ESSAYS AND OBSERVATIONS,

PHYSIOLOGICAL AND MEDICAL,

ON THE

SUBMERSION OF ANIMALS,

AND ON THE

RESIN OF THE ACOROIDES RESINIFERA,

OR

YELLOW RESIN FROM BOTANY BAY.

TO WHICH ARE ADDED,

SELECT HISTORIES OF DISEASES;

WITH REMARKS.

By CHARLES KITE.

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METEOROLOGICAL TABLES:

EXHIBITING AN

ACCURATE AND COMPREHENSIVE VIEW

OF THE

VARIATIONS

OF THE

BAROMETER, THERMOMETER, HYGROMETER,

WINDS AND WEATHER;

AND THE

QUANTITIES OF RAIN AND EVAPORATION

IN

EVERY MONTH, FOR NINE YEARS,

From 1786 to 1794 inclusive.

ADVERTISEMENT.

THE Eſſays on the Submerſion of Animals, and on the Yellow Reſin from Botany Bay, have already appeared in the Memoirs of the London Medical Society; but as many applications were made for a ſeparate publication, and as ſeveral friends were diſappointed of copies by the inattention of the printer, it was thought adviſable to republiſh them in the preſent form;—if, by making them more generally known, they

ſhould

ſhould become more extenſively uſeful, my intention will be abundantly anſwered.

I have taken the opportunity of annexing a few ſelect and intereſting Hiſtories of Diſeaſes; ſome of which alſo have already appeared before the publick; and as recording memorable facts has at all times been recommended and approved, any apology for ſo doing, is, I apprehend, unneceſſary.

Graveſend, March, 1795.

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ON

ON THE

SUBMERSION OF ANIMALS.

TO improve the means of recovering perſons apparently dead, a very particular and minute attention to the real ſtate of the vital parts, after reſpiration has been ſuſpended, ſeems neceſſary.

Much has already been ſaid on this very intereſting ſubject, but authors (even thoſe who have written the moſt recently concerning it) differ ſo materially in their opinions, that it is by no means eaſy to diſcriminate which may be preferable. The point therefore is not ſo perfectly and ſatisfactorily decided, or the ſubject ſo completely underſtood, as to preclude farther inveſtigation.

Under theſe circumſtances I venture to addreſs the Society; my inducement for requeſting their attention is a perſuaſion that it may be poſſible to throw conſiderable light on the ſubject by noticing ſome things not yet ſufficiently adverted to, and placing others in a clearer point of view than has hitherto been done.

How far I have ſucceeded I leave to their judgment, whoſe opinion will be held univerſally deciſive; but even if I fail in eſtabliſhing what appears evident to me, I ſhall at all times have the ſatisfaction of knowing that my remarks will meet from them a candid reception.

It is unneceſſary to prove, what ſcarce any one at this time doubts, that the ſuſpenſion or abolition of life in drowned animals, is effected entirely by the operaton of the water upon the lungs: I ſhall therefore proceed to enquire into the manner in which it operates ſo as to produce that effect.

The only manner in which it appears to me poſſible, in theſe caſes, for the water to operate, is either by entering the trachea, or by ſuſpending the action of reſpiration.

In the experiments which I made ſome time ſince, and have again lately repeated, in order to determine this point, I have never been able to detect more than a very ſmall quantity of the coloured liquor in which the animal was ſubmerſed, if examined when the animal had been only a ſhort time under water; and commonly

no appearance whatever of the liquor was to be diſcovered in the lungs.

But from the experiments of others, of very conſiderable reſpectability, particularly thoſe of M. Louis, Dr. D'Haen, and Dr. Goodwyn, it appears that the liquor has ſometimes been found in greater abundance. It muſt, however, be mentioned, that even with thoſe gentlemen this was not a conſtant occurrence; it therefore ſtill continues a queſtion, how death was occaſioned in the other inſtances.

Dr. Goodwyn has very much elucidated this part of the ſubject by a very ingenious and well conceived experiment: he firſt immerſed a cat in quickſilver, and, on opening the body, found half an ounce of quickſilver in the lungs,* and

* This experiment was performed eight times, but in three inſtances out of that number no quickſilver was

and an ounce of frothy fluid: having by theſe means found the quantity of fluid in the lungs of one drowned animal, he endeavoured to determine what effect the ſame, or a greater quantity of water, would have when introduced into the lungs of a ſimilar animal; two ounces of water, therefore, were introduced into the trachea of another cat. It had immediately a difficulty of breathing, and a feeble pulſe; but theſe ſymptoms were ſoon abated, and it lived ſeveral hours afterwards without much inconvenience. It was at length ſtrangled, and two

 ounces

was found in the lungs; now it is extremely probable that quickſilver would, on account of its greater ſpecific gravity, be found in the lungs when water would not; which is a farther preſumption that water is not often taken in, and never but in a very ſmall quantity; for the quantity of water, equal to the bulk of half an ounce of quickſilver, is only ſeventeen grains.

ounces and a half of water found in the lungs.

From what has been obſerved it appears, that although water may ſometimes enter the lungs of drowned animals, yet not in a ſufficient degree to occaſion their death.*

It

* The uncertain occurrence of water in the lungs of animals that have long been in the water, may be thus accounted for. It appears to me that all animals in dying, and I ſhall particularly ſhew that thoſe in the act of drowning, make as perfect and complete expiration of all the air in their lungs as they poſſibly can. In animals who die otherwiſe than by drowning, the diaphragm and intercoſtal muſcles will contract to their natural ſtate, as all the other muſcles of the body do, after death has apparently taken place, and then the external air will neceſſarily ruſh in: but animals confined in water are under different circumſtances; for if, after this complete expiration, the muſcles are contracted, water inſtead of air will get into the lungs. I have, however, in another place

ſhewn

It is evident, therefore that the death of drowned animals is to be attributed entirely *to the water intercepting the action of reſpiration.*

In this opinion I believe all parties are now very well agreed, but they differ extremely reſpecting the manner in which this ſuſpended action operates.

Reſpiration being an indiſpenſable requiſite for the ſupport of life in the more

ſhewn that water will not, at leaſt in any quantity equal to the air diſplaced, enter the lungs, till the irritability of the parts about the glottis has entirely ceaſed, the opening into the lungs then becoming free: if the muſcles concerned in reſpiration are ſtiff and rigid, that is, if they have really loſt the vital principle, the veſicles of the lungs being firmly com-compreſſed, will admit ſcarcely any water; but if the muſcles of the epiglottis loſe their power before the reſpiratory muſcles become fixed, the cavity of the thorax will be enlarged, and, in proportion as it is enlarged, water muſt neceſſarily enter into the lungs.

perfect amimals, any material impediment to it occaſions death. The ſtoppage of reſpiration acts powerfully on the ſyſtem in two ways at the ſame time: i. e. if the lungs are quite empty of air, the chemical action of the air on the blood immediately ceaſes; and the blood is alſo prevented from paſſing through the lungs.

If reſpiration be ſtopped at the end of a common expiration, both theſe circumſtances may continue a ſhort time, as there will be an hundred cubic inches of air in the lungs, in which quantity, it is ſaid, there are about thirty cubic inches of pure air, which is ſufficient to carry on the requiſite change for a few ſeconds; with theſe hundred cubic inches of air in the lungs they muſt be conſidered as in a middle ſtate of dilatation, and will conſequently allow the circulation to be continued through them for a ſhort time likewiſe.

wiſe. If a larger quantity of air be in the lungs, the chemical action may ſubſiſt for a longer time, and the blood veſſels, being more enlarged, will allow the circulation to be longer carried on through them. In ſhort in every ſtate of the lungs, the two circumſtances muſt be equal and reciprocal; the chemical and mechanical action will go hand in hand.

From this view of the ſubject it cannot be a matter of ſurpriſe, that writers ſhould have differed as to which of theſe circumſtances occaſions death; without, therefore, adverting to all the other opinions on this ſubject, of which I have already treated ſufficiently in another place, I ſhall confine myſelf to the conſideration of two queſtions, the proper explanation of which will, I conceive, exhibit this intricate ſubject in ſuch a point of view as may enable us to determine,

mine, with ſome degree of certainty, the preciſe circumſtance to which the ultimate effect ſhould be imputed.

The queſtions, by which I conceive this determination will be moſt clearly eſtabliſhed, are,—Whether the ſuſpenſion of the action of reſpiration induces a ſtoppage of the circulation and its neceſſary conſequences—*chemically*, by depriving the blood of certain properties which it ſhould acquire from the air in its paſſage through the pulmonary veſſels—or *mechanically*, by obſtructing the paſſage of the blood through the lungs.

The arguments that are brought to ſupport the former, I ſhall endeavour to ſtate with all the accuracy in my power.

Atmoſpheric air is ſaid to be compoſed of phlogiſticated, dephlogiſticated, and fixed air, in the proportion of nearly two thirds of the firſt, one third of the ſecond, and

and a very ſmall quantity of fixed air. When this air is reſpired, it is found to have undergone a change in the proportion of its conſtituent parts, the dephlogiſticated air being diminiſhed, the fixed air increaſed. As theſe changes are conſtant and uniform, they muſt be connected with ſome correſponding changes in the blood that circulates through the lungs.

By repeating the experiment of Veſalius it was found that the blood in the trunks of the pulmonary artery was black, but in thoſe of the pulmonary veins, florid; this change of colour therefore is produced by the chemical action of the air, and the dephlogiſticated portion is found to be that which produces the effect.

When the dephlogiſticated air is diminiſhed, the blood paſſing through the lungs does not undergo the change of colour, and the ſymptoms which follow obſtructed reſpiration are to be attributed

to

to this particular quality of the blood; it having been obſerved that when the blood which paſſed into the left auricle was florid, the auricle and ventricle contracted ſtrongly, but when the blood began to put on a ſhade of brown the contractions were diminiſhed, and when it was black they ceaſed, although the auricle was diſtended with blood, and as the contractions ceaſed, the functions of the body were ſuſpended; but as ſoon as the florid colour began to be reſtored, the auricle and ventricle reſumed their contractions, and all the other functions returned.

Applying theſe principles to animals in a ſtate of ſubmerſion, it is ſaid that the dephlogiſticated air, which the animal has in its lungs, is gradually conſumed, and conſequently that the blood paſſing through the pulmonary veſſels receives leſs and leſs of its florid colour, and the con-

contractions of the heart become proportionally ſlower until they ceaſe entirely, becauſe the blood which paſſes into its cavities is an inſufficient ſtimulus.

The blood in the pulmonary vein, the left ſinus venoſus, left auricle, ventricle, and arterial ſyſtem, is therefore of a black colour, and is an inſufficient ſtimulus for exciting the action of the parts that contain it; on account of this defect of ſtimulus the left ſinus venoſus and auricle receive it into their cavity and remain at reſt. As ſoon as they ceaſe to contract all the intellectual operations ceaſe, ſenſation and voluntary motion are ſuſpended, and the external ſigns of life diſappear.

Dr. Goodwyn, aware that the concluſion may "at firſt appear ſingular," that the

the ſame black blood which is a ſufficient ſtimulus for the *right* ſide of the heart, ſhould be inſufficient to excite the *left*, endeavours to obviate the objection that will naturally occur againſt this theory.

He obſerves, "that the two ſides of the heart do not exactly reſemble each other in all their qualities, there being a conſiderable difference between them, both in reſpect to the quantity of muſcular fibre and the facility of being excited to contraction."

The concluſion does indeed appear ſingular *at firſt*, for the reaſon ſpecified; and notwithſtanding what is ſaid in its favour, I apprehend it will alſo appear ſingular *at laſt*.

There certainly is a conſiderable difference in reſpect to the quantity of muſcular fibre in the two ventricles, and for a very evident reaſon,—the right ventricle has only to propel the blood through the lungs,

lungs, whilſt the left muſt (with a much greater force) drive it over the whole body.

That there is a difference between them in reſpect to the facility of being excited to contraction, I am willing to allow, under certain reſtrictions; for, ſo far as my obſervations have extended, the greater facility of contraction does not depend on any peculiarity in the fibres of the right ſide of the heart, but on the greater degree of ſtimulus which is conſtantly in animals under the preſent circumſtance applied to that ſide of the heart; for when, by any means, the quantity of blood in the two ſides has been brought to an equality, the irritability or excitability has been nearly equal; and many inſtances have occurred to me where the contractions of the left ſide have been ſtronger, and continued longer, than thoſe of the right.

It is alſo added, "that there are ſeveral examples in the animal body where muſcles of a ſimilar ſtructure are not excited the by ſame or ſimilar power; ſome are thrown into contraction by the will, ſome by particular conceptions of the mind, and ſome by chemical ſtimuli: yet none of theſe different powers will produce a perfect contraction of thoſe muſcles to which they are not adapted by nature."

But this is a vague argument. The heart being a muſcle of a very peculiar nature, and its offices no leſs remarkable, it reſembles no other muſcle in its contraction, or in the direction of its fibres; whilſt all other muſcles have ſome conſiderable affinity to each other, both with reſpect to the nature and direction of their fibres:---neither is there any muſcle, viſcus, or other part in the whole body, whoſe function bears any ſort of reſem-

blance to the heart, or that has the ſame, or even a ſimilar, power to excite it to contraction, or to the performance of its office.

Theſe arguments therefore will, I apprehend, be deemed a very indeciſive anſwer to the objection, that the blood which is ſufficient to excite the action of one ſide of the heart ſhould be ſufficient to excite the action of the other.

The next circumſtance deſerving of notice is, that the left ſide of the heart *ceaſes to contract* as ſoon as the blood in its cavities becomes *black*, and that the ceſſation of the intellectual operations of ſenſation, voluntary motion, and the external ſigns of life, *ariſes from this ſtoppage of the motion of the left ſide of the heart.*

Did the inaction of the heart depend upon this black colour, or phlogiſticated ſtate, of the pulmonary blood, it is evident that, as ſoon as the blood paſſing through the pulmonary vein has acquired in a great degree this colour, the left ſinus venoſus, auricle, and ventricle, would *immediately ceaſe their action, and that this action could not be renewed* in any degree ſo long as the blood in thoſe cavities continued in the *ſame ſtate*, that is, ſo long as it was kept from the influence of freſh air.

If this therefore be the caſe, it is evident that when we open the cheſt of any animal, as ſoon as the uſual external ſigns of life diſappear we ſhall not perceive any motion in either the left auricle or ventricle.

EXPERI-

EXPERIMENT.

To aſcertain this circumſtance, I drowned an animal under a glaſs receiver filled with, and inverted into a veſſel of, water: as ſoon as its ſtrugglings ceaſed, and it appeared to be dead, it was removed from the water, and the heart and lungs expoſed to view.

Both auricles and both ventricles were found contracting and dilating with conſiderable ſtrength and *regularity:* the right auricle and right ventricle contracted for thirty minutes; whereas the left auricle and left ventricle continued to contract for one hour and a quarter, after every external ſign of life had diſappeared.*

* The blood in the left ſide of the heart was as black, immediately after the animal appeared dead, and while the contractions of the heart ſubſiſted, as it was two or three hours after, when all motion of the heart had ceaſed; it cannot with any propriety therefore

The ſame experiment was repeated on eleven other animals. The event of theſe experiments was not exactly the ſame :— in ſome the contractions continued longer, in ſome a ſhorter time; and an inſtance or two occured where no motion whatever in either ſide of the heart could be obſerved. This difference does not at all however interfere with the general event, for the average length of time, in five caſes wherein the left auricle contracted after the animal appeared dead, was one hour and twenty-eight minutes; and in the left ventricle, forty-eight minutes.*

Conceiving

therefore be ſaid that the heart's motion ceaſed in conſequence of the blood's having acquired a higher degree of phlogiſtication.

* I take this opportunity of mentioning that, on account of the difficulty, indeed the abſolute impoſſibility,

Conceiving it poſſible that the air might have ſome effect on the external parts of the heart, ſo as to continue its

bility, of procuring other ſubjects, my experiments were chiefly made on young animals, ſuch as kittens and puppies; what therefore is ſaid in this place, and indeed in every other part of this paper, is to be conſidered as referring to appearances obſerved in thoſe animals. I have not been able to remark any difference of the leaſt conſequence in the length of time required to drown a kitten and a puppy; nor could I obſerve any difference in the continuance of their convulſive motions, in the contractions of their hearts, or in the irritability of theſe or of any other parts of their bodies: obſervations therefore made on one claſs of theſe animals refer with ſtrict propriety to the other claſs alſo. I have not yet aſcertained whether the appearances between the full grown animals correſpond ſo exactly, although I have reaſon to believe they do; but I am certain there is a difference between the appearances attending the deaths of young and of old animals, and it is a circumſtance that ought to be particularly adverted to.

motion longer than natural, I varied the experiments in ſuch a manner, that it did not appear poſſible the air could produce any ſuch effect.

EXPERIMENT.

With this view, after drowning the animals in the uſual manner, and opening the cheſt, the pericardium was ſuffered to remain upon the heart, ſo that the air could not come in contact with its external ſurface: but the heart, in all the inſtances, contracted as uſual.

EXPERIMENT.

More effectually to exclude the contact of the air, ſome animals were drowned in cold, and others in moderately warm water;

water: the thorax was then opened, and the ſternum removed, while the animal remained under water; but in every inſtance the heart was found contracting, and it continued to contract, ſome time after the animal appeared dead.

Recollecting that Dr. Prieſtley had related, that the colour of the blood was capable of being ſoon affected through a moiſt bladder, and having often remarked the familiar appearance which preſents itſelf in bleeding, where the blood is changed from its uſual dark brown to a bright florid colour, conſiderably below the ſurface of the coagulum, although this was covered with the ſerum, I thought the continuance of the contraction might, in the preſent inſtances, be attributed to ſome ſuch circumſtances: I

attempted therefore to find out whether the heart would contract when the animal was covered with a fluid, through which I found the air could not produce any alteration in the colour of the blood.

EXPERIMENT.

