the diabetes. And Dr. Currie has perpetually to complain, that the heat is little obſerved in any diſeaſe whatever.

Whoever inquires experimentally into the comparative weights of the body and the powers of the ſkin, will of courſe ſeek to conſult Sanctorius and other celebrated authors ; but let him not overlook the Engliſh Dr. Stark, of whoſe experiments Dr. Franklin was ſo fond. Dr. Stark, like many others in Europe, expoſed his life in medical reſearches, and would himſelf have been more celebrated, had not his zeal brought upon him a premature death. Lieutenant, (now Admiral) Bligh has given a relation of a famine at ſea ſuffered by himſelf and his companions, which deſerves particular conſultation ; for he was left adrift in a boat in the Pacific Ocean, during ſix weeks ; in conſequence of a mutiny on board his veſſel, which was conveying the bread-fruit, ſpice and other plants, to the Britiſh Weſt-Indies. Nor will Dr. Franklin's remark be uſeleſs, as to the *looſe texture of the ſkin*, after having long remained immerſed in water.

The practice of *anointing* the ſkin among ſome of the ancients who were *fully* clothed, and among many nations ancient and modern uſing *little* clothing ; alſo calls for attention. Unction with them ſeems a cuſtom alike prevailing in warm and cold weather. If new principles are called for to explain theſe uſages, modern lights and modern accuracy will probably lead to them.

Dr. Currie connects the *warm bath* with the ſubject of *unguents*. He ſays, that the warm bath is uſed in the French, and is beginning to be uſed in the Engliſh,

Weſt-Indies ;

Weſt-Indies; and he ſuppoſes it ſalutary after exerciſe; and that it reſtrains profuſe ſweating, keeps up the heat of the ſurface and extremities ſo as to prevent re-action in the arterial ſyſtem, and ſooths the ſenſations; but he adds, that on leaving the bath, friction ſhould follow, with the anointing of the ſurface to prevent evaporation. To this ſyſtem, however, he would join flannel clothing next to the ſkin, after the Greek and Roman manner. Perhaps theſe things ſhould accompany each other; but without going ſo far, it is clear that cotton would be uſeful next to the ſkin both in hot and in cold countries; purſuant to the boaſt of the Engliſh cotton manufacturer, who ſays that whoever uſes cotton *once*, never quits it. The uſe of oil is alſo proper for ſwimmers; and among other reaſons (as Dr. Currie remarks) that the body may glide more eaſily through the water, as well as to guard them (as we have added) againſt the cramp.

Dr. Currie thinks that the perſpirable matter of Europeans is not well fitted for the torrid zone, as being too liquid; adding that the ſweat of the negro is unctuous or oily. Has he or others made the compariſon in a ſcientific view; and taken the caſe of the Hindoo and other Aſiatics, with that of the original Americans, into the account? The queſtion demands to be treated with caution.

Dr. Currie, in a paper in the *Appendix* to his work, ſpeaks of a *ſhip-wreck of ſome Americans near Liverpool*; adding remarks on the influence of freſh and ſalt water, hot and cold, on the powers of the living body immerſed in it: the article being extracted from the London Phil: Trans: for 1792.

It appears as to the Americans, that two who died early during the accident, ſuffered from an alternate expoſure

poſure to air and to water (both ſalt and freſh;) that others ſurvived, who were more plunged in the ſea, one excepted, who was deſponding, but who died later; and that he who ſuffered leaſt, was a black, who was covered to the ſhoulders in the ſea. The ſea was about 35 degrees in its temperature, according to the author's preſent conjecture. The air was probably ſtill lower, and attended during part of the time with ſleet and ſnow and a piercing wind. The ſtay on the wreck on the whole was 23 hours. The two who died firſt, were delirious; none were ever drowſy; but all were thirſty and hungry. Mr. Amyat who related the ſtory, had his hands and feet ſwelled and numb, but not ſenſeleſs; his mouth parched; a tightneſs at the pit of the ſtomach; and diſtreſſing cramps in his ſides and hips. Hence we may perceive the advantage of having been continually covered with the ſalt water.