After various devices, I found that oil was extremely well calculated to anſwer this purpoſe; for, on receiving ſome dark venal blood, in a wide mouthed glaſs veſſel, and immediately covering it with a very thin coat of oil, not the leaſt alteration was perceived in the colour of the blood, although the oil was expoſed ſeveral days to the influence of the air: a kitten was therefore immerſed in a veſſel of ſweet oil, of the temperature of $67\frac{1}{2}^{d}$. nine minutes after immerſion it was opened while it was entirely covered

covered with the oil; both auricles and both ventricles were found contracting very forcibly, fifty-one ſtrokes in a minute, and continued to do ſo about three quarters of an hour, but ſome degree of motion was perceivable upwards of two hours after.*

From the events of theſe experiments we may conclude, therefore,

That the left ſinus venoſus, auricle, and ventricle, do not ceaſe to contract in conſe-

* The motion here alluded to was conſiderable, although by no means ſo ſtrong as at firſt; but it was ſeveral hours before it ceaſed entirely. In looking over the notes of my experiments, I find that in ſome animals, both cats and dogs, that were drowned in the uſual manner, and opened after their deaths, ſome motion was perceivable in the heart after a very conſiderable length of time; i. e. ſix, eight, ten, and twelve hours; and in one or two inſtances, where particular attention was paid, its motion did not entirely ceaſe for almoſt twenty hours.

quence

quence of the phlogiſticated ſtate of the blood in their cavities:

That the intellectual aperations do not ceaſe—that ſenſation and voluntary motion are not ſuſpended—and that the external ſigns of life do not diſappear in conſequence of the ſinus and auricle ceaſing to contract: for, in the generality of inſtances, the ſinus, auricle, and ventricle, continue to contract with a conſiderable degree of force for ſome time after the blood has acquired its black colour and appears fully ſaturated with phlogiſton, and for ſome time after the external ſigns of life have diſappeared.

Dr. Goodwyn infers from this theory, that the only conditions of the body requiſite for the recovery of drowned animals are, that the blood be of a florid colour

lour in the left ſide of the heart, and that that ſide of the heart retain the faculty of contraction.

Several inſtances are mentioned where the blood in the left auricle and ventricle was, by imitating natural reſpiration, very ſoon changed from a black to a florid colour; and many experiments which I have juſt related prove, that the heart has not only the faculty of contraction, but abſolutely a ſtrong and natural action commonly for a conſiderable length of time after the animal has appeared dead: upon this principle therefore it would be very eaſy to recover animals, ſo long at leaſt as the heart continues to contract, without the application of any ſtimulus, either internal or external, other than that which uſually excites its action.

I have ſaid that the average length of time during which the left auricle continued

tinued to contract ſpontaneouſly, and with a tolerable degree of force, in five inſtances, was nearly one hour and a half; conſequently, if the colour of the blood is changed at any time within that period, which may, according to Dr. Goodwyn, readily be done, the animal ought to recover: but will any man venture to ſay he can recover an animal whoſe reſpiration has been ſuſpended one quarter of that time?*

We

* The hearts of many animals continue the capacity of contracting, if kept in a mild atmoſpere, even ſo long as twenty-four hours, after the appearance of death has taken place, upon the application of various ſtimuli to their external ſurface, ſuch as gentle preſſure, pricking with a knife, a drop of any of the mineral acids, the cauſtic alkali, an hot iron; and ſometimes much longer by means of an electrical

We are told that the pulmonary veins, ſinus venoſus, left auricle, left ventricle, and the trunks and ſmaller branches of the arteries proceeding from the left ventricle, contain a quantity of this black blood, which is ſaid to be an *inſufficient ſtimulus* to excite the contraction of the heart: it is not allowed that this blood is poſſeſſed of any noxious power, becauſe "if it diminiſhed or deſtroyed the faculty of contraction, the heart would not contract again when thoſe means are applied which are neceſſary to produce the contractions:"—no experiments however are offered in ſupport of this poſition, and the reaſon has not even plauſibility to recommend it, for ſurely no one

electrical ſhock: ſo that I am not ſure, if we adopt this theory, whether we muſt not give credit to thoſe extraordinary inſtances of recovery which have long been deemed fabulous.

can

can deny but the faculty of contraction may be materially diminiſhed, and yet it may contract again "when thoſe means are applied which are neceſſary to produce the contraction;" for any thing that appears to the contrary, therefore, the blood may juſt as readily exert a *noxious* or *ſedative* power as be an *inſufficient ſtimulus.*

In which ever point of view this affair of black blood is regarded, it ſhould ſeem that all the parts of the body in which this blood is preſent are equally liable to languiſh under the ſame defect —the brain, the ſource and origin of all the ſenſes—the chylopoetic and abdominal viſcera—the muſcular ſyſtem, &c. in ſhort, the animal and natural functions muſt ceaſe, as well as the vital, for want of the ſalutary action of the florid blood; and how is it poſſible that all theſe organs

can

can again acquire their power of action, by altering the property of the blood in the pulmonary artery, and perhaps likewiſe in the pulmonary veins?

But ſuppoſing for one moment, and for argument's ſake, what is very difficult to conceive, that this alteration does take place; yet it muſt be evident to every one, at firſt ſight, that it is impoſſible the change can take place till inflation of the lungs has produced it: now, of the great number of recoveries mentioned in the reports of the Humane Society, how very few are the caſes where artificial reſpiration was uſed at all; and many inſtances muſt have been ſeen, by every one uſed to make experiments of this kind on animals, that they often recover without any aſſiſtance whatever: —how the blood in the lungs, heart, brain, &c. has in theſe caſes undergone the

the neceſſary change I am unable to comprehend!

The author of this theory ſays, "no one can deny that the reſpiration is ſometimes eſtabliſhed in this ſtate, in conſequence of the application of heat:" but if the cauſe of the animal's ſtate of apparent death is, as we are taught to believe, black or phlogiſticated blood in the left ſide of the heart, what effect can *heat*, or any thing elſe, air excepted, have in changing its property? A proper degree of heat may encreaſe the irritability of the fibres, and by ſuch means the diſpoſition for action in the fibres of the heart will be encreaſed, but nothing further: action itſelf cannot take place till the blood has received its ſtimulating property, and till its colour is altered; which changes cannot take place without the repeated application of freſh air.

Mr.

Mr. Hunter, in his paper on the recovery of perſons apparently drowned, publiſhed ſeveral years ſince, notices a theory very ſimilar to that adopted by Dr. Goodwyn; he ſays, "the loſs of life in drowned perſons has been accounted for, by ſuppoſing that the blood rendered unfit, by want of the action of the air in reſpiration, is ſent in that vitiated ſtate to the brain and other vital parts, by which means the nerves loſe their effect on the heart, and the heart in conſequence its motion:" this however, he continues, "I am fully convinced is falſe; firſt from the experiments on the dog, in whoſe caſe a larger column of bad blood, viz. all that was contained in the heart and pulmonary veins, was puſhed forward without any ill effect being produced (Animal Oeconomy, page 118); and next, from the recovery of drowned

perſons and ſtill-born children, which under ſuch circumſtances never could happen unleſs a change of the blood could take place in the brain prior to the reſtoration of the heart's motion: therefore the heart's motion muſt depend immediately upon the application of ſuch air to the lungs, and not upon the effects which air has upon the blood, and which the blood has upon the vital parts."

As this objection was oppoſed to a theory ſo very ſimilar to that which is the ſubject of our preſent diſquiſition, ſeveral years I apprehend before Dr. Goodwyn attended to the ſubject, and by a perſon of the very firſt eminence and authority in our profeſſion, it was natural to conclude that Dr. Goodwyn would, at leaſt the ſecond time of publiſhing his book, pay particular attention to an objection

objection that materially concerned his theory.

But if any notice whatever is taken of it, it is ſo very diſtantly and obſcurely as ſcarcely to be perceivable; and as neither arguments nor experiments are brought againſt this objection, it ſeemingly was found altogether unanſwerable.

It is ſaid that the diſeaſe under conſideration is in the blood, and conſiſts in the preſence of this black blood in the left ſide of the heart and arterial ſyſtem; and the ſubſequent appearances, ſuch as the diminution of the action of the heart and arteries, &c. are the conſequent ſymptoms.

Whatever ſhare the ſtate of the blood may have in cauſing death, it does not appear by any means certain that it is

owing ſo entirely to its black colour as this and many other paſſages in the Doctor's performance would lead us to conclude, ſince caſes do not unfrequently occur, where, in diſſection, black blood has been found in the left ſide of the heart and arterial ſyſtem, notwithſtanding the perſon ſuffered a very different kind of death, and where lividneſs of the lips, face, and other parts of the body, to a conſiderable degree, was found in patients under circumſtances ſeemingly not any way connected with a ſtate of ſuſpended reſpiration.

In proof of the former part of this aſſertion I might here relate many inſtances which have occurred to my own obſervation; but ſuch inſtances are ſo generally known, and ſo many are to be found in almoſt every book of anatomical collections, that I will only refer to thoſe related

related by Morgagni, of perſons dying in conſequence of *apoplexy* (which apoplexy was evidently induced either by extravaſation or great diſtention), where the face, lips, and neck, were of a *blue* or *livid colour*, and where on diſſection the blood in the different cavities of the heart was *black*.

I lately had two caſes under my care, and every man of moderate practice muſt have ſeen others, where the patients being ſuddenly and unexpectedly attacked with violent apoplexies, an hour or two before death the face and neck became very livid, and juſt before that event took place almoſt entirely black: in theſe caſes the reſpiration was, as it always is under ſimilar circumſtances, long and laborious; but there was no obſtruction to the paſſage of the air into and out of the lungs; and as, probably, there was ten times the quantity of air taken into and expelled from the lungs than would

be in common reſpiration, the blood paſſing through the pulmonary veſſels muſt have been expoſed to the influence of a greater quantity of air than when the perſon was in health.

I am acquainted with a young lady of a healthy, but very delicate conſtitution, ſubject to no complaint but what occaſionally ariſes from a weak ſtomach, who obſerved, the beginning of the winter before laſt, that ſhe was more than uſually affected by the cold; as the winter advanced the inconvenience increaſed; and it was ſoon obſerved, that when ſhe expoſed herſelf to any moderate degree of cold, either in the houſe or whilſt in exerciſe in the open air, for a very few minutes, it had a viſible effect on the colour of her face; the cheeks and noſe became red, the redneſs would increaſe, and, if ſhe continued expoſed any conſiderable

derable length of time, it became quite of a blue colour. The intenſity of the colour began to abate as ſoon as ſhe became in the leaſt warm, and when ſhe was ſufficiently ſo, it entirely diſappeared, and her complexion recovered its uſual appearance. From that time to the preſent ſhe ſuffers the ſame inconvenience whenever ſhe expoſes herſelf to the cold, and it goes off as ſoon as ſhe becomes warm: it is for obvious reaſons more frequent in winter; but if in the ſummer-time ſhe finds it at all cool, the ſame appearance readily takes place.

This lady was about twenty years old when this occaſional change of colour was firſt obſerved, and it came on without any aſſignable reaſon whatever. Her ſtate of health, particularly as to reſpiration, does not vary either before, at the time of its appearance, or after it has ſubſided; and

the only inconvenience ſhe perceives, is from the ſenſation of cold, and a kind of pricking in the parts affected.

Can the black colour of this blood be occaſioned by the want of the action of the air in reſpiration? If it can, I would gladly know in what manner its action is impeded.

Dr. Crawford has obſerved, in his elaborate treatiſe on animal heat, that the venal blood of animals, which has been kept for ſome time in a warm medium, approaches in its colour very nearly to that of arterial blood; and that the arterial blood of animals kept in a cold medium, becomes darker than uſual. I have been informed that Dr. Crawford confined an animal in a cold medium at about 28°, and allowed him to inſpire but a ſmall quantity of air; arterial blood drawn from this animal, although he was perfectly alive and well, was equally dark coloured

coloured as the blood found in the left ſide of the heart of an animal that was drowned; ſo that the ſame coloured blood killed one animal, although it ſuffered another of the ſame ſpecies to live very well.

From theſe caſes and experiments it is evident,

1. That in the inſtances mentioned, and in many ſimilar to them, the black colour of the blood muſt depend on ſome other circumſtance beſide the want of the action of the air. And,

2. That the black blood *does* poſſeſs a ſufficiently ſtimulating quality to excite the action of all parts of the heart.

From

From what has been ſaid, therefore, it appears,

1. That the left auricle and ventricle do not ceaſe to contract *in conſequence* of the black colour or phlogiſticated ſtate of the blood in their cavities; becauſe they really do contract, and with a conſiderable degree of force, for ſome time after the blood has acquired its black colour.

2. That the intellectual operations *do not ceaſe*; that ſenſation and voluntary motion *are not ſuſpended*; and that the external ſigns of life *do not diſappear in conſequence* of the ſinus and auricle ceaſing to contract becauſe the ſinus and auricle continue to contract a conſiderable time after thoſe changes have taken place.

3. That

3. That it does not appear that the blood's being reſtored to a florid colour in the left ſide of the heart, and that ſide's retaining the faculty of contraction, are the only conditions requiſite for the recovery of drowned animals; becauſe animals do not in many inſtances recover when this colour of the blood is reſtored, although the contraction of the heart continues.

4. If the black colour, or phlogiſticated ſtate of the arterial blood, is the cauſe of the death of drowned animals, it may juſt as readily exert a ſedative effect, as be an inſufficient ſtimulus; under either circumſtance, all the different viſcera in which this blood is preſent, appear liable to be affected by want of the ſalutary action of the florid blood as much as the left

left auricle and ventricle; and it does not appear, when their various functions are in this manner once ſuſpended, how they can be removed by altering the property of the blood in the pulmonary artery and pulmonary vein.

5. If the death of drowned animals be occaſioned by the black blood in the left auricle and ventricle, it would be impoſſible that any animal ſhould recover till the property of the blood is changed by inflating the lungs; the contrary of which is very generally known.

6. It does not appear that the death of drowned animals is occaſioned by "black blood in the left ſide of the heart and arterial

arterial ſyſtem," becauſe many inſtances have occurred where the ſame appearances have been obſerved in perſons who have ſuffered a very different kind of death: where, in diſeaſes, the blood has appeared to poſſeſs an equal degree of blackneſs, accompanied with ſtrong action of the heart and arteries, and deep regular and uninterrupted reſpiration: and where in a ſtate of health, the vital, natural, and animal functions have been continued, notwithſtanding there was a conſiderable alteration in the colour of the blood.

From the whole of theſe obſervations I draw the following concluſion.

That

That the ſuſpenſion of the action of reſpiration does not induce a ſtoppage of the circulation and its neceſſary conſequences, by chemically depriving the blood of certain properties which it ſhould acquire from the air in its paſſage through the lungs.

We

We now proceed to inquire, Whether the ſuſpenſion of reſpiration induces a ſtoppage of the circulation and its neceſſary conſequences, by mechanically obſtructing the paſſage of the blood through the lungs.

EXPERIMENT.

I find, by repeated experiments, that a perſon in health, and in a ſtate of perfect reſt, uſually reſpires about ſeventeen cubic inches of air; but, at the end of the expiration, there ſtill continues in the lungs eighty-ſeven cubic inches; and at the end of each inſpiration, the lungs are capable of containing near two hundred additional

additional inches. So that we may reckon, upon an average, that a moderate ſized perſon can take into, and expel from his lungs, three hundred cubic inches of air; the volume of the lungs, therefore muſt be very materially different at the time of a full inſpiration from what it is at the time of complete expiration.

It is very well known, and I believe univerſally underſtood, that the capacity of the pulmonary blood-veſſels muſt be diminiſhed or enlarged in equal and exact proportion as the volume of the air-veſſels is diminiſhed or enlarged: conſequently, at the time of complete inſpiration, the capacity of the pulmonary artery and vein will be enlarged to the utmoſt extent, ſo that the blood will circulate

culate with ſome degree of readineſs through them; and, at the time of complete expiration, their extremities in particular will be ſo much contracted as almoſt entirely to prevent the paſſage of any blood through them.

In ſupport of this, I beg leave to mention the following experiments.

EXPERIMENT.

A terrier puppy, about a week old, was placed under the receiver of the air pump, and the air directly exhauſted. Notwithſtanding the receiver was tolerably capacious, the animal's ſtrugglings ceaſed in exactly two minutes from the time the machine began to be worked.

After twenty minutes the air was let into the receiver, the cheſt was opened, and the heart and lungs expoſed to view. The right ſide of the heart and veins were enormouſly diſtended with blood; the left ſide was almoſt empty.

EXPERIMENT.

A puppy of the ſame litter was placed under a glaſs magazine of a condenſing machine, and as much air forced into it as could be done by means of a common hand condenſer. The reſtleſſneſs of the animal prevented my obſerving by the gage to what degree the air was condenſed; but by ſubſequent operations I have reaſon to believe, though I cannot be certain, that between three and four atmoſpheres were forced into the magazine; notwithſtanding this great degree of condenſation,

denſation, the animal remained in his confinement a quarter of an hour at a time without any material inconvenience. When the ſuper-abundant air was let out, the ſudden change ſeemed to have a momentary effect upon him, but in a few ſeconds he was as well as ever.

In the firſt experiment the air was ſo much rarefied, that the diaphragm, intercoſtal muſcles, and all the other muſcles concerned in the action of *inſpiration*, were inſufficient to counteract the expanſile property of the air; for the uſual equilibrium between the external, air, and the air circulating in the fluids in a diſſolved or fixed ſtate, was deſtroyed; the conſequence of this muſt be, that as the preſſure of the external air was diminiſhed the fixed air of the fluids began to expand,

and when the former was materially removed, the latter became detached and extricated from the maſs of fluids in equal proportion; hence the air in the veſicles of the lungs being exceedingly rarefied, the internal air muſt become expanded, the muſcles concerned in *inſpiration* could not act with ſufficient force to overcome theſe cauſes, the lungs were therefore neceſſarily forced into a ſtate of complete expiration, and but a ſmall quantity of blood paſſed to the left auricle of the heart.

In the ſecond experiment the external air acted with a very conſiderably increaſed force upon every part of the body that it could come in contact with; theſe were the ſurface of the body and the cavity of the lungs: upon the ſurface of the body this additional preſſure could effect no particular alteration; but the

the condenſation of the air being very conſiderable, the muſcles of *expiration* were not ſufficiently ſtrong to expel more than a ſmall quantity of air from the lungs, conſequently the lungs would be continued in a ſtate nearly approaching to that of complete inſpiration; under which circumſtances this experiment proves that the blood paſſes with ſufficient readineſs through the pulmonary veſſels.

To corroborate theſe experiments I endeavoured to produce a ſtate of complete inſpiration, and likewiſe a ſtate of complete expiration, in the following manner.

EXPERIMENT.

A proper pipe being affixed to an hand air-pump, was introduced into the trachea of a kitten, and the air immediately exhauſted from the lungs; the exhauſtion was continued until the animal ceaſed to ſtruggle, which was fifty ſeconds.

This experiment was repeated on another kitten with this difference, that as ſoon as the air was exhauſted the trachea was immediately tied, the ſtruggles ceaſed as in the laſt exactly in fifty ſeconds; in both caſes but a ſmall quantity of blood was found in the left auricle.

EXPERIMENT.

A proper pipe was inſerted into an opening made in the trachea of a kitten about

about a month old, and air was, by means of a common pair of bellows and flexible tube, continually forced into the lungs, ſo as to keep them as conſtantly as poſſible diſtended; the operation was continued one hour, at the end of which the animal did not appear any ways affected; the pipe was therefore removed, and he immediately appeared as lively as ever.

EXPERIMENT.

A proper pipe was fixed to a ſtrong bladder, which was filled with atmoſpheric air; the pipe was inſerted into an opening made in the trachea of a kitten about three weeks old, and properly ſecured there; a very ſtrong and uniform preſſure was then made on the bladder, ſo as to keep the lungs conſtantly and regularly diſtended: in this ſtate the

animal continued ſtrongly alive eight minutes, its ſtrength then failed, and in four minutes more it loſt all the uſual ſigns of life; a ligature was then made on the trachea ſo as to continue the lungs in a ſtate of diſtention, and the pipe was withdrawn. It was opened; the motion of every part of the heart was uncommonly quick and ſtrong, by far more ſo than I had ever obſerved in any animal killed in any other manner; and ſome of the ſmaller arteries which were divided bled per ſaltim. There did not appear by any means that diſtention of the cava, or of the right auricle or ſinus, which is uſual in animals that are drowned, or when the air is exhauſted from their lungs. On opening the left auricle a larger quantity of blood was evacuated than I had ever obſerved before.

To perform this experiment with accuracy conſiderable attention is requiſite, or it will not always ſucceed; it was repeated ſeveral times, and at one in particular every precaution was taken againſt all interfering accidents. The ſubject was a kitten of the ſame age and litter as that juſt mentioned. After introducing the pipe into the trachea, a very, ſtrong, regular and uniform preſſure was made on the bladder; the preſſue was ſo hard that I with difficulty could continue it fifteen minutes, my arms were then ſo tired I was obliged to remove the pipe; the animal directly turned itſelf about, reſpiration immediately commenced, and in a few minutes it perfectly recovered.

EXPERIMENT.

The pipe was introduced into an opening made in the trachea of another animal;

mal; as ſoon as the lungs were fully diſtended, a ligature was made on the trachea, and the pipe withdrawn. In two minutes and ten ſeconds the ſtruggles ceaſed; in fifteen more it was opened, and the right auricle was found to contain a ſomewhat ſmaller quantity of blood than the left. This experiment was repeated on an animal of exactly the ſame age, and the ſtruggling continued two minutes and forty ſeconds.

From theſe experiments it is evident,

That only a very ſmall quantity of blood can paſs through the lungs when they are in a ſtate of perfect expiration.

That the impediment to the paſſage of the blood through the lungs is materially leſſened by their being in a ſtate of full inſpiration. And

That

That the difference in the length of time which an animal will live with colapſed and diſtended lungs, is in the proportion of fifty to the former, and one hundred and thirty to the latter.

If the capacity of the pulmonary blood veſſels be enlarged to the utmoſt when the cells of the trachea are fully diſtended, it may be doubted what purpoſe the alternate motion of the lungs can anſwer, as in expiration the capacity is ſo much diminiſhed: to this it may be replied, that, independent of its being the moſt commodious method of bringing the air in contact with the blood that has ſerved its offices in the conſtitution, and thus producing a continual ſupply of freſh heat, it is extremely probable that the motion of the lungs is neceſſary to promote the circu-

circulation through them; for the quantity of blood that is to paſs through the lungs is enormouſly great, equal to that which paſſes through the whole arterial ſyſtem in the ſame ſpace of time, the impediment to its free circulation through the minute ramifications muſt therefore be conſiderable, even when the capacity of the veſſels is tolerably enlarged; hence ariſes the neceſſity of expiration, which, by reducing the capacity of the veſſels, preſſes the blood through the capillaries, and very much accelerates its paſſage into the left ſinus and auricle.

The idea is rendered more probable by obſerving that the degree of motion of the lungs is always in proportion to the quantity of blood circulating through them; for inſtance, when in a ſtate of perfect reſt, a perſon in health uſually

occaſions

occaſions but a ſmall alteration in the volume of the lungs, for he then reſpires about ſeventeen cubic inches: motion of the body quickens the circulation: the exertion of certain paſſions produces the ſame effect; and we all know by experience, that the motion of the lungs is increaſed likewiſe: if either one or the other is continued, or materially increaſed, the reſpiration is increaſed in proportion; and if the exertions are violent, we are then compelled to produce the greateſt motion in the lungs, by inſpiring as much air as they will contain.

The event of the following experiments ſeems alſo very much to corroborate this opinion.

EXPERI-

EXPERIMENT.

I made a full inſpiration, and took three hundred cubic inches of air into my lungs; I retained it there as long as I was able, which was ſeventy-two ſeconds. On examining this air by the teſt of nitrous air, I found it 31,00 worſe than when I inſpired it.

EXPERIMENT.

I inſpired the ſame quantity of freſh atmoſpheric air, and by means of a proper contrivance breathed it into and out of a bladder as long as I could, which was one hundred and thirty ſeconds; on examining it in the ſame manner, it was 48,00 worſe than when inſpired.

A certain

A certain quantity of air, therefore, when the lungs are in motion, will continue the circulation of the blood through them almoſt twice as long as the ſame quantity will when they continue uniformly diſtended; the uneaſineſs and anxiety is the ſame in both experiments notwithſtanding the air which is breathed longeſt is 17,00 worſe than the other.

Having premiſed theſe obſervations, it will now be neceſſary to enquire in what ſtate and in what degree of diſtention the trachea of thoſe animals is found that are killed by drowning.

The diſtention of the trachea, and its ramifications, may be occaſioned by one of two circumſtances; by water inſpired into the trachea, or by air remaining in it.

If

If water is inſpired into the trachea, the coloured fluid in which the animal was drowned, will of courſe be found in it.

The general event of my experiments on this head I have before mentioned, and declared that very *little*, if *any*, occurred to my obſervation, if the examination was made ſoon after the animal appeared dead.

If air remains in the cells of the windpipe, the quantity may be nearly aſcertained, by preſſing the cheſt of the animal while its head is placed under a receiver filled with, and inverted into a veſſel of, water.

EXPERIMENT.

After an animal was drowned in the uſual manner, it was gently removed from

from the receiver in which it had been drowned, and its head placed under another receiver exactly filled with water; in this ſituation its cheſt was repeatedly preſſed, but not one particle of air eſcaped from the mouth.

EXPERIMENT.

In order to compreſs the lungs as effectually as poſſible, after drowning other animals, and placing them in the ſame ſituation as in the laſt experiment, the ſternum was removed, the lungs were conſequently ſurrounded with water; but, notwithſtanding there was the preſſure of fifteen inches of water on their ſurface, not the ſmalleſt portion of air was expelled into the receiver.

From hence we conclude,

That the lungs of drowned animals are in a ſtate of perfect and complete expiration: and, conſequently,

That only a ſmall quantity of blood can paſs to the left ſinus and auricle.

If the ſtoppage of the circulation firſt takes place in the pulmonary artery, it follows that the blood returning from the various parts of the body, ſhould, in conſequence thereof, be accumulated in the right ventricle and auricle, in the ſinus venoſus, and in the great veins immediately connected with them. But is this found to be the caſe?

I ſpeak with moderation when I ſay, that the number of experiments which I have made on various drowned animals, principally to elucidate the nature of their deaths, has amounted to two hundred;

hundred; and out of this number I can with truth aſſert, that not one inſtance occurred in which the venæ cavæ, right ſinus, and auricle, were not exceſſively and enormouſly diſtended with blood; but the accumulation did not at all times appear ſo conſiderable in the right ventricle,*

* Why the right ventricle is not ſo much diſtended as the right auricle, may be readily explained. The contraction of this ventricle, as I may ſhew in another place, continues longer than in any other part of the heart; its ſubſtance is likewiſe much ſtronger than that of the auricle, ſinus, and great veins: hence no ſooner is blood thrown into it from the auricle than it immediately contracts; the contraction is ſo conſiderable that ſome blood is propelled through the lungs, and what remains in the cavity keeps up ſo conſtant an irritation that the further entrance of freſh blood is prevented.

If an animal is opened as ſoon as it appears drowned and a ligature paſſed round the pulmonary artery, the diſtention will be ſomewhat more conſiderable;

but

although the pulmonary artery was always very much dilated and filled with blood.

We have now traced the conſequences of the ſuſpenſion of reſpiration to the mechanical congeſtion of blood in the right ſide of the heart and lungs, it only

but while the power of contraction and the irritability are greater than in the parts connected with it, the full effect cannot take place.

Whoever has employed much time in making experiments of this kind, muſt have remarked, that although the contraction and irritability of the different parts of the heart obſerve a general rule, yet that particular exceptions now and then occur; when, therefore, an inſtance is obſerved where the pulmonary artery has been taken up, that the right ventricle loſes its power of contraction ſome time before the auricle, there the diſtention is equal in every part of the right ſide of the heart.

remains

remains to offer ſome few remarks as to the manner in which this congeſtion may occaſion death.

It cannot be expected that we ſhall be able to aſcertain this point exactly by diſſection; we have hitherto been conducted entirely by it; the ſubject now, however, becomes too minute to rely altogether upon this mode of inveſtigation, and we are compelled to call in other aid.

As the congeſtion muſt produce its final effect either on the heart, the lungs, or the brain, we will examine upon which of theſe vital organs it is moſt likely to act.

We are naturally led, in the firſt place, to enquire whether it may not exert its fatal effects immediately upon the heart itſelf.

If it operate immediately upon the heart itſelf, the action of the heart, more eſpecially of the affected ſide, muſt ceaſe as ſoon as the diſtention is formed.

I have already had occaſion to obſerve that this is by no means the caſe, for the heart in every inſtance continues to pulſate, and with a very conſiderable degree of force, ſometimes upwards of an hour after the appearances of death have taken place; and the right ſide, which ſhould be moſt immediately affected, almoſt always continues its action the longeſt, commonly at leaſt three times as long as the left ſide; how, therefore, it is poſſible that this congeſtion ſhould operate on the heart ſo as to induce the appearance of death in every other part of the body, and yet continue perfectly alive itſelf, is very much beyond my comprehenſion.

Can

Can it produce this effect by acting upon the lungs?

The lungs are perfectly paſſive in reſpiration, and are deſtitute of ſenſation; they moreover do not appear to be further concerned in the vitality of the ſyſtem, than as they facilitate the action of the air on the blood and blood-veſſels: to effect this as completely as they do, it is neceſſary they ſhould have a regular and conſtant motion, which, while it promotes as much as poſſible the action of the air on the blood is admirably calculated to propel the blood through the pulmonary veſſels; a circumſtance that would not be readily effected without ſome ſuch contrivance, on account of the vaſt quantity of blood that is to paſs through ſo ſmall a ſpace.

When this motion then is interrupted, an impediment ariſes to the action of the air on the blood; and the blood is arreſted

in its paſſage from one ſide of the heart to the other.

We ſee, therefore, that although the ſtoppage of the action of the lungs neceſſarily cauſes death, yet that it muſt effect it by the medium of ſome other vital organ, inſtead of producing it immediately by itſelf.

If the congeſtion does not produce its final effect on the heart or lungs, it follows that the brain is the organ it muſt operate upon.

But it may not be improper to enquire, whether there be any, and what proof, of the reality of this circumſtance.

We will, therefore, firſt make ourſelves acquainted with the external appearance of the body, and the ſtate of the brain, as it appears on diſſection; next trace the conſequences that reaſon teaches us muſt enſue from the congeſtion

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in the great veins; and we will then obſerve in what manner it is likely the brain ſhould in conſequence be affected.

" The face is remarkably ſwelled; the eyes violently ſuffuſed with blood, enlarged, prominent, and ſometimes ſo protuberating that the eye-lids ſeemed inſufficient to cover them; the features of the countenance are generally diſtorted; and the tongue, in part, thruſt out of the mouth."

Extravaſation does not, in healthy animals, take place in any part of the brain; but there is a conſiderable fulneſs or diſtention of the veins of every part of that organ. The heads of various animals were examined likewiſe by ſeveral friends, at my requeſt, and a certain degree of fulneſs, I was informed, always occurred.

The pulmonary artery, right ventricle and auricle, and the venæ cavæ, are diſtended

diſtended with blood; in conſequence of this an accumulation of blood will take place throughout the whole venal ſyſtem; but the accumulation will be more conſiderable in the veins of the brain than in any other part, on account of the greater quantity of blood ſent to it, and the weaker contexture of its veſſels, which will more readily allow their capacity to be enlarged.

When any material addition is made to the bulk of the brain, ſymptoms of what is commonly called compreſſion muſt neceſſarily take place, on account of the cloſe connection between it and the cranium, for the bones of the cranium, cannot relax; the pulpy ſubſtance of the brain muſt therefore be compreſſed, or forced into a ſmaller compaſs; every one is acquainted with the ſymptoms that muſt in conſequence enſue; and every one

one knows, when they are violent, how ſpeedily they will occaſion death.

From the external appearances of the body, from the ſtate of the brain as it appears on diſſection, and from the conſequences that muſt enſue from the congeſtion of the great veins, it is evident that the brain muſt be in a ſtate of compreſſion; and, from the manner we know the brain to be affected by compreſſion, we may conclude, *that thoſe who die by drowning, die in conſequence of an apoplexy, or a compreſſion of the brain**. That

* Should any further proof of the reality of this circumſtance be required, I beg leave to refer to an Eſſay on the Recovery of the Apparently Dead, p. 37—58, where the ſubject is treated at ſome length and where the ſymptoms attending perſons in the act of drowning, and in their recovery from that ſtate, are particulaly noticed; and, likewiſe, the ſymptoms in other ſituations, ſuch as in hanging, in the inflammatory angina, in the actions of laughing, ſtraining, coughing, &c. all which ariſe from a greater or leſs

That the ſuſpended action of reſpiration is the firſt and original cauſe, will admit of no doubt; and it is equally evi-

leſs interruption of reſpiration, and which conſequently produce ſimilar, although ſometimes leſs dangerous effects.

Whoever has any difficulty in conceiving that the preſſure on the brain is ſufficient to occaſion death ſo ſuddenly as is here repreſented, will do well to recollect the numerous inſtances of apoplexy which have ſo frequently terminated in ſudden and almoſt inſtant death, with which the books of Pathologiſts are crowded; where, after opening the body, no other cauſe is to be diſcovered except a diſtended ſtate of the veſſels of the brain.

It may not be improper here to remark alſo, that very many inſtances may be recollected where the conſtitution will permit the greateſt changes, provided they be gradually applied; but if too ſuddenly, the event is frequently very different.

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dent, from what has been ſaid concerning the appearances on diſſection, that the right ſide of the heart and venal ſyſtem are very much diſtended with blood; it is clear alſo, from diſſection and the general collection of obſervations, that the diſtended ſtate of the veſſels of the brain is the immediate cauſe of the animal's loſing the uſual character and appearances of life.

From all this it is extremely plain that our firſt, principal, and great intention, ſhould be—to remove the compreſſion of the brain, and the diſtention of the right auricle and ventricle, and of the great veins connected with them. How is this to be affected?

We have ſeen that the impediment to the paſſage of the blood from the right ſide of the heart to the left is owing to the diminiſhed capacity of the pulmonary blood veſſels; if, therefore, theſe veſſels

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are put in the ſame condition as when the blood uſually circulates through them in a ſtate of health, this impediment will be removed.

We have already obſerved, that when the pulmonary veſſels are extended to the utmoſt, their capacity is not ſufficiently large to allow the circulation to be carried on through them, even in a ſtate of health; but that their alternate contraction and expanſion is neceſſary to effect it: this action muſt therefore now be put in execution, and we muſt imitate the manner which nature compels us to act in, when from any particular circumſtance we retain our breath, ſo that a larger quantity of blood than uſual is collected in the right ſide of the heart; we are then obliged to make ſeveral deep inſpirations and expirations, in order to propel the blood into the left ſide of the heart.

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The lungs, therefore, being fully inflated, all the branches of the pulmonary artery will be immediately filled and dilated with blood by the contractions of the right ventricle, which we have ſeen uſually continues a conſiderable length of time, and with a force ſeemingly ſufficient to carry on the pulmonary circulation when no obſtruction to the paſſage of the blood exiſts; ſome of this paſſes into the correſponding veins and left ſinus, but the contraction of the ventricle not being ſo ſtrong as in health, and the blood heſitating in its paſſage through the minute ramifications, ſome additional power becomes requiſite to accelerate its circulation.

If the air is now forced out of the lungs by compreſſing the cheſt, or by any other means, this intention will be accompliſhed; for the volume of the lungs will

will be diminiſhed, and the blood in the pulmonary artery and veins will, by inevitable conſequence, be driven into the left ſinus, and auricle; for it is well known that it cannot return into the right ventricle, on account of the action of the ſemilunar valves.

When the lungs are again inflated, the pulmonary veſſels will, as before, be immediately filled and diſtended from the right ventricle, for the blood cannot return from the left ſinus, as it is prevented by the valves; ſome of this will likewiſe readily paſs into the left auricle, and the remainder will, by imitating expiration, be urged forward in the ſame direction alſo.

By frequently repeating this operation therefore, the diſtention of the right auricle and ventricle, and of the great veins connected with them, will be removed,

and

and the compreſſion of the brain, which depended upon this diſtention, will be overcome alſo.

It is incumbent upon us in this place to enquire, whether bleeding can have any effect in removing the compreſſion of the brain, and the congeſtion in the right ſide of the heart and venal ſyſtem.

If an opening is made in any of the veins of the arm, the greater part of the blood in the veins below the orifice may, by rubbing the extremity, be evacuated; very little, however, can be procured, becauſe the left ſide of the heart and arterial ſyſtem being almoſt deſtitute of blood, a freſh ſupply is intercepted: indeed, could any quantity be procured, it would do no good, although it might do harm, by leſſening the quantity in the

left ſide of the heart and its appendages, without leſſening that in the right ſide and great veins, as the valves will effectually prevent the retrograde motion of the blood in the veins.