This accident led the author into a train of experiments on what he eſteemed the moſt fundamental power attending life; namely, the capacity of the body *to preſerve the ſame heat under different circumſtances.*

In his firſt experiment a young man who was plunged into a bath at 44 degrees of Fahrenheit, had the thermometer under his tongue reduced from 98 to 87; then raiſed gradually in 12 minutes to above 93; but upon being expoſed to the wind at 44, though attendants were rubbing him, it fell again in two minutes to 87; nor did he, though every reſource was employed, entirely recover his heat under three hours. A ſecond experiment on the next day, gave nearly the ſame reſult; as did a third on the following day; but in the third, the man was afterwards plunged into a *warm* bath on being taken out of the cold air, when the thermometer *ſunk* two degrees. But the thermometer roſe again

again more quickly than in the cold bath, and the heat was general over the body, and not confined (as in the cold bath) to the trunk alone. In a fourth experiment on another day, a longer ſtay in the bath produced inconveniences ſomewhat reſembling thoſe felt by Mr. Amyat; and great pain followed afterwards from a warm bath at 104,* into which the party was too ſuddenly transferred. Three other experiments offer little eſſential variation, though two of them were tried on a new ſubject.

The cold water had always ſalt mixed in it, in the proportion of 1 to 24; and the cold was always leſſened one or more degrees by the ſtay made in it.

The parties immerſed were generally agitated, ſo that the pulſe was quickened; but the cold bath ſunk it 20 beats in the minute from its laſt rate; and at the wriſt, it was ſcarcely to be felt. A ſenſe of cold at the ſtomach was generally followed by a rapid fall of the thermometer; and heat applied there ſo generally reſtored the heat in other parts that the author is perſuaded that the ſtomach or diaphragm or both, have ſome concern in the proceſs of animal heat.

The following facts alſo appeared. 1°. The parties beſt reſiſted ſituations tending to produce cold, when they poſſeſſed moſt of their natural heat, as by wearing

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* *In caſes of this ſort,* 'Heat (*ſays John Hunter*) *muſt* 'be gradually applied, and proportioned to the living 'principle; but as the life increaſes, we may increaſe 'the degree of heat.' *See his Propoſals for recovering perſons apparently drowned, in the London Phil. Trans. for* 1776. *Mortification ariſing from heat too ſuddenly applied to a froſt-bitten limb, is one of the facts, on which he founds his opinion.*

a flannel dreſs. 2°. Cold wind operated more ſeverely than colder calm weather. 3°. Though the human body rapidly accommodates itſelf to change, yet the change may be made too quick, eſpecially when the ſtrength is diminiſhed. 4°. The action of cold water is more or leſs conſiderable, according to the vigor of the conſtitution. 5°. The condition of the mind operates alſo; fear increaſing the influence of cold; and attention pointed to other objects, as in madneſs, diminiſhing it. 6°. Theſe experiments require great caution, and the preſence of every means neceſſary for counteracting their effects when carried too far.

The author in an experiment upon himſelf, paſſed alternately but gradually out of a cold into a hot bath, twice; ſtaying a ſhort time only in each bath, and being covered with a flannel dreſs; but his internal heat never varied from 96.

By another experiment, it was found, that the cold of *freſh* water is more difficult to ſupport, than that of ſalt water.

In another paper of the Appendix, we find *Dr. Wright* again coming into notice, through Dr. Duncan's Medical Annals for 1797. He was ſtill among other things uſing in the Weſt-Indies external applications of cold in various ſhapes in the early ſtages of the ſhip-fever and of the yellow fever, and with continued ſucceſs; and in the latter ſtages, he employed calomel in ſmall doſes, to procure purging and *ſweating*. Where the ſtomach was too irritable for calomel, recourſe was had to Capſicum (or Cayenne, commonly called Kian, pepper) made into pills; and it has cured even after the black vomit. This pepper has been given in the putrid ſore throat, in the Weſt-Indies, with the moſt ſignal benefit.

In

In the courſe of this paper concerning Dr. Wright, Dr. Currie obſerves that perſpiration ſeems uſeful in *every fever in every country*, not excepting the famous Engliſh ſweating ſickneſs ; but that for this purpoſe it muſt be *profuſe*, and alſo *early*, ſince in the latter ſtages of fever it is often injurious. The mode of exciting it, he ſays, may however be mechanical. Mr. Thomas Graham for example, covers the whole ſurface of the body for this purpoſe with warm vapor, in the early ſtages. In the plague, CountBerchtold relates, that perſpiration may be produced by a pint of olive oil, rubbed during four minutes, upon the patient in a cloſe room over hot coals, with a clean ſponge ; or if the firſt trial fails, then after wiping the body with a warm dry cloth, it may be repeated, and be aided by ſudorific drinks. But in every caſe, the ſweating muſt not only be early, but may be employed during the cold fit ; when it will ſtill leave room for the uſe of cold water in the hot fit, ſhould the hot fit ſtill occur.

Before quitting Dr. Currie, we ſhall give him pleaſure, by affording him an opportunity to rectify two or three overſights.

Firſt, Dr. Cullen does not, as he intimates, neglect *cold* as a cauſe of fever ; though by inadvertence, that author once ſpeaks of two kinds of *contagious* fever, as including *all* fever.