We cannot procure blood from the right auricle or ventricle, the pulmonary artery or venæ cavæ, by making an immediate opening into either of them; nor is it poſſible, by opening a vein in any acceſſible part of the body, to diminiſh in the leaſt the quantity of blood in any of thoſe cavities, and for the ſame reaſon that it could not be done by bleeding in the arm, the action of the valves preventing the blood's paſſing in a direction contrary to its natural courſe. It is therefore impoſſible to effect any diminution of the quantity of the blood in the right ſide of the heart by bleeding:—we will now enquire, whether, by that operation, we

we can in any meaſure remove the compreſſion of the brain, which, as we have ſeen, is the immediate cauſe of the animal's loſing the uſual ſigns of life.

To aſcertain this point, it will be neceſſary to conſider the manner in which the blood returns from the brain and its membranes.

The blood ſent to the brain returns from thence more particularly by the internal jugular veins, which are continuations of the lateral ſinuſes; ſoon after they get out of the cranium they run along the vertebræ of the neck, and paſs behind the ſterno-maſtoidæi, and omo-hyoidæi, and end in the ſubclavian veins. The internal jugular veins, therefore, are too deep to attempt the drawing off blood from them.

But although the internal jugular veins are the principal conductors of the blood from the inſide of the head, yet the blood is in part conveyed from the brain itſelf into the external jugulars by the orbitary ſinuſes, which communicate with the venæ angulares, frontales, naſales, &c. The poſterior external jugulars receive veins which come out of the cranium by the poſterior maſtoide hole from the lateral ſinuſes; they alſo receive the occipital veins which have further communication with the lateral ſinuſes, and under the angles of the lower jaw the poſterior and anterior external jugular veins communicate. But independent of, and beſide theſe, there are a great variety of communications between the internal and external jugular veins themſelves.

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It cannot admit of the ſmalleſt doubt, therefore, but that by drawing off blood from the external jugular vein, we ſhall diminiſh the quantity of blood in the brain; and, as the compreſſion of the brain, and its conſequences the loſs of the appearances of life, depend upon that ſuperabundant quantity, it will be adviſable in all caſes, but particularly in thoſe when the external appearances of diſtention are violent, to have immediate recourſe to that operation.

It is evident, from what has been ſaid reſpecting the operation of artificial reſpiration, that it has the moſt powerful effect in removing the congeſtion about the heart and lungs, and conſequently the compreſſion of the brain likewiſe; on this account bleeding may be thought unneceſſary, but, as it will materially expedite the removal of the compreſſion,

I am of opinion it ought by all means to be employed.

As ſoon as the blood is thus conveyed into the left ſinus and auricle, it is thrown into the left ventricle, and is from thence propelled into the aorta, its large branches, and ſmall ramifications; the veſſels having, however, in a good meaſure loſt their irritability, or power of contraction, which is univerſally allowed to be the principal cauſe of promoting the circulation through the ſmaller order of veſſels, an obſtruction will begin to take place, and the further progreſs of the blood into the correſponding veins will be prevented. How is this obſtruction to be overcome?

The only method of ſupplying the defect of the vibratory motion of the ſmall veſſels,

veſſels, will be by alternately compreſſing and dilating them; and in this manner their contained blood muſt of neceſſity be driven towards the heart, as the valves will prevent its retrograde motion. Hence we ſee the great advantage that is to be obtained from the proper application of frictions, more particularly when they are applied to the extremities.

When the blood is in this way, with ſome degree of equality, diſtributed through the vaſcular ſyſtem, we have an opportunity of paying more attention to the ſupport and increaſe of the heat remaining in the body, which we know, from a variety of circumſtances, is very intimately connected with the healthy ſtate of the ſyſtem, and which, therefore, at this time demands our aſſiſtance.

It does not appear, however, that the conſtitution at this time, I mean when all the functions are either entirely ſuſpended, or very much diminiſhed, requires any great degree of heat for its ſupport; on the contrary, it appears from many obſervations, and particularly from Mr. Hunter's experiments, "that the degree of external heat ſhould bear a proportion to the quantity of life," that "warmth cauſes a greater exertion of the living powers than cold; and that an animal in a weakly ſtate may be obliged to exert a quantity of the action of life ſufficient to deſtroy the powers themſelves."

I am further confirmed in this opinion from the event of the following experiments.

EXPERI-

EXPERIMENT.

An animal was drowned, and the temperature of its body reduced as ſoon as poſſible two or three degrees below the temperature of the air, which was ſixty-one degrees, by allowing it to remain in the water: ſmall electrical ſhocks were now paſſed through the extremities, of ſuch a degree of ſtrength as was merely ſufficient to excite a contraction; the animal was then plunged into water three degrees warmer than the muſcles of its thigh, and the heat of the water was increaſed three degrees every five minutes, till it became of the healthy ſtandard; notwithſtanding the heat was ſo gradually applied, the power of contraction in the muſcles diminiſhed at every obſervation ſo much, that it was neceſſary

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to increaſe the ſtrength of the ſhock every time; but ſome time before the body had acquired the natural ſtandard, the irritability of the muſcles was entirely deſtroyed.

The experiment was repeated with this difference: the heat of the body was reduced in one inſtance to ſeventy degrees, in another to eighty, the animals being kept in the water twenty minutes; the degree of irritability was then accurately aſcertained, and the heat of the bodies increaſed in the ſame gradual manner as before; but in neither inſtance, nor in any experiments I afterwards made, did the powers of life increaſe; on the contrary they evidently diminiſhed, and, as far as I could judge, equally as faſt as when no artificial heat was applied.

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In whatever point of view this ſubject is obſerved, it is evident that the external heat ſhould be applied in the moſt gradual manner; and even when this is done with every precaution, it will be highly adviſable to continue the body at a moderate degree of heat, and never attempt any degree equal to the natural temperature, until the ſymptoms of life are ſufficiently ſtrong to bear ſo great an exertion.

While I am treating upon this part of the ſubject, I cannot avoid noticing ſome directions that have lately been given concerning it, which I ſhould not think it adviſable to follow; and I the more readily do it, as they are delivered by a gentleman for whoſe abilities I entertain a great reſpect, and to whoſe opinion the world will ever be inclined to pay much attention.

Dr.

Dr. Goodwyn, in his book "on the connexion of life with reſpiration," ſpeaking of the application of heat, after ſome judicious obſervations, ſays it ſhould be applied very gradually and uniformly, and it may be raiſed to ninety-eight degrees, but not further than one hundred.

"When the body is warmed uniformly, and the heat of the interior part about ninety-eight degrees, we direct our attention to the ſtate of the thorax; and, if the patient makes no attempt to inſpire, we proceed to inflate the lungs with air."

It is to me a matter of extreme aſtoniſhment, that we are here directed to wait till the body is uniformly warm, and the heat of the interior parts about ninety-eight degrees, before we turn our attention to the ſtate of the thorax, and proceed

proceed to inflate the lungs. The enormous length of time neceſſary to give a body, that has in winter fallen into the water, and for a conſiderable time been expoſed to the cold bleak air, an uniform and natural degree of heat, will readily be conceived by thoſe who have ſeen perſons in ſimilar ſituations; and by them it will naturally be ſuppoſed, that by the time the body has acquired this degree of artificial heat, the vital principle, unaided by the ſmalleſt degree of circulation, will be too far extinguiſhed for any future recovery. I muſt approve the directions for conducting the application of heat, becauſe precautions nearly ſimilar to mine are recommended, and for ſimilar reaſons; but where ſo much dependance is placed on the immediate application of heat, and where ſo great a quantity is directed, I fear its application

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will be made too ſuddenly, and thereby deſtroy the ſmall remains of vitality, or at leaſt materially impede its further increaſe.

No reaſon is given by Dr. Goodwyn, nor do I conceive any good reaſon can be given, why we are to wait till the body is thoroughly warmed before we inflate the lungs; for from any thing that apears to the contrary, the blood may, according to his theory, be as readily changed at one period of the treatment as at another. In every caſe of ſuſpended animation, therefore, I ſhould, on every account, have recourſe to artificial reſpiration; as ſoon, at leaſt, as I had placed the body in the beſt ſituation for the application of external heat.

No one, I believe, at this time doubts that the conſtant ſupply of animal heat is occaſioned by the action of the air on the

the blood in reſpiration: this is rendered ſufficiently evident by the very accurate and elaborate experiments of Dr. Crawford; and from the manner in which that gentleman explains the generation of animal heat, we have reaſon to apprehend, that the circumſtance of artificial reſpiration is one of the moſt powerful and effectual means we can employ for producing heat in the body at this time; and this it will be likely to do in proportion to the remaining degree of life. "The pure air," ſays Dr. Crawford, "is received into the lungs containing a great quantity of elementary fire; the blood is returned from the extremities impregnated with the inflammable principle; the attraction of pure air to the latter principle is greater than that of the blood. This principle will, therefore, leave the blood to combine with the air; by this combina-

combination the air is obliged to depoſit a part of its elementary fire, and as the capacity of the blood is at the ſame moment increaſed, it will inſtantly abſorb that portion of fire which has been detached from the air." Now there is every reaſon to think that the blood in the lungs of drowned animals is very fully impregnated with the inflammable principle, and conſequently, if there be any degree of vitality remaining in the ſyſtem, the repeated application of freſh air to the lungs will be likely to produce effects ſimilar to, although in a ſmaller degree than in thoſe who have a greater degree of life.

In confirmation of this idea, it ſuits my purpoſe to obſerve, that I once attended a perſon who had been ſome conſiderable time in the water, and was a ſtill greater length of time expoſed in his wet clothes

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to the action of the air. When removed on ſhore there was no opportunity in the houſe to which he was conveyed, of applying external heat; but all the other means of recovery were employed with unremitting aſſiduity, in order, if poſſible, to compenſate for the loſs of ſo powerful a remedy: artificial reſpiration was, in particular, very conſtantly and attentively employed, but all to very little purpoſe; for, although there was evidently ſome irritability in the body, yet the vital functions could never be renewed. In the progreſs of the treatment there was one circumſtance which pleaſed us not a little, and from which I entertained conſiderable expectations of a favourable termination; it was, that although no external heat of any conſequence had been applied, yet after our remedies had been employed ſome time,

there was a generous warmth diffuſed over the greater part of the body, and which I attribute to the action of the air on the blood in the lungs.

When the compreſſion of the brain, and the diſtention of the right auricle and ventricle, and of the great veins connected with them, are removed; and when the irritability of the heart and vaſcular ſyſtem is prudently increaſed by the proper adminiſtration of heat, it is from every conſideration rendered in the higheſt degree probable, that we have done every thing in our power; we have removed the original cauſe,—have diminiſhed the conſequent effects,—and have increaſed the irritability as much as could be done conſiſtently with prudence:—

dence:—in my opinion art can do no more. The event of the caſe will now depend entirely on the remaining powers of the conſtitution: if they are conſiderable, the heart will be enabled to act with force ſufficient to propel the blood through the vaſcular ſyſtem; but if the power of contraction is materially weakened, the blood will either not circulate at all, or elſe in ſo ſmall a degree as to be inſufficient to continue the neceſſary functions of life.

We will take this opportunity, however, of enquiring whether, under any, and what circumſtances, other remedies that have been ſuppoſed particularly uſeful may be really ſo. The principal of theſe are electricity, particular ſtimuli adapted to the different organs of ſenſe, and irritating medicines thrown into the ſtomach and inteſtines.

That ſhocks of electricity, when ſent through the region of the heart, will ſtimulate it to contraction, is moſt certainly true; and from this circumſtance I ſome time ſince entertained very conſiderable expectations, from its application in the recovery of animals whoſe reſpiration had been ſuſpended.

But ſince that time I have had better and more frequent opportunities of obſerving the real ſtate of the heart, which I have in another place mentioned as continuing its contractions ſome conſiderable time after the external characteriſtics of life have quitted the body; as, therefore, it already poſſeſſes not only the power of contraction, but does abſolutely continue to contract, and that with apparently ſufficient energy to propel the blood

blood through the veſſels, if there were no impediment to its paſſage, any additional ſtimulating power will be wholly unneceſſary; and conſequently it does not appear what good effect electricity can produce when applied to the heart.

It is not probable, either from reaſon or experiment, that it can have any influence on the brain, which is entirely of a pulpy ſubſtance; or on the lungs, which are deſtitute of muſcular fibres, and are perfectly paſſive in reſpiration.

The next part on which it might operate with advantage, is the diaphragm, as it is ſo intimately connected with the vital organs, and is ſo readily excited to contraction; but even here its utility is not very apparent, for the action of the diaphragm can be of no further ſervice than by producing motion of the lungs, and conſequently a ſmall degree of reſpi-

ration, which we know how to produce much more readily and effectually by other means.

If electricity is, therefore, ever admiſſible in the treatment of caſes now under our conſideration, it muſt be when reſpiration has long been ſuſpended, at which time the action of the heart will neceſſarily be much diminiſhed.

Although I do not expect any advantage from its application, yet, ſo far as I am able to judge, if it be prudently and cautiouſly applied it will not do any harm; if a very ſtrong ſhock is ſent through any muſcle, it will leſſen its irritability; and if it be frequently repeated, its power of contraction will ſoon be deſtroyed: the irritability of the ſyſtem at large, however, will not ſuffer in the leaſt, nor even the irritability of thoſe parts that are in immediate contact with the affected muſcle.

muſcle. I have frequently ſent ſtrong ſhocks through one auricle or ventricle of the heart while both have been beating, till both the motion of the part and its power of contraction have been deſtroyed, and yet the one that has not been electrified has continued its contraction regularly, even for hours after. Small ſhocks, I have no doubt, in ſome degree leſſen the irritability of the parts through which they paſs, but it is ſo trifling as to be almoſt imperceptible; and on this account I would recommend, that the ſtrength of the ſhock ſhould be no greater than merely ſufficient to occaſion a contraction; what this preciſe degree is in the human frame I have not yet had ſufficient experience to aſcertain, although I can very well judge in various kinds of quadrupeds. I ſhould, however, commence this operation with ſhocks about two or

three tenths of an inch, from a ſmall vial containing not more than ten or twelve inches of coated ſurface; if theſe did not produce effect, I would gradually increaſe both the length of the ſhocks and ſize of the vial; and, proceeding in this manner, it will be impoſſible to do harm, let their ſtrength be ever ſo great; although I apprehend, if ſmart ſhocks from a pint vial do not produce effect, that it will not be poſſible to do it by any means whatever.

When an animal loſes the external characteriſtics of life, he loſes ſenſation and voluntary motion likewiſe: this is extremely evident, and very eaſily proved; for if an animal is covered with water till it appears dead, it may then be opened and cut in every direction, without exhibiting the leaſt motion or ſenſe

of

of pain from ſuch treatment; is is abſurd, therefore, to ſuppoſe that remedies applied to parts deſtitute of feeling, and the power of motion likewiſe, can be productive of any effect whatever upon the part, either good or bad; as well might we expect to operate upon the feelings of a ſtone, or any other inanimate ſubſtance, as to imagine it is in our power to excite thoſe of animals under theſe circumſtances. Irritating remedies applied to the ſkin, and all the other ſtimuli adapted to the different organs of ſenſe, cannot therefore be of the leaſt benefit while ſenſation and voluntary motion are ſuſpended.

From the ſympathy that is well known to exiſt between the ſtomach and the vital organs, more particularly when in a ſtate both of health and diſeaſe, we are led to conceive, that exciting its action

may

may, be productive of advantage in the preſent ſituation; and ſo moſt aſſuredly it would, were we able to effect it; but as the nerves of the ſtomach are in the ſame ſtate as thoſe in the other parts of the ſyſtem, that is, deprived of their power of action, it will not be poſſible for us, by any means, to produce any ſenſation or action whatever in the ſtomach, until the energy of the brain be in ſome meaſure reſtored.

All this is confirmed by a variety of experiments, for I was never able to obſerve that any ſtimulus applied to the internal ſurface of the ſtomach produced a perceptible effect; if a ſolution of white or blue vitrol, or emet. tartar, were injected, it did not produce vomiting; nor did ſtimulating medicines increaſe either the ſtrength or quickneſs of the heart's motion when reſpiration and the uſual action

tion of the brain were interrupted, and conſequently when ſenſation and voluntary motion were ſuſpended, and the uſual ſigns of life had diſappeared.

Applications to the internal membrane of the inteſtines will be attended with no better effect; but even if it were poſſible to act on their nerves, and excite the periſtaltic motion, it does not appear what influence this would have on the vital functions, and the ſyſtem at large; for the periſtaltic motion will continue ſometimes upwards of two or three hours after the appearance of death has taken place, it will even continue after the brain is removed from the body, nay after the inteſtines themſelves are removed: the reaſon of this I apprehend to be, that the fæces are the proper ſtimulus of the inteſtines and the moſt powerful that can be applied to them; for if any other ſtimulus,

lus, ſuch as warm atmoſpheric air, air loaded with the effluvia of aromatic ſubſtances, warm water, aromatic decoctions, or electricity, be recurred to, after the motion has once ceaſed, it has never happened to me to obſerve that they were reproduced. The nature of this ſtimulus is not affected or altered by any change that takes place in the ſyſtem, and therefore it continues to exert its effects on the inteſtines ſo long as their irritability remains. So that it does not ſeem, even if it were in our power to continue or increaſe the periſtaltic motion of the inteſtines, that it would be in any reſpect advantageous.

If theſe remedies are at any time capable of producing good effect, it muſt be when the principle of *ſenſibility* is in ſome meaſured returned;—that is, when the body begins to diſcover ſome appearances

of

of life,---at this time it may be judged unneceſſary,---but from various conſiderations I am diſpoſed to believe that they may be of much real benefit. I will not, in this paper, dwell particularly on them as it ſeems to me that I have already done that ſufficiently in another place. I will content myſelf with obſerving, generally, that ſtimulating remedies of every kind, applied to the different organs of ſenſe, will increaſe the excitement and energy of the brain, and the other vital functions muſt of neceſſity be increaſed alſo.

In caſes of extreme debility ariſing from other cauſes, and where all the vital actions are much diminiſhed, a ſimilar mode of treatment is adopted with much ſucceſs; bliſters are applied to irritate the nerves of the ſkin, the volatile alkali to ſtimulate thoſe of the noſtrils, and a gene-

rous

rous cordial is thrown into the ſtomach; it is well known that any of theſe remedies applied individually will rouſe the languid powers of life, and increaſe the action of the heart and arteries; but if they all are had recourſe to at the ſame time, then the effect will be proportionably powerful.

I am ſtill of opinion that the action of vomiting, if excited by ſuch medicines as do not occaſion a preceding or conſequent nauſea, may be productive of much good. Nauſea weakens and debilitates the animal powers to a very great degree; it is ſelf-evident, therefore, that it muſt be extremely prejudicial in ſuch caſes as we are now treating of, and ought moſt particularly to be avoided; but full vomiting may be effected without inducing any ſuch ſymptoms: it then produces a ſtrong action in the ſtomach, diaphragm, and

and abdominal muſcles; the conſequence of this action muſt neceſſarily be a ſtronger propulſion of the blood throughout the whole vaſcular ſyſtem, but more particularly through the brain and all the abdominal viſcera: ſtagnations of the blood in the inferior order of veſſels will be overcome, and by ſuch means, it is probable, the equable circulation of the blood throughout the whole ſyſtem will be effected ſooner than by any other.

Of what, and how great, importance the eſtabliſhment of a free circulation muſt be, is evident to the moſt ignorant; ſuffice it to ſay, that if a perfect recovery does not enſue after ſuch appearances, it muſt, in my opinion, be attributed to improper treatment.

From what has been ſaid, therefore, I conclude, that neither ſtimuli applied to the different organs of ſenſe, or irritating medi-

medicines thrown into the ſtomach and bowels, can produce any effect while ſenſation and voluntary motion are ſuſpended; but that they are capable of producing much advantage, if applied when the principle of ſenſibility is in ſome meaſure returned.

APPENDIX.

APPENDIX.

I have, upon a former occaſion, mentioned the electrical ſhock as being the *teſt* or *diſcriminating characteriſtic of any remains of animal life*, and my ſubſequent obſervations and experiments have confirmed me in the opinion that it is the only means by which we can diſtinguiſh between abſolute and apparent death.

It may not be amiſs, however, in this place to obſerve, that as the irritability is different in different parts of the body, and as it is materially diminiſhed in ſome parts before it is at all affected in others, electricity, applied to a *particular part*, cannot be conſidered as an accurate and perfect evidence of the ſtate of the *whole*

ſyſtem: to determine this, therefore, with preciſion, it will be neceſſary to paſs ſmall ſhocks in various directions through the body, when, if they produce contractions, we may be certain the parts through which they were ſent are alive; if not, that they are abſolutely dead*.

If tolerably ſtrong contractions follow very ſmall ſhocks, the remaining powers of life may be deemed very conſiderable;

* The length of time the irritability continues, and the part it continues in, are different in different experiments. Five hours and an half is the ſhorteſt, and twenty-three hours and forty minutes is the longeſt, time I have obſerved the irritability to continue in the heart; in ſome it has continued longeſt in the right auricle, but in at leaſt as many it has continued longeſt in the left auricle: ſometimes I have found it has quitted almoſt every part of the heart one, or even two hours, before it had left the extremities; but I have met with but few inſtances where it remained in any other part after it had entirely quitted the heart.

but

but if ſtrong ſhocks are requiſite to produce trifling motions, the irritability muſt be almoſt entirely exhauſted.

In this manner, therefore, we may judge with great accuracy concerning the degree of vitality remaining in all the external parts of the body; and may likewiſe determine, if we obſerve attentively, the motion of the diaphragm; but I do not know in what manner we can perceive the contraction of the heart, in which organ the irritability moſt commonly continues the greateſt length of time, more eſpecially if reſpiration has long been ſuſpended, for then the left ventricle and arterial ſyſtem being almoſt deſtitute of blood, we cannot feel any thing like a pulſation in the larger arteries, a circumſtance that may indicate when reſpiration has lately ceaſed, as at that time the left ventricle, and arteries

proceeding from it, contain a quantity of blood.

An animal body cannot be ſaid to be poſitively and abſolutely dead, ſo long as any part of it can by any means be brought into a ſtate of contraction; but it is far from being neceſſary, when we wiſh to determine whether the body is in a recoverable ſtate, to be certain that every part has loſt its irritability; for I am ſatisfied, by abundant experiments, that the irritability may, and does continue, in *every part of the body*, a conſiderable time, ſometimes an hour or two, after the animal could not be recovered.

Upon the whole then, and from the experiments I have made, I am ſufficiently convinced,

That, in caſes of what is uſually called ſudden death, a recovery is not to be expected if the irritability of any of the extremi-

extremities is deſtroyed, or even if it is materially diminiſhed *.

In a late publication on this ſubject it is ſaid, with ſome degree of exultation, that

* Mr. Coleman ſays, my opinion that the electrical ſhock is to be admitted as the teſt or diſcriminating characteriſtic of any remains of animal life—"is fraught with imminent danger and a dangerous prognoſtic built merely on hypotheſis"—after this, it is reaſonable to expect that a man of candor ſhould offer ſomething in the ſhape of an experiment—or ſtate facts in its ſupport:—no ſuch thing—the only way in which he ſupports it is, by joining this idea of electricity with an opinion I had elſewhere expreſſed "that irritability and vital heat appear to be co-equal" "which opinion" he ſays, "is incompatible"—now whether the idea of the criterion is correct or erroneous, is not in the leaſt affected by what he ſays, but it clearly proves the very high idea he entertains of his own notions, over the *facts* and *experiments* of others.

"whenever the functions of an animal are ſuddenly ſuſpended, and the body puts on the appearance of death, it is always in our power to determine whether it be really dead, by reſtoring the temperature, and by inflating the lungs with proper air." It does not appear, however, that there is any thing new or important in this obſervation; for if an animal does not recover from ſuch treatment, there are very few who would expect it to recover from any other. Dr. Goodwyn has not ſtated any particular length of time as being requiſite to make the determination; ſo that in one ſenſe he is ſure to be right, for if theſe means are made uſe of without effect for ſeveral hours, it will not be doubted that abſolute death has taken place.

When

When a kitten, or young puppy, is drowned in the uſual manner, all voluntary motion ceaſes, the ſenſes are aboliſhed, and the animal appears perfectly dead in about one minute and twenty ſeconds. In a very ſhort time, however, from fifteen ſeconds to one minute, it is affected with a violent and general convulſive motion: this motion is ſtrong, regular, and ſlow; ſometimes remaining near five ſeconds. It returns in a few ſeconds, and is repeated two or three times in every minute, ſometimes for the ſpace of a quarter of an hour, but more commonly, and at a medium, for about ten minutes after the natural ſtruggling has ceaſed.

I am perſuaded this convulſive motion is entirely an extraordinary exertion of the remaining powers of life to continue reſpiration, and for this reaſon, that the diaphgram and abdominal muſcles are

more particularly concerned in the action; but all the muſcles connected with reſpiration, both ordinary and extraordinary, are contracted likewiſe; the convulſion is alſo attended with a kind of gaſping, which is a further corroboration of the opinion: indeed it is placed out of all doubt, for if the animal be removed from the water, it remains perfectly ſtill till the convulſion returns, which is accompanied with a very deep inſpiration, and ſucceeded in a few ſeconds by an expiration.

Several experiments were made upon the following plan:

EXPERIMENT.

In the ſpace of a minute after the ſtrugglings had ceaſed, the animal was removed from the receiver and expoſed to the open air; inſpiration accompanied the

the next convulſive motion, and reſpiration was ſoon eſtabliſhed.

The ſame event happened when the animal was withdrawn at the end of the ſecond, third, and fourth minute; they ſeldom recovered at the fifth or ſixth, and I do not perceive by my notes that any revived after the ſeventh, although they might make ſeveral imperfect reſpirations after that time.

As far as my experiments upon ſuch animals as are here inſtanced have gone, we may be allowed to conclude, that they will very generally recover their vital functions, after the natural ſtrugglings from drowning have ceaſed for the ſpace of four minutes.

I made a few experiments with the view of obſerving the longeſt general period at which it would be poſſible to recover

ver animals that had been immerſed in water, by the ſingle remedy of reſtoring reſpiration; the ſuſpenſion of which was the cauſe of inducing the appearance of death. I had not an opportunity, however, of purſuing this intereſting ſubject with that accuracy or attention to which it is ſo deſervedly entitled, on account of the difficulty of procuring a ſufficient number of ſubjects for experiments. All that I ſhall therefore, at this time, mention reſpecting it is, that although I have been able, by imitating natural reſpiration, to recover ſome animals after they had been eight, ten, or twelve minutes under water, I have obſerved ſeveral inſtances when the operation had been performed with accuracy in which the animal did not recover, notwithſtanding it had not been immerſed ſo long as ſome others that had recovered ſpontaneouſly.

I cannot

I cannot venture to draw any general concluſion from the event of my experiments on this part of the ſubject. If, however, I might be allowed to form any *opinion* upon it, it would be this: that reſtoring ſuſpended reſpiration will probably not be ſufficient to renew the vital functions, if it be not attempted before the convulſive motions of the animal have ceaſed*.

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* I have before remarked, that the continuance of this motion is uncertain; the ſooneſt I obſerve in my notes is three minutes, the longeſt twenty; but the medium of many experiments is eleven minutes and thirty-five ſeconds; the probable time of recovery, therefore, will vary likewiſe, but the average may perhaps be about eleven minutes and a half alſo. It is a ſubject, however, that demands a further inveſtigation.

From

From the appearances on the diſſection of animals that have been hung, it is natural to conclude that their death ariſes from the ſame cauſe as thoſe which are drowned,---a ſuſpenſion of the action of reſpiration. I have always, however, had ſo much difficulty in conceiving how it was poſſible, that the trachea could be ſo completely ſhut by the preſſure of the cord, as wholly to intercept the paſſage of the air, that I could not allow the death of the animal to be owing to that cauſe only, although I did not heſitate to admit it as the principal one.

Conſiderable light may be thrown on this circumſtance, by hanging an animal whoſe trachea is not included in the ligature, or into whoſe trachea an opening has previouſly been made, ſo that the paſſage of the air into and out of the lungs may not be intercepted; if an animal in this ſituation ſhould die in the ſame, or nearly

nearly the ſame time that another animal of the ſame age and ſpecies would die hung in the uſual manner, the death of animals that are ſo hung muſt be attributed to ſome other cauſe than a ſuſpenſion of reſpiration: but if the animal ſhould live any conſiderable time longer than uſual, its death ſhould then be imputed to that circumſtance only.

EXPERIMENT.

A dog was hung in the uſual manner; in eight minutes his ſtruggling ceaſed, and in nine minutes the pulſation of the heart could not be perceived.

EXPERIMENT.

An opening was made into the trachea of a dog about two months old, and a ligature being paſſed round his neck above the opening, he was hung as uſual:

he

he ſtruggled for ſome time, but breathed freely through the aperture in the intervals of ſtruggling: in this kind of way the animal continued for the ſpace of an hour and an half, when he was cut down, and appeared to have received but little inconvenience from the ſuſpenſion. Early the next morning he eſcaped from his place of confinement, and became ſo troubleſome to the ſervants that they turned him away.

If the death of animals that are hung ariſes from the preſſure of the cord preventing the return of the blood from the brain, the animal ſhould die very ſoon when a tight ligature is made round the blood-veſſels of the neck without including the trachea.

EXPERIMENT.

The trachea of a dog was ſeparated from

from the contiguous parts, and a cord paſſed under it and round the vertebræ of the neck, ſo as to include every blood veſſel of the neck, but to leave the opening into the lungs free and pervious. One end of the rope being then faſt to a fixed point, the force of three men was exerted to draw it tight, which being continued ſeveral minutes, he was left ſuſpended, the cord ſtill drawn moderately tight. In this ſituation the animal continued alive two hours and ten minutes, and it ſeemed as if he then died more in conſequence of his own exertions than any other cauſe.

From theſe experiments it appears,

That the death of animals which periſh from hanging is not occaſioned by any compreſſion of the nerves, arteries, or veins

veins of the neck, but is owing entirely to the trachea being ſhut by the preſſure of the cord, and thus cauſing a ſuſpenſion of reſpiration.

I cannot omit this opportunity of making ſome remarks on one or two inſtruments lately recommended for inflating the lungs.

Dr. Goodwyn intends that his ſyringe ſhould inflate the lungs and draw the air out again; and this it appears as if it would do very effectually; but yet, if I underſtand the conſtruction of the inſtrument, one half of the air laſt expired, or what remains between the opening (a) and the lower part of the cylinder, will be again forced into the lungs, becauſe there is no opening at the lower part to permit

permit the eſcape of the air, as there is at the upper part; and of this the Doctor ſeems aware when he ſays the *greater* part of the expired air eſcapes into the atmoſphere. If the blood of an animal under the circumſtances we ſuppoſe our ſubject to be, has the power of phlogiſticating air thrown into the lungs, the air next expired will of courſe be worſe than when thrown in: only half of this foul air, however, is thrown out of the inſtrument, the remainder (half of which is air that has once been in the lungs) is mixed with the ſame quantity of freſh air, and thrown into the lungs again; hence it is evident that the air thrown in becomes worſe every time, and that, in every point of view, air from the lungs of an healthy perſon would be preferable.

I have before remarked, that it would be adviſable to introduce as large a quantity of air into the lungs, as they can well contain, and this, whether it be done on the ſuppoſition of the air acting chemically or mechanically: one hundred inches is recommended,—but as our lungs will hold three times that quantity without inconvenience, I think it would be adviſable to uſe three times as much.

In giving the deſcription of a fumigator, Dr. Cogan makes this remark, "ſome have been conſtructed ſo as to work with a piſtern in the manner of a ſyringe," but "they are *expenſive, complicated, and ſoon out of order, and are worked with great labour and fatigue*,"

This inſtrument is, however, ſaid to anſwer the purpoſe of extracting water from the lungs, as well as of throwing air into them.

When

When it is intended to anſwer this purpoſe, the inſtrument acts in the manner of a common air-pump, though, as the piſtern is drawn but half way up the cylinder, only fifty inches of air can be drawn out. Dr. Goodwyn has ſhewn in another place, that there are upwards of one hundred inches of air in the lungs of dead perſons, ſo that not half of the air in the lungs will be extracted. The only way in which an inſtrument of this kind can operate ſo as to effect the extraction of water, muſt be by diminiſhing the capacity of the air-cells, and in this manner half their contents, whether air or water, will of courſe be evacuated; for evident reaſons the air will firſt be drawn into the cylinder, and the greater part of the water will remain in the lungs, till, if it could be ſo contrived, by repeated exſuctions, the cells of the bronchia are drawn ſo cloſe together that their contents muſt be ex-

pelled. In order to explain more correctly the effect of this inſtrument, let us ſuppoſe a perſon taken out of the water with a conſiderable quantity (fifty inches for inſtance) of water in his lungs: the inſtrument being properly applied, fifty inches of ſomething are drawn out of the lungs; by far the greater part of this will, of courſe, be air, becauſe that being lighteſt will be uppermoſt; and if any quantity is confined in the bronchia by the water, it, by means of its great elaſticity, will force its way through the water when the firſt exhauſtion has taken place. As ſoon as the inſtrument is removed, the external air will occupy the place of whatever was drawn out by the firſt operation; ſo that when the inſtrument is uſed again, the freſh air, which has juſt entered, is extracted, but the water muſt ſtill continue almoſt the ſame in the lungs,

and

and ſo it muſt, let the operation be repeated ever ſo often, and for the ſame reaſons.

From this view, it appears that this inſtrument poſſeſſes no advantage over thoſe in common uſe for inflating the lungs; and that, in the ſtate in which it is here deſcribed, it will not anſwer the purpoſe of extracting water from the lungs, although with ſome alterations it might be made to anſwer that purpoſe effectually; but how ſafely, I will not pretend to ſay; of that point I have many doubts.

EXPERIMENT.

I procured an hollow glaſs globe, capable of containing a few ounces; two openings were made into it oppoſite each other; in one I fixed a valve of oiled ſilk, this valve would allow air to paſs from

the globe, but not into it; and by means of a ſcrew it was connected with a ſmall exhauſting ſyringe: in the other opening of the globe I fitteda tube proper to be introduced into the trachea; the inſtrument was now in effect an air pump, the globe anſwering the purpoſe of a receiver, and the valve connected with it allowing every degree of exhauſtion that might be required. If the pipe of this inſtrument be introduced into the trachea of a drowned animal, and the air drawn out of the globe, whatever is in the trachea or lungs, will be brought from thence into the globe. The pipe was therefore introduced into the trachea of a ſmall animal, and the piſtern gradually drawn up, but, notwithſtanding this attention, ſome of the blood-veſſels were ruptured, for as much blood as water was perceived in the globe; the operation, therefore, of extracting

tracting water from the lungs by any exhauſting inſtrument, is, on account of the danger attending it, what I ſhall never attempt, except in my experiments on brutes.

It is poſſible, however, that there may not be ſo large a quantity of water in the lungs as to render it neceſſary to have recourſe to any particular method of removing it: I always concluded ſo from the event of my own experiments, and my opinion is not altered by the ſmall quantity Dr. Goodwyn mentions to have found in his; for if the water were even in greater abundance, I ſhould not apprehend that it would prove any material impediment to *the action of the air on the blood*, for we daily ſee that the colour of the coagulum changes ſoon after it is

drawn from the vein when it is conſiderably below the ſurface of the ſerum. In certain caſes of catarrh likewiſe, and where, from general relaxation of the veſſels of the lungs, a great ſecretion of mucus takes place, we have reaſon to think that ſometimes, and in particular caſes, the whole of the air-cells are occupied with mucus inſtead of air, and yet the atmoſphere exerts its uſual influence over the blood in the lungs; ſo that if theſe circumſtances are true, and no one can deny them, it does not appear why a very thin ſurface of water ſhould render it "impoſſible to apply the freſh air ſufficiently near to change the quality of the blood."

A pair of double bellows has lately been made known to the public; they are,

are, as well as the inſtrument laſt deſcribed, intended to imitate expiration as well as inſpiration, and, from the account I have ſeen of them, appear very well calculated to anſwer thoſe purpoſes, if they are large enough to contain a ſufficient quantity of air. I do not, however, perceive the leaſt advantage theſe can have over Mr. Hunter's, and their very complicated conſtruction will render them extremely liable to be frequently out of order.