Next, Dr. Currie attributes the diſcovery concerning the near agreement of the heat of ſprings with the average heat of the place where they are found, to Dr. John Hunter ; a Britiſh phyſician of eminence, (but not related to the celebrated ſurgeon and anatomiſt of that name.) Dr. Hunter's reputation does not need the aid

of

of borrowed fame. The firſt obſerver of the fact appears to have been Dr. John Roebuck, F. R. S. at leaſt Dr. William Heberden's comment upon the ſubject implies it—(See London Phil : Trans : for 1775.)

Laſtly, Dr. Currie ſeems alſo to have omitted to notice Dr. Crawford's paper in the London Phil : Trans : for 1781 ; where that amiable philoſopher ſtated, that the *difference* between the color of the venous and arterial blood increaſes with *cold* and leſſens with *heat* ; and that from the event connected with this difference, nature finds the means of proportioning the generation of heat to the call for it.* Dr. Currie knows that this difference of color had its proper cauſe † aſſigned to it, by Dr. Prieſtley ; which paved the way for Dr. Crawford's application of the fact, to explain the origin of animal heat as coming from the action of the air on the blood in the lungs. The above additional fact noticed by Dr. Crawford, if confirmed by a few more experiments ; will probably go far to remove Dr. Currie's difficulties concerning this beautiful diſcovery reſpecting animal heat, which he extended alſo to combuſtion. Mr. Cavendiſh and the French chemiſts have by their new

* *Is there any deciſive difference in the color of the venous and arterial blood in inſane perſons indicative of their known power to reſiſt cold ; which the practitioner can purſue thro' all its mazes, ſo as to arrive at the means of aſſiſting their malady ? Their power of reſiſting cold has indeed its limits, ſince their limbs may be froſt-bitten ; and perhaps it ſeems greater than it is, from their attention (where they can command any) being directed to other objects ; in which they agree alſo with children.*

† *Mr. Hewſon and others had been aware that the air operated here, but they knew not* how *it operated. See London Phil. Trans. for* 1776.

new ſyſtem led to ſome modification of this diſcovery, (for it is no longer to be called theory;) but however this ſhall be decided by time, the eſſence of the whole is Dr. Crawford's, and will render his name immortal. Dr. Rutherford of Edinburgh, under their modification, explains the ſupply of water in diabetes to ariſe from 'a 'portion of the oxigen, (which in the ordinary courſe of 'things is exhaled in the form of an elaſtic vapor,) be-'ing abſorbed in the form of water.' But Dr. Crawford's diſcovery requiring to be treated at length, we for the preſent drop any further diſcuſſion of it; eſpecially as this hypotheſis regarding diabetes, leaves its *ſymptoms* ſtill unexplained.

In taking leave of Dr. Currie, let us do juſtice to his ingenuity, induſtry and candor. If his work ſtands the teſt of time, immortality alſo will be *his* lot. He is well known to many Americans frequenting Liverpool; but it is not perhaps known to all Americans, that beſides Middleſex, no county in England can boaſt of ſo many able and ſpirited medical men, as that of Lancaſter; eſpecially if we include Dr. Haygarth in the number, as united with them by intercourſe, though reſiding in Cheſter. Among the foremoſt of theſe, we may certainly place the excellent Dr. Percival of Manchester; to whoſe zeal for philoſophy and for humanity, we may attribute in no ſmall degree the honorable pre-eminence here mentioned.

As to our analyſis, though it includes the chief ſubſtance of Dr. Currie's book containing 347 octavo pages, the reader will not fail to peruſe that work, with pleaſure; nor, having read that work, will the reader perhaps regret his having ſeen this analyſis. Dr. Currie is not in every reſpect methodical; but he is more; he is original on ſome of the moſt important of medical ſubjects.

ADDENDA, &c.

P. 10, l. 12, *read*, expedients is ſimple.

p. 14, l. 14, *read*, in every.

p. 20. l. 9 from the bottom, *read*, practitioners in medicine.

p. 22, laſt line, for *his*, read *this*.

p. 26, l. 7, *after* employed, *inſert* a mark of reference, and at the bottom add this *note*.

Whenever the fluid employed is carried off by evaporation or other accident, it is eaſy to put in a freſh quantity, in the manner uſed for putting in the firſt.

p. 32, l. 3, *read*, more or leſs.

p. 34, l. 12, *after* recovered, *inſert* a mark of reference, and at the bottom add this *note*.

See a remarkable caſe of this kind in the London Phil. Trans. for 1786, p. 190.

FINIS.