AN

AN ACCOUNT

OF THE

MEDICINAL EFFECTS

OF THE

RESIN OF THE ACOROIDES RESINIFERA:

OR

YELLOW RESIN,

FROM BOTANY BAY.

I SOMETIME ſince received a ſmall piece of a yellow gum * from Botany

* Strictly ſpeaking, it ſhould be called a *reſin*, as will be ſeen by the experiments I have made with it:—but, partly to avoid confuſion, as it has hitherto been called and deſcribed by the name of a *gum* only,—partly, becauſe its proper name is not yet finally ſettled—but more particularly, as a great variety of *reſins*, are by univerſal conſent called *gums*, ſuch as gum elemi,—gum anime—gum hederæ—gum juniper—gum benzoin—gum tacamahac—gum copal—gum labdanum—gum maſtich—gum ſtorax—gum ſandarac—gum guaiacum, &c.—as well as all the *gum reſins*;—I thought it would be better, at leaſt for the preſent, to continue the name as I received it.

Bay,

Bay, and was at the ſame time informed, that it had been found very uſeful in many complaints of the ſtomach.

I happened juſt at that time to have a patient under my care with a very troubleſome complaint in his ſtomach,—it appeared to be either dyſpeptic, or ſpaſmodic, I was not perfectly ſatisfied which:—he had been vomited—his bowels been opened—and he had taken opiates, bitters, and æther, without any apparent advantage—all the medicines except the opium ſeemed to diſagree, and they afforded only a temporary relief.

I thought this a fair opportunity of trying the effect of my new gum,—and I gave him ten grains rubbed with a little common water,—with directions to take ſuch draught every ſix hours, provided he did not find them to diſagree.

At the time of his taking the firſt draught,

draught, he was almoſt as bad as he had been at any period of the complaint:—it, however remained upon his ſtomach, and he obſerved that it did not produce that diſturbance which his food or other medicines had been uſed to do. After the ſecond draught, the ſickneſs, fulneſs, and pain, of the ſtomach, materially abated;—and when he had taken the third, he thought himſelf ſo much better, as to have no occaſion for any further medicine: he, however, deſired to have a few more that he might ſecure againſt a relapſe;—theſe he took the next day, and the day following, he was ſo well as to be able to go about his uſual buſineſs.

I was very well ſatisfied with the event of this caſe—for although I would not venture to attribute the ſudden alteration, altogether to the effect of the medicine, yet it proved that the remedy might in

ſimilar

ſimilar caſes be given not only without the leaſt apprehenſion of inconvenience, but with very probable expectations of material advantage.

Another caſe occurred ſoon after, in which it ſeemed to produce very good effects;—and this fixed my reſolution of examining its chemical properties,—and of attempting to diſcover its medicinal effects.

All

All the information I have been able to collect reſpecting the hiſtory of the yellow gum is the following:

"The plant that produces it is low and ſmall, with long graſſy leaves; but the fructification of it ſhoots out in a ſingular manner from the centre of the leaves, on a ſingle ſtrait ſtem, to the height of twelve or fourteen feet. Of this ſtem, which is ſtrong and light, like ſome of the reed claſs, the natives uſually make their ſpears. The reſin is generally dug up out of the ſoil under the tree, not collected from it, and may perhaps be that which Taſman calls "gum lac of the ground." See Philips's Voyage, p. 59, 60, where an accurate engraving is given of the Plant.

Mr. Bowes, the Surgeon of the Lady Penrhyn gave me a ſomewhat different account; and as this gentleman appeared

to have paid conſiderable attention to the ſubject, his account may certainly be relied upon.

After deſcribing the tree in preciſely the ſame manner as above, he obſerves, that at the top of the trunk of the tree, long graſſy leaves grow in great abundance. The gum is found under theſe leaves in conſiderable quantities: it commonly exudes in round tears or drops, from the ſize of a large pea, to that of a marble, and ſometimes much larger. See ſpecimen No. I. Theſe are by the heat of the ſun, frequently ſo much ſoftened, that they fall on the ground, and, in this ſoft ſtate, adhere to whatever they fall upon; hence the gum is frequently found mixed with dirt, wood, the bark of the tree, and various other ſubſtances. See ſpecimen No. II. He has ſeen one lump compoſed of many ſmall pure

pieces

pieces of various ſizes, united together, which weighed nearly half an hundred weight. It is produced in ſuch abundance, that one man may collect thirty or forty pounds in the ſpace of a few hours. The convicts have another method of collecting it; they dig round the tree, and break off pieces of the roots which always have ſome, and frequently conſiderable quantities of the gum in them. This gum appears nearly, but not entirely, the ſame, as that which exudes from the trunk of the tree: the former is often mixed with a ſtrong ſmelling reſinous ſubſtance of a black nature, and is ſo interwoven in the wood itſelf, that it is with difficulty ſeparated: See ſpecimen No. III. The black ſubſtance appears a pure unmixed reſin.

The following experiments were made principally with the view of determining what menſtruum would diſſolve the gum the moſt readily, and in the greateſt quantity.

EXPERIMENT. I.

Thirty grains of the bright yellow gum in powder, was agitated in a vial with one ounce of ſpring water; it readily mixed with water, but it did not appear that much was diſſolved. In three days, the water was filtred through paper; it retained a ſtrong flavour of the gum, and on evaporation, four grains of matter were encruſted very firmly on the ſides of the glaſs.

II.

II.

Thirty grains of pure yellow gum was boiled ſeveral minutes in a Florence flaſk with eight ounces of ſpring water; while boiling it was paſſed through fine tow—the liquor was evaporated, and gave five grains and a half of extract.

III.

Thirty grains of the ſame gum in powder, was added to one ounce of alcohol, they were ſhaken together till the gum was diſſolved. On evaporation it became a beautiful tranſparent balſam.

IV.

Thirty grains of the ſame gum in powder, was in the ſame manner agitated with one ounce of rectified ſpirits till it was wholly diſſolved. On evaporation it became a beautiful tranſparent balſam.

V.

Thirty grains were treated in the ſame manner with one ounce of brandy—and the gum was diſſolved. On evaporation it yielded an opake gummy reſin.

VI.

Thirty grains were added to one ounce of ether; it wholly diſſolved.

VII.

The ſame quantity was added to one ounce of ſpt. æther. vitr.—and alſo to one ounce of ſpt. æther. nitros.—both diſſolved all the gum entirely, and only a very ſmall quantity of grit remained on the filter.

VIII.

Thirty grains were added to one ounce of aq. kali pur. and it was entirely diſſolved.

IX.

IX

Thirty grains were added to one ounce of each of the following wines—port, calcavella, and cyder. On filtring the wines and evaporating them the port gave eight and a half grains:---the calcavella eighteen grains of very tenacious extract:---and the cyder twenty-five grains of tenacious extract.

X.

Thirty grains were added to one ounce of aq. kali---the liquor becomes of a deep yellow colour—the gum floats at top, and very little solution appears to have taken place.

XI.

Thirty grains added to one ounce of aq. ammon. pur. forms a very deep tinc-

ture---but the gum collects into a lump, and appears to be very little diſſolved.

XII.

Thirty grains were mixed with one ounce of acid. vitr. dil. the liquor becomes of a pale yellow, and the gum remains immoveable at the bottom.

XIII.

Thirty grains mixed with one ounce of acid. nitros. dil. emitted many air bubbles---and continued to do ſo a week afterwards. The quantity of the gum did not appear to be leſſened.

XIV.

Thirty grains mixed with one ounce of acet. diſtil. produced a very pale yellow; the gum collected into a lump, and appeared to be very little diſſolved.

XV.

XV.

Thirty grains mixed with one ounce of ol. tereb. produced a very pale yellow ---the gum collected into a lump at the bottom of the vial. By boiling it diſſolved three parts of the gum.

XVI.

Thirty grains mixed with one ounce of ol. oliv.---the gum does not appear to be diſſolved. On boiling about three fourths of the gum ſeemed diſſolved.

XVII.

Thirty grains of the gum were added to a mixture of one ounce of water, and one dram of quicklime. It produces a high bright coloured tincture, and ſeemed as if it had diſſolved about ten grains of the gum.

XVIII.

XVIII.

Thirty grains of the gum were added to one ounce of lime water---it did not appear to have diſſolved ſo much as ſpring water.

XIX.

Thirty grains of the gum were added to a mixture of one ounce of water and ten grains of kali---it produced ſomewhat of a dark colour, but does not ſeem to have taken up much of the gum.

XX.

Thirty grains of the gum were added to a mixture of one ounce of water and one ſcruple of magneſia:---on filtring and evaporating, the liquor gave two grains of extract.

XXI.

XXI.

Camphor mixed with the gum, diſſolved it after ſome time, but it does not promote its ſolution in water.

XXII.

Half a dram of gum arabic in powder was made into a mucilage: thirty grains of the yellow gum was then well rubbed with it, and two ounces of ſpring water added by degrees: after ſtanding ſometime, the greater part of the gum falls to the bottom.

XXIII.

With the view of determining the greateſt quantity of gum that rectified ſpirit will diſſolve, I added thirty grains to one ounce of the ſpirit: as ſoon as it was diſſolved, I added thirty grains more

---and

—and continued to add, ſometimes that, ſometimes double the quantity, till I found it became of ſo thick conſiſtence, it would not diſſolve any more :—in this way, and in the ſpace of about a month, one ounce of rectified ſpirit diſſolved two ounces of the powdered gum—at which time the tincture was of the conſiſtence of treacle. Ether.—Spt. ether. vitr.—Spt. ether. nitr. each took up eleven drams, in one day.

Brandy treated in the ſame manner, in the ſpace of a month, was made to ſuſpend ſeven drams, which were added at eleven different times, I ſay ſuſpend, for the brandy did not retain the gum in perfect ſolution—at the top of the vial there was about three drams of a clear, light, yellow fluid: below this, a quantity of light matter, reſembling the gum diſſolved, and depoſited in a light looſe ſtate; this, and the yellow

yellow fluid, occupied nearly the ſame ſpace in the vial:---under this, a dark brown liquor, not tranſparent, in quantity about one ounce; and at the bottom of the vial about twelve or fifteen grains of the gum undiſſolved.

The tranſparent yellow liquor was decanted---it contained but a ſmall quantity of ſpirit, for it would not take fire when a lighted paper was applied to it, till it was heated, when it caught fire, and about one third burnt away: the reſiduum was like milk: it was evaporated, and only four grains of light gum remained. What remained in the vial was too thick to paſs the filter.

XXIV.

Alcohol, rectified ſpirit, brandy, ether, ſpt. etheris nitros: ſpt. ether vitr: and aq: kali pur: diſſolved the gum completely

pletely and in conſiderable quantities :— this experiment was made to ſhew which of theſe would diſſolve a certain quantity of the gum the moſt readily. Thirty grains of the gum in powder were added to each of the above; they were then briſkly ſhaken together, and required the following time to make the ſolution.

	Alcohol.	S.V Rect.	Brandy	Ether.	Eth. Nit.	Eth. Vitr.	A.Kali.
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	
1ſt. 30 grains required	1m.	1m.	2m.	0 45	1 30	1 30	2m.
2d. 30	1m.	1m.	4m.	1	1 30	1 30	3m.
3d. 30	1m.	1m.	12m.	1	1 30	1 30	would
4th. 30	1 15	1 15		1	1 30	1 30	not diſ-
5th. 30	1 30	1 30		1	1 30	1 30	ſolve
6th. 30	1 30	1 30		1	1 30	1 30	any
7th. 30	1 30	1 30		1 45	1 30	1 30	more.
8th. 30	1 30	1 30		2 30	1 30	1 30	
9th. 30	2 15	2 15		8	1 30	1 30	

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THE

FOLLOWING TABLE

Shews the quantity of gum that is diſſolved by one ounce of various menſtrua.

	℥	ʒ	℈	gr.
Alcohol	2			
Rectified ſpt. . .	2			
Ether . . .	1	3		
Spt. eth. Vitr. .	1	3		
Spt. eth. nitr. . .	1	3		
Brandy . . .		7		
Lixiv. Sapon. . .		1		
Cyder . . .			1	5
Calcavella . .				18
Calc. viv. et. aqua .				10*
Port . . .				8½
Ol. tereb. . .				4*
Water . . .				4
Aq. kali . .				3*
Aq. ammon. p. .				2*
Acid. vitr. dil. .				2*
Acid. nitr. dil. .				2*
Acet. diſt. . .				2*
Aq. calcis . .				2*
Ol. oliv. . .				2*

Where

Where aſteriſks are placed, it ſhews that the quantity diſſolved is calculated, as it would have been impracticable in many inſtances to determine the exact quantity by evaporation.

XXV.

Thirty grains of the gum were mixed with eight ounces of water---the infuſion was continued ſeveral days during which time it was frequently ſhaken. It was afterwards filtred.

One ounce of the filtred liquor was mixed with two drams of aq. kali---no effervescence enſued---the liquor became of a bright yellow colour.

One ounce of the filtred liquor was mixed with two drams of acid. vitr. dil. no effervescence, or change of colour enſued.

One

One ounce of the filtred liquor was mixed with one dram of a ſolution of ſal martis---the mixture aſſumed ſomewhat of a dark colour.

One ounce of the filtred liquor was mixed with twenty drops of a ſolution of ſublimate---no alteration in colour took place.

XXVI.

Half an ounce of the gum was diſtilled in a glaſs alembic, with a pint of ſpring water, nearly a pint of water ſmelling ſomewhat ſtrongly of the gum, came over. The reſiduum when dried weighed three drams and half. This diſſolved in ſpirits.

XXVII.

Half an ounce of gum was diſtilled

with a pint of rectified ſpirit---the ſpirit came off pure.

XXVIII.

Half an ounce of the powdered gum, was put into a ſmall glaſs retort---it was placed in a water bath: at 180 degrees, the powdered particles began to unite, and almoſt to flow. The retort was then placed in a ſand heat, and very ſoon, about half a dram of inſipid water came over—then about one dram of a dark, heavy, empyreumatic oil. About two ounces of water was then added to the reſiduum—it was diſtilled, and the liquor that came over, had a very ſtrong ſmell of the oil.

XXIX.

The gum inflames in the naked fire—but if thrown on a red hot iron, it is moſtly

moſtly diſſipated in white fumes. On treating one dram of pure yellow gum in this laſt manner, a cinder remained on the iron, weighing ſeven grains.

XXX.

Half a dram of the reſiduum, obtained in the ſame manner as in the laſt experiment, was infuſed in four ounces of ſpring water; in a few days is was filtred, and the lixivium was taſteleſs.

To one ounce of this lixivium was added one dram of the diluted vitriolic acid—not the leaſt appearance of effervescence.

To half an ounce of this lixivium was added one dram of aq. kali. Not the leaſt appearance of effervescence.

To half an ounce of this lixivium was added one dram of ſyrup of violets—the colour of the mixture was exactly the

ſame as when the ſyrup was diluted with the ſame quantity of ſpring water.

To half an ounce of the lixivium, thirty drops of an infuſion of galls were added:—ſcarce any alteration in the colour enſued:—if any, the mixture became ſomewhat darker.

To half an ounce of the lixivium, ten drops of a ſolution of ſal. martis. were added:—it did not make any difference in the appearance of the mixture.

I content my ſelf with merely relating the event of theſe experiments, and ſhall leave it to the reader, to draw what concluſions from them he may think proper.

I now

I now proceed to lay before the Society, the caſes of ſeveral patients in which it has been adminiſtered under my own eye: and ſeveral caſes likewiſe, wherein it has been given under the direction of other medical gentlemen, who have employed it at my requeſt.

CASE I.

Mr. Stables was ſuddenly ſeized with a violent vomiting and purging, which in a very few hours brought him into a dangerous and alarming ſituation—by proper management however, and the aſſiſtance of conſiderable quantities of opium and aromatics, the violence and ſeverity of the diſeaſe was, in a ſhort time abated, and nearly as ſoon as this was done he left off his medicines. His conſtitution in general, and his ſtomach in particular,

however, ſuffered ſo much in conſequence of this attack, as to diſable him from following his buſineſs a conſiderable time after:---ſickneſs and ſometimes vomiting ---and a conſtant pain in the ſtomach, which two or three times a day increaſed to a violent degree---together with what is called a bilious aſpect, and very high coloured water, made me apprehenſive of ſome ſerious *diſeaſe* about the ſtomach or liver. In this ſtate he had continued a month. He was ſtill unwilling to take medicine, but knowing him to have a piece of the yellow gum by him, I directed him to infuſe it in three or four times the quantity of brandy, and to take two tea ſpoonsfull of the clear tincture, two or three times a day, and as often as the pain was more violent than uſual: ---This after ſome time was complied with, and *he found immediate relief from the very firſt doſe*:---the pain would often return

return in a ſlighter degree, but he informed me that it *always* gave way as ſoon as he had taken the drops.

It may be ſuſpected that the great and immediate relief this patient experienced, might be in a good meaſure, if not entirely, owing to the tea ſpoonsfull of brandy in which the gum was diſſolved—but both before and while this plan was purſuing, a large quantity of pure brandy was had recourſe to, without any ſenſible advantage.

CASE II.

Mrs. Brett—a ſpaſmodic complaint remaining in her ſtomach after a fever:—the fever was removed—and this ſymptom treated with one dram of the tincture of the gum, twice or thrice a day:—by taking eleven doſes, this was cured, and her appetite and ſtrength returned.

CASE III.

Mr. Chambers---had an apoplectic fit, from which he was recovered by bleeding:---a great and univerſal proſtration of ſtrength remained without any other concomitant ſymptom: for this I directed a ſcruple of the gum to be taken twice a day, and when ten doſes had been taken, the debility was ſo far recovered as to enable him to return to his uſual occupation.

CASE IV.

Mr. P——t, about 40 years old, an irregular liver, and ſubject to violent epileptic fits, on any particular, or long continued exceſs. On the 4th of Auguſt he was attacked with one, different in ſome reſpects to thoſe he had been ſubject to before. When recovered from it, he found a much greater degree of general debility

debility than he had been uſed to experience before, and likewiſe a pain and relaxation of the ſtomach to an unuſual degree. The bowels were kept open, and he took quaſſia and ether :---the ſame ſenſation however continuing, on the evening of the 6th he had draughts, with one ſcruple of the powdered gum mixed in water, and one dram of Tr. Cinn. comp: ---the day following he took three---on the 8th the quantity of gum was encreaſed to half a dram, which agreed very well, and he was ſo much mended as to render any further aſſiſtance unneceſſary.

CASE V.

Mr. Webſter---aged 70 ; a great degree of debility from an immoderate flux of blood from the noſe.---After taking a conſiderable quantity of bark without any ſeemingly good effect, one ſcruple of the extract

extract was given thrice a day:---the doſe was gradually encreaſed to double that quantity,---and in three days this patient perſuaded himſelf he had received conſiderable benefit from this remedy.

CASE VI.

Miſs S----s, a young lady about 19, on the 3d of Auguſt was taken with hyſterics:--ſhe was very well in health before they came upon her, but on leaving her, ſhe had a very ſevere pain in the ſtomach and bowels---for which opiates, joined with rhubarb, and antiſpaſmodics were given, without effect. Aperient medicines were then given, but although frequently repeated and aſſiſted by enemas of various kinds, a paſſage through the bowels could not be procured till the evening of the 7th.---Some

con-

conſiderable degree of pain and uneaſineſs remained, for which the conf. opiat. with ether was given, but without much advantage:---on the 9th ſhe took one ſcruple of the powdered gum, mixed with ſimple water by the aſſiſtance of mucilage of gum arabic---it agreeing very well, it was repeated twice that day, and twice the day following:---ſhe ſaid ſhe gained evident advantage from the medicines---and ſhe appeared ſo much better that I recommended her not to take any more.

CASE VII.

Miſs H——n, about 22 years old---of a conſtitution exquiſitely irritable, and extremely ſuſceptible of hiſterical affections. This young lady was at times, exceſſively harraſſed with a very violent and uncommon diſturbance of the ſtomach and bowels---the abdomen would

ſwell

ſwell to an enormous degree, and be attended with conſiderable pain :---at other times the ſwelling would not be ſo great, but then the abdominal muſcles would be ſeized with a convulſive motion, beginning at the ſcrobiculus cordis and gradually paſſing along the muſcles, to the pubis :---it would then return in the oppoſite direction, from the pubis to the ſcrobiculus cordis. As there was always ſome conſiderable quantity of air in the bowels, and as the bowels were neceſſarily affected by the motion of the muſcles, a very loud and particular noiſe always attended. I am unable to convey a proper idea of it, but as it evidently aroſe from the paſſing of the contents of the bowels from one part to the other, it may readily be conceived. To remove, or abate theſe complaints, I had given every thing which an attentive conſideration

tion of the caſe could ſuggeſt: particular attention was paid to the proper regulation of the ſtate of the bowels; a very fair chance was given to the quaſſia, in ſubſtance and infuſion---to the bark---ſteel---zinc---and cold bathing;---and when the ſymptoms were urgent, fœtid medicines, the volatile alkali, ether, and opiates were had recourſe to, and in conſiderable doſes---but with ſo little effect, either as to diminiſhing the preſent ſymptoms, or preventing a return of them ---that I am in doubt whether ſhe derived any benefit from them. A Phyſician of very conſiderable eminence and reſpectability, reſident in this part of the country ſaw her:---ſhe had likewiſe the opinion of two other Phyſicians in London---their directions were followed with exactneſs, but without any advantage.

On

On the 16th of Auguſt laſt, ſhe had a ſevere return of hyſteric faintings, and its uſual attendant, the convulſive diſturbance of the abdominal muſcles:---ſomething was to be done, and as our former plan had ſo often failed, I relinquiſhed it, and gave a ſcruple of the yellow gum, with the ſame quantity of gum arabic, in common water---a draught of this kind was repeated two, three, four or five times a day, according to the ſeverity of the ſymptoms, till ſhe had taken nineteen doſes, when ſhe was ſo much better, as not to require any further immediate aſſiſtance. It was evident in this caſe, both to the patient as well as myſelf, that greater advantage was gained from this medicine, than from any other ſhe had taken. In about ſix weeks the complaints returned, when, as in the laſt inſtance, their continuance was very much ſhortened by the uſe of the gum.

CASE.

CASE VIII.

Mr. Aſhwood.---I was not able to aſcertain with ſatisfaction to myſelf what this patient's complaint really was---he had great ſhortneſs of breath, and very conſiderable difficulty in breathing, particularly on lying down---his pulſe beat 110 feeble ſtrokes in a minute---his face was very much pinched in---ſome degree of œdema in the feet---a ſhort cough, but no expectoration:---All theſe ſymptoms ſtrongly indicated water in the thorax; but as no fluctuation was diſcoverable, and as the ſymptoms pointed out conſiderable debility of the ſyſtem, I directed my attention to the removal of that circumſtance:---draughts, with 25 grains of extract, diſſolved with mucilage of gum arabic, were given every ſix hours, and a grain of opium at bed-time. For two days

days there was no alteration for the better---and I apprehended my patient to be in very conſiderable and immediate danger: the quantity of extract was increaſed to half a drachm:---on the third morning however, there were ſymptoms of amendment, and from this time, he continued in a progreſſive ſtate of recovery. It is remarkable in this caſe, that all the ſymptoms gradually ſubſided without my being able to detect any thing like a critical evacuation, more eſpecially by urine or expectoration. No other medicines were given from the beginning to the end of this caſe, but the gum in extract, and the opium pill.

CASE IX.

Mrs. Preſcot,---about 50 years old, near three months ſince was attacked with a very violent cholera; the vomiting abated

abated, but the purging continued, which in a few hours reduced her amazingly:—this was treated with opiates and ſtimulants, which always afforded a temporary but never any permanent relief:—bitters and tonics of various kinds were had recourſe to, but without any advantage; and at the expiration of three months, ſhe was ſo much reduced by this conſtant diſorder in her bowels, that a favourable change was ſcarcely to be expected:—the yellow gum was now however, had recourſe to, in doſes of half a drachm, mixed in plain water---one to be taken twice a day.---I was informed that in two days ſhe was very materially mended, and had a more diſtinct ceſſation of her complaint than at any time ſince ſhe had been taken ill:—from this period her health improved daily, and ſhe has not had any return of the purging ſince: ſhe took twelve doſes

in ſix days, and to prevent a return, I directed one to be taken daily for ten days or a fortnight longer.

CASE X.

——Merrel, a plumber and painter,—had been for upwards of a year, ſubject at times to pains in the bowels and coſtiveneſs, but they had uſually given way on the uſe of purging medicines. In December, however, theſe complaints came on with unuſual ſeverity and obſtinacy, and they were not in the leaſt altered by the uſe of a vaſt variety of purging medicines, and the occaſional uſe of opiates. When he had been in this ſtate a week, I had recourſe to the application of cold water to the extremities, which being continued about 15 minutes, produced an immediate and profuſe evacuation:—the next morning, however, the pain in the bowels returned, and it did not give way

to

to either glyſters or opiates:---one ſcruple of the gum in powder was therefore given in plain water, every four hours,---he became eaſy after the firſt doſe, and when he had repeated it three times, he was as well as he had been for ſome conſiderable time before.

There is a diſorder in the cheſt---a ſpecies of catarrh---which is extremely common among the tide-waiters of the cuſtoms at this place: this deſcription of men are from their ſituation neceſſarily expoſed to every viciſſitude of weather, and every irregularity in their mode of living. In whatever manner theſe circumſtances may operate, it is not my buſineſs in this place to enquire:---it is only neceſſary for me here to mention, that on the firſt attack the air veſſels of the lungs appear to

be affected with ſome degree of inflammation; but if that viſcus is tolerably ſound and the conſtitution not remarkably athletic, the inflammation very ſeldom terminates in ſuppuration; but in two or three days, the ſymptoms indicating that ſtate, begin to abate, and an expectoration of matter or mucus enſues. There is at this time alſo a troubleſome cough, which is particularly urgent at night ſo as uſually to deprive the patient of reſt:—a ſoreneſs and weakneſs of the cheſt: a pain in the forehead:—very little, if any fever attends;—and the appetite is tolerably good. If no attention be paid towards the removal of theſe ſymptoms, I have found, by experience, that they will continue a very conſiderable length of time, I have known them often to remain ſeveral months, with but little variation. From the general maſs of obſervations,

vations, I am induced to conſider the continuance of this complaint, as depending in a very great meaſure, on a debility of the bronchial glands, or of the innermoſt membrane of the trachea—and my opinion ſeems ſtrengthened by the obſervation that whatever tends to lower, or relax the conſtitution, invariably does harm; and whatever on the contrary has the effect of encreaſing the general ſtrength, very generally does good.

In what way it may act, I will not pretend to ſay, but I have found in very many inſtances, that the yellow Gum in tolerably large doſes, has, in theſe caſes been productive of very beneficial and powerful effects, inſomuch that thoſe patients who have once taken it, have ſtrongly recommended it to their friends —and inſtead of aſking my opinion as uſual, generally preſcribe this medicine

for themſelves. That the cure of the complaint does here really depend upon the medicine, and not as in many other caſes, upon any ſpontaneous alteration in the conſtitution, change in the mode of living, or alteration in the ſtate of the air, is rendered extremely probable in the firſt inſtance, by what I have ſaid reſpecting its continuance where no means for its removal is uſed---and is evident in the ſecond and third, as they are neceſſarily obliged to be expoſed to every viciſſitude of weather; and to live on ſuch kind of diet as chance throws in their way.

Beſides theſe caſes, there are many other complaints wherein I found it extremely ſerviceable, more eſpecially in certain complaints of the ſtomach and bowels: theſe complaints were ſuch as ariſe from a debility, a loſs of tone, or a dimi-

diminiſhed action, in the muſcular fibres of that organ, ſuch as loſe of appetite, ſickneſs, vomiting, flatulency, heart-burn, pains in the ſtomach, &c. when they were *really idiopathic* complaints, and not dependent upon any *diſeaſe* in the ſtomach, or affections of other parts of the body communicated to the ſtomach.

In debilities and relaxations of the bowels, and the ſymptoms from thence ariſing, ſuch as purging and flatulency, I have found it of good effect: in certain caſes of diarrhœa however, (and it ſeemed thoſe in which an unuſual degree of irritability prevailed,) I think it did not anſwer ſo well, unleſs given in ſmall doſes and combined with opiates, when the patient ſeemed to gain greater advantage, than when opiates only were had recourſe to.

In caſes of amenorrhœa, depending on (what I believe moſt of thoſe caſes do de-

pend upon)---a ſluggiſhneſs, a debility, and flaccidity of the ſyſtem,---this medicine, when aſſiſted by proper exerciſe and diet, has, by removing the ſymptoms of dyſpepſia, and by reſtoring the tone and action of the muſcular fibres, been found very ſerviceable.

This medicine does not, in the doſe I have been uſed to give of it, appear to poſſeſs any remarkably ſenſible operation;---it neither vomits, purges, nor binds the belly, nor does it materially encreaſe the ſecretion of urine or perſpiration. It has indeed ſometimes been ſaid to purge, and at others to occaſion ſweating, but they are not conſtant effects, and when they do occur, depend, I believe, on ſome accidental circumſtance. It ſhould ſeem to poſſeſs in a very extenſive degree, the property of allaying morbid irrita-

irritability, and of reſtoring tone, ſtrength, and action, to the debilitated and relaxed fibre.

When the gum itſelf was given, it was always the pure unmixed part:—if given in the form of a draught, it was mixed in water with mucilage of gum arabic:—if made into pills, a ſmall portion of Caſtile ſoap was employed, as I had found the lixv. ſapon. diſſolved it entirely. It was commonly however made into a tincture by mixing equal parts of the gum and rectified ſpirit; one drachm of this tincture (containing half a drachm of the pure gum) made into a draught with water and ſyrup, by the aſſiſtance of fifteen grains of gum arabic in mucilage, forms an elegant medicine, and at the ſame time ſo palatable that I do not recollect an objection being made to it by any one patient.

Once

Once or twice I had uſed all my pure gum and could not get any freſh ſupply—I therefore collected all the ſmall pieces and refuſe together, and ſteeped them in an equal quantity of rectified ſpirit; after ſhaking them thoroughly the tincture was ſtrongly preſſed through a linen bag:—the tincture was then weighed to aſcertain the quantity of gum it contained; or elſe it was evaporated to nearly a ſolid conſiſtence, and given in the ſame manner as the gum itſelf. In this manner all the gum may be extracted from the very worſt ſpecimen: I believe however that the druggiſts are now in poſſeſſion of a large quantity of a very good kind: Meſſrs. Hopkins and Jackſon have ſupplied me with ſome at the rate of 3s. 6d. per pound,—which one pound with the other yielded 12 ounces of pure unmixed gum; and from the reſiduum

about

about 3 ounces of extract might be obtained.

Dr. Beugo of Rocheſter has employed it in a great variety of caſes: I am indebted to him for the following information.

'It has been found extremely ſerviceable in diarrhœas; and on repeated occaſions, it has very ſpeedily relieved both the purging and the pain, *when opiates had no effect.*

'In incipient dyſenteries, and in ſome of long ſtanding, it has proved remarkably uſeful: but in inflammatoy dyſenteries, it was obliged to be omitted till the inflammation was removed.

'In one inſtance of pains in the bowels, three doſes of the tincture (one dram in each doſe) *gave more relief than ſix grains*

'*of*

'*of opium:* this effect it produced not 'only once, but on repeated trials. 'When the gum was given, it brought 'away large quantities of ſcybala or 'knotted fœces, which repeated cathartics 'both ſaline and reſinous, would not 'effect:--and this it did without the gum 'ſeeming to act as a purgative.

'It was given in many complaints of 'the ſtomach, both of the ſpaſmodic and 'dyſpeptic kind, that had continued two 'or three months:---and in ſo ſhort a 'time as two or three days, the diſtur-'bances in moſt of them were materially 'abated.

'In what are called ſpaſms of the ſto-'mach, it has been found of great uſe.

'In ſpaſmodic complaints of various 'parts of the body, ſuch more eſpecially 'as ſtitches in the ſide and in the abdomi-'nal muſcles, attended ſometimes with a

'degree

'degree of fever, it has been productive
'of conſiderable ſervice.

'In violently excruciating rheumatic
'pains, *it has often relieved, when opiates*
'*even in large doſes* did not procure eaſe.

'In a caſe of oppreſſion of breathing,
'which appeared to ariſe from debility—
'it produced a good effect.

'The gum was given in a caſe of fœtid
'and ichorous diſcharge from the vagina,
'a fortnight after miſcarriage, attended
'with a low fever. In two days the diſ-
'charge was removed, the fever ſubſided,
'and the ſtrength, appetite, and ſpirits
'began to improve.

'It has appeared to have a good effect
'in fluor albus. In general it has no ef-
'fect when fever attends, either in aba-
'ting, or encreaſing it.

'The gum in no inſtance appeared to
'produce any inconvenience, except once
'during

'during the inflammatory ſtage of the 'dyſentery.

'The mode of adminiſtring the gum in 'the above caſes was by infuſing two 'ounces of the gum in one pint of brandy '—one dram of this tincture diſſolved in 'mucilage of gum arabic, was the uſual 'doſes; and finding that anſwer ſo re-'markably well, the quantity was not 'increaſed.

Mr. Thompſon of Rocheſter has favoured me with the following caſes.

CASE I.

'Mr. Dixon, a gentleman of Ro-'cheſter, was ſeized with a violent pain 'in his bowels, attended with vomiting 'and purging:—his pulſe was quick and 'his tongue dry.—After ſeveral hours he 'ap-

'applied for aſſiſtance:—he immediately 'took a draught with ten grains of the 'gum and repeated it every four or ſix 'hours;—this ſoon relieved him, and in 'a few days he got quite well.'

CASE II.

'John Painter was attacked with ſimi-'lar ſymptoms while he was in a weak 'and reduced ſtate from a previous illneſs '—the ſame quantity of the gum in pow-'der was given every four hours, and he 'ſoon recovered.

'A. B. had the ſame complaint, dif-'fering only in his having a few bloody 'ſtools—he took the ſame medicine—'ſoon found eaſe, and recovered faſt.

'In ſome other ſimilar caſes it was 'given with equal ſucceſs—from the very 'beginning of the complaint—but in 'others it had not that effect, until a vo-

'mit

'mit and ſome rhubarb had been given—
'it there appeared to act very powerfully
'in relieving the purging, and in reſtor-
'ing the patient.

'Mr. Thompſon adds, that 'when it
'is more known he thinks it will be found
'an uſeful medicine in what are called
'bilious caſes, and in dyſenteries:—but
'that as a great deal of gum is foul and
'impure—its operation will not always
'be the ſame.'

In a ſecond communication with which I am favoured by Mr. Thompſon, he informs me of two caſes in which he ſays, 'it almoſt *inſtantly cured*.'

CASE III.

'Maſter Anderſon applied to me a few
'days ſince with a violent pain in his
'bowels and purging—he could ſcarcely
'ſtand upright:—I gave him one dram
'and

'and an half of the tincture (containing 'about ten grains of the gum) in an 'ounce of water, and desired to see him 'in three hours :---he had had no stool, 'and the pain was still violent. I repeated the dose :---in three hours more he 'was almost free from pain—and had one 'stool :—two doses more quite cured 'him.'—

'CASE IV.

'A pauper at the workhouse had a violent purging, with some pain :—Mr. 'Smith, my Assistant, saw him and gave 'him two drams of the tincture, and he 'was cured :—he has since had natural 'stools daily.'

The following caſes were communicated by Mr. Andrews of Brompton.

CASE I.

'Mrs. Andrews, of a delicate and irri-
'table habit, is frequently troubled with
'cramp in the extremities; and when
'free from it, in thoſe parts, ſhe in ge-
'neral has it in her ſtomach, attended
'with griping in the bowels, which al-
'moſt always terminates in a violent pur-
'ging; I have frequently given 100
'drops of tincture of opium for a doſe,
'which has *ſometimes relieved after* 200 *or*
'300 *drops had been taken:* Æther joined
'with camphor, has alſo *at times* had a
'good effect in procuring a temporary
'relief.

'In October laſt the above complaints
'attacked her violently in her ſtomach,
'and bowels, when I had recourſe to the

tincture

'tincture of opium, æther and camphor,
'which at firſt relieved the ſpaſms a little,
'but did not at all remove the complaint.
'After continuing thoſe medicines about
'three days, I determined to try the ef-
'fect of the yellow gum from Botany
'Bay:—half a drachm of a tincture, con-
'taining ſeven grains of the gum, was
'united with water by means of muci-
'lage, and was given four times in the
'day. After taking the above for two
'days, the ſpaſms and complaint in her
'bowels were very much relieved; the
'ſame medicine was therefore continued
'for ſome time after, twice a day, when
'the complaint ſeemed perfectly re-
'moved. However any ſlight Cold
'brings on a return of the cramp, which
'if it attacks the ſtomach, the bowels
'are immediately affected, but relief is
'*always* had from the gum as above.'

CASE II.

'Miſs Howe, of a delicate conſtitution, in October laſt had a low fever, 'which ſhe ſoon got the better of, but 'was followed by a violent burning pain '(as ſhe expreſſed it) in her ſtomach, 'which came on every day about noon, 'continued the remainder of the day and 'great part of the night: her appetite 'was bad and ſhe was generally worſe af-'ter taking any kind of nouriſhment. I 'gave her a ſtrong infuſion of Cort. St. 'Lucia, to be taken every four hours, and 'every third day an opening draught with 'rhubarb, which plan was followed for 'twelve days, when finding I gained no 'ground, I determined to try the effects 'of the gum from Botany Bay, which I 'gave in the proportion as mentioned in 'the other caſe; on the ſecond day ſhe

'found

'found great relief, and continuing it for 'about one week, the complaint was en- 'tirely removed, and ſhe had no return 'of it ſince.

'Her pulſe was low, but regular, till 'after taking the gum, when it roſe to 'it's uſual ſtate; her bowels were not af- 'fected, but ſhe found a pleaſing warmth 'in her ſtomach after taking the medi- 'cine.'

The following Caſes were communicated, by Mr. Harris of Graveſend.

CASE I.

'S. B——k, aged 20, ſubject to a ner- 'vous diſeaſe, complained to me on the '29th of October laſt, of violent pain 'about the Pylorus, attended with vo- 'mitings, particularly after taking the 'ſmalleſt quantity of nouriſhment; her

'ſpirits were much dejected and her 'pulſe low, and quick. I ordered a large 'bliſter to be applied to the ſtomach, and 'from one drachm to two drachms of 'æther every hour till better, this had not 'the deſired effect; although more than 'an ounce was taken, it only afforded 'ſhort intervals of eaſe.——30th. The 'bliſter had riſen well, ſhe had had no 'reſt. The pains were ſtill violent; vo-'mitings continued and the pulſe and 'ſpirits were lower; I then ordered her 'ſmall doſes of Tinctura Opii, joined 'with ſtimulants, the Infus. Ligni Quaſſ. 'and other bitters were given, but with no 'better effect; I then gave her one 'drachm of the tincture of the yellow 'gum from Botany Bay; diſſolved in 'mucilage of gum arabic, every three 'hours. *The firſt draught gave her im-'mediate relief* and *ſtopped the vomitings*;

'and

'and *the ſecond doſe removed the pain en-*
'*tirely*; I then deſired the draughts to
'be continued two days, one every eight
'hours, and ſhe has not had the ſmalleſt
'return of her complaints ſince.'

CASE II.

'Mrs. W——d aged 26, and Mrs.
'F——n aged 24, both ſubject to ner-
'vous diſorders, complained on the 31ſt
'of October laſt, of the ſame ſymptoms
'as were mentioned in the preceding
'Caſe: I gave them immediately the
'tincture of the yellow gum and they
'ſoon recovered.'

CASE III.

'I was ſent for the 3d of November to
'Mrs. Farmer's ſon, 4 years old, of a
'very weak and delicate habit,—with
'general debility, particularly of the ſto-

'mach, which would not retain any kind 'of nouriſhment—it being immediately 'rejected. I gave him half a drachm of 'the tincture diſſolved as above, which 'ſtopped the vomitings in 24 hours, and 'the ſtomach was enabled to retain its 'uſual food. The medicine was conti-'nued only three days.'

CASES IV. V. VI. VII.

'Mrs. W——t, aged 57, of a dropſi-'cal habit, applied to me the ſixth of 'November laſt, with vomitings but 'without pain.'

'Miſs G—e, aged 20, of a delicate 'habit, the 22d. of November com-'plained of reachings, particularly in the 'morning with pain.'

'Mrs. A——d, aged 32, of a delicate 'habit, the 6th of December complained 'of ſickneſs, with loſs of appetite and reſt.'

'Mrs.

'Mrs. T----- r, aged 32, of a delicate, 'conſtitution, the 8th of December com- 'plained of being very languid; ſhe had 'a nauſea, and loſs of appetite, her ſpi- 'rits were much dejected and her pulſe 'low and quick.

'The gum given as above directed, in 'a few days removed their complaints, 'and reſtored their healths, ſpirits, and 'appetite: except Mrs. W------t, and to 'her it always afforded a temporary relief 'to the vomitings; but ſhe lately died 'of a dropſy of the cheſt.'

CASE VIII.

'Mrs. E------n, aged 35, complained 'to me the 6th of December of a quartan 'fever, attended with loſs of appetite, 'and violent reachings ſo that her ſtomach 'would not bear the cort. Peruv. or any 'of its preparations; the ſaline draughts

'there-

'therefore in a ſtate of effervescence, opi-
'ates, cardiacs, preparation of lignum
'quaſſiæ, and other ſtomachic bitters
'were given, but without any good ef-
'fect; nor did the tincture of the yellow
'gum diſſolved with mucilage anſwer
'here ſo well as expected; I therefore
'ordered one tea-ſpoonful of the tincture
'to be taken alone, when ſhe found her-
'ſelf ſick, ſince which time the ſickneſs
'and nauſea have been effectually re-
'moved, and the ſtomach now retains an
'infuſion of the cort. anguſtur. without
'the leaſt uneaſineſs.'

CASE IX.

'Mrs. M------n, aged 28, very much
'afflicted with rheumatiſm, complained
'on the 20th of December, of pain in the
'ſtomach which was ſo violent that the
'neighbourhood was alarmed with her
'cries:

'cries: I gave her one drachm of the 'tincture diſſolved at firſt which abated 'the pain; and ſome time after I gave 'one drachm of the tincture alone, and '*it immediately carried it off*; ſhe has had 'another return of the pain ſince, at-'tended with a greater degree of flatu-'lency, when I gave a doſe of the tinc-'ture, with as good ſucceſs as before.'

CASE X.

'Miſs S. O-----m, aged 17, of a deli-'cate conſtitution, complained the 6th of 'December of a very acute gnawing pain 'in her ſtomach, with ſickneſs and at 'times a difficulty of reſpiration. I firſt 'ordered the tincture diſſolved, which 'was taken for four days ſucceſſively, and 'only afforded a temporary ceſſation of 'pain, for about an hour, when it ge-'nerally returned:—I then deſired one

'drachm

'drachm or more of æther to be taken 'every five hours, and that being con- 'tinued for three days, and not even 'giving ſo much relief as the former me- 'dicine, I determined to give one drachm 'of the tincture alone, which *immediately* '*releaſed my patient from her pain.* The 'medicine has been continued every day 'ſince.'

CASE XI.

'Mrs. P------n, aged 40, very much 'afflicted with the gout. She had had pains 'in the extremities for ſome weeks paſt: '---on the 20th of December I was ſent 'for, when I found her almoſt diſtracted 'with pain in her ſtomach, during which 'time ſhe could not feel thoſe in the ex- 'tremities which ſhe before complained 'of: I gave her the tincture of the yellow 'gum diſſolved; The firſt doſe abated the 'pain for half an hour, when it returned

'I gave

'I gave a ſecond doſe which releaſed her 'for two hours and a half: I gave a third 'doſe, which again gave eaſe but it was 'only for half an hour: finding the laſt 'intermiſſion of ſo ſhort duration, and 'her reſpiration becoming very quick, I 'gave her two drachms of æther, and re-'peated it three times in the ſpace of an 'hour, without its affording any relief. 'I had every reaſon to expect I ſhould 'have loſt my patient, as her pulſe and 'ſpirits began to ſink very faſt, and the 'extremities were covered with a cold, 'clammy ſweat; I then gave one dram 'of the tincture *alone*, *which inſtantane-'ouſly removed the pain from her ſtomach*, 'and it has not been felt there ſince; only 'in the extremities as at firſt, and now 'gets better every day.

'The

'The tincture was made by mixing 'equal parts of the pure gum and recti-'fied ſpirit. One drachm of this was 'the uſual doſe.'

Mr. Bowes the Surgeon of the Lady Penrhyn tranſport from Botany Bay, aſſured me, he had ſeen it produce very good effects in various inſtances of debility in the ſtomach and bowels, when given in doſes of fifteen grains or a ſcruple.

The chief mate of the Lady Penrhyn, informed me, that in his voyage home, he had been very much troubled with a nauſea and ſickneſs of ſtomach: and it was attended regularly every morning after breakfaſt, with vomiting:—Having in

in many inſtances witneſſed the good effects of the yellow gum in ſtomach complaints, he was induced to take ſome of it himſelf: he did ſo, and the complaint immediately left him.

In Philips's Voyage to Botany Bay, its effects are thus ſpoken of;—'In the dyſentery, the red gum* of the tree which 'principally abound on this coaſt, was 'found a very powerful remedy. The 'yellow gum has been found to poſſeſs 'the ſame property, but in an inferior 'degree. p. 59.

* This is ſaid to be 'drawn from the tree by tapping, or taking out of the veins of the wood when dry.' It appears to me, and I have on doubt from the ſpecimen I have ſeen, it really is the gum rubrum aſtringens. I tranſmit a ſmall portion to the ſociety, who will be the better judge.

'We

'We are informed by Dr. Blane, phy-
'ſician to St. Thomas's Hoſpital, that he
'has found it remarkably efficacious in the
'cure of old fluxes, and this not only in
'a few inſtances, but in many obſtinate
'caſes.' p. 294.

As the yellow gum, the ſubject of the preſent paper, muſt be in a great meaſure unknown to the generality of practitioners, it having been but very lately introduced into this kingdom, I have thought it neceſſary to produce before the ſociety, as large a collection of facts reſpecting it, as I have been able to procure in the ſhort ſpace of time that it has come under my obſervation; and I have been more particular in the relation of its effects, as no account of its medicinal properties has yet been made public.

From

From what has been ſaid reſpecting its effects, I cannot enterain a doubt that it will be found a very uſeful acquiſition to the medical practitioner; and in this opinion I am confirmed by the concurrent teſtimony of every one of my acquaintance who has employed it. It is not to be expected, that I can yet have had an experience of its effects, ſufficiently extenſive, to enable me to point out with confidence, all the diſeaſes in which it is moſt likely to ſucceed: I will for the preſent therefore content myſelf with obſerving, that independent of the complaints in which it is here related to have ſucceeded, ſuch as, nauſea, ſickneſs, vomiting, flatulency, heartburn, pains in the ſtomach, and all the other ſymptoms of dyſpepſia,—Diarrhœa, mild degrees of cholera, and dyſentery, pain in the bowels, ſpaſms, in the ſtomach, in the muſcles of the trunk,

and in thoſe of the extremities, the gout in the ſtomach, and violent pains in the extremities reſembling the gout or rheumatiſm,---catarrhous affections,---and in certain caſes of amenorrhœa and fluor albus.---Excluſive of theſe complaints I ſay, in all caſes where debility itſelf is the idiopathic complaint, where it is independent of, and unconnected with any real organic diſeaſe---I ſhould expect whether the affection be local or general, that the yellow gum will be found a very powerful and effectual reſtorative. In what other caſes beſide thoſe already mentioned, it may be likely to anſwer, I will not take upon myſelf, at this time to ſay; but from what has here been ſtated reſpecting its general effects, every one will be able to form the opinion for himſelf.

January 1ſt, 1790.

CASES OF SEVERAL WOMEN

WHO HAD THE

SMALL-POX DURING PREGNANCY;

WITH AN

ACCOUNT OF THE MANNER

IN WHICH THE

CHILDREN APPEARED TO HAVE BEEN AFFECTED.

AS the moſt eminent phyſiologiſts are unſettled in their opinion reſpecting the operation of the ſmall-pox on the fœtus in utero, and as but a ſmall number of caſes have been publiſhed of women who have undergone that diſeaſe during pregnancy, I apprehended the relation of a few inſtances, which occurred under my own immediate obſervation, and likewiſe of ſome which were communicated to me, will not be unacceptable; and as nothing can be more eſſentially

neceſſary for the elucidation of real circumſtances, than a large collection of facts, I have ſubjoined a conciſe account of all thoſe caſes which have occurred in the courſe of my reading.

Caſes of Children which are ſaid to have been infected with the Small-Pox in Utero.

Mr. Wood, Surgeon to the General Hoſpital in Chatham Barracks, communicated the following.

CASE I.

"SEVERAL years ſince, when the Eſſex militia were in Chatham Barracks, I was called to ſee a woman who was dead of the ſmall-pox: on my arrival I found the woman had been dead ſomewhat above two hours;—the ſmall-pox were of

of the confluent kind, and they appeared to be about the turn. She was in the ninth month of her pregnancy, and as no doubt could be entertained of her death, I opened the abdomen and uterus, with the view of ſaving the child. The child however was dead; but it had numerous puſtules all over the face, body, and extremities, which in my opinion were moſt evidently and undoubtedly variolous eruptions. The puſtules appeared of the ſame ſize, as they uſually are about the fourth or fifth day."

Mr. Andrews, of Brompton, communicated the following letter from Mr. Robert Sargeant, of Plymouth.

CASE II.

"ON the 6th day of December 1782, I inoculated Mrs. Lay, of Plymouth, for the ſmall-pox, who was (unknown to me) in the ſeventh month of her pregnancy. She had the diſeaſe favourably, and was delivered of a boy on the ſixth of January following, who had puſtules diſperſed all over his body. The puſtules were very numerous, and exactly reſembled variolous eruptions which were in an early ſtage of maturation; and they appeared to advance until his death, which happened two days after."

Mr. Sargeant concludes his letter by obſerving, "I have no more doubt that the eruptions were variolous than I have of my own exiſtence."

Mr.

Mr. Derham relates, that a woman with child being pretty well recovered from a mild ſort of the ſmall-pox, on the 3d of September took a purge, which worked ſo violently, that ſhe fell into faintings and convulſions. She was not delivered till the 8th of September. The child appeared to the midwife to have been dead five or ſix days: its belly was burſt, the bowels came out, and the whole body tended to putrefaction. The child was ſo very full of the ſmall-pox, that hardly a pin's head could be put between the bliſters, which were very plump and full of matter, like the puſtules of an adult, when the ſmall-pox are

at the height, only a little depreſſed in the middle.

Ph. Tr. 337. p. 165.

BARTHOLIN affirms, as an eye witneſs, that a poor woman, ill of the ſmall-pox, was delivered of a child, whoſe tender body had as many pocks on it as the mothers, and who died ſoon after the birth, as the mother herſelf did, three days after of the diſorder.

Van. Swieten, XV. p. 16.

A WOMAN, big with child, having herſelf long ago had the ſmall-pox, very aſſiduouſly nurſed a maid ſervant during the

the whole proceſs of this diſeaſe. At the proper time ſhe brought forth a healthy female child, in whoſe ſkin Dr. Watſon aſſerted that he diſcovered evident marks of the ſmall-pox, which ſhe muſt have gone through in the womb: and the ſame phyſician pronounced that this child would be free from future infection. After four years her brother was inoculated: and Dr. Watſon obtained permiſſion of the parents to try the ſame experiment on the girl. The operation was performed on both children in the ſame manner, and the pus uſed in both caſes was taken from the ſame patient. The event however was different: for the boy had the regular eruption and got well; but the girl's did not inflame or ſuppurate. On the tenth day from the inſertion of the matter, ſhe turned pale ſuddenly, was languid for two days, and afterwards

was

was very well. In the neighbourhood of the inciſion there appeared a puſtule, like thoſe puſtules that we ſometimes obſerve in perſons, who, having had the diſeaſe, attend patients ill of the ſmall-pox."

Ph. Tr. V. 46. p. 235.

MAURICEAU affirms, that he had heard his father and mother often ſay, that he came into the world with five or ſix pocks upon him: it ſeems a brother of his, ſix years old, whom his mother anxiouſly attended day and night, during the ſmall-pox, had died of it on the ſeventh day, and our author was born the next.

Van Swieten, XV. p. 17.

Dr.

Dr. MEAD ſays, when a woman in the ſmall-pox ſuffers abortion, the child moſt commonly comes into the world with the diſtemper upon it, but not always. When it does not, the diſeaſe generally breaks out a few days after delivery: in proof of which he mentions the following caſe.

"A lady of quality was, in the ſeventh month of her pregnancy, ſeized with ſo malignant a ſort of the confluent ſmall-pox, that there was no appearance of any one favourable ſymptom. In this condition ſhe was, on the eleventh day of the diſtemper, delivered of a ſon, who brought no marks of the infection into the world, and ſhe died on the fourteenth day. But, in the morning of the fourth day following, the infant was ſeized with convulſions, the forerunners of the eruption,

tion, which appeared the ſame day, and he died in the evening."

"But in caſe there is no miſcarriage, the child will be free from the diſeaſe during his whole life, unleſs he happens to be born before the puſtules were come to maturity.

"The infant in the womb ſometimes catches the diſtemper, without the mother being affected, as I ſhall prove by this remarkable inſtance which I well remember."

"A CERTAIN woman, who had formerly had the ſmall-pox and was now near her reckoning, attended her huſband in the diſtemper. She went her full time, and was delivered of a dead child. It may be needleſs to obſerve, that ſhe did not catch it on this occaſion, but the dead body of the infant was a horrid ſight, being all covered with the puſtules: a mani-

a manifeſt ſign that it died of the diſeaſe before it was brought into the world."

Mead's Works, 8vo. 252. and 253.

MRS. FORD, who looked upon herſelf in the ſixth month of her pregnancy, on the 5th of December was ſeized with the eruptive fever of the ſmall-pox. On the eighth they appeared, proved of a mild kind, moderate in quantity, and ſhe paſſed through the diſeaſe in great ſpirits. On the 31ſt of December ſhe was delivered, that is, twenty-three days after the appearance of the eruptions. The body of the child was covered with an eruption, and ſeveral of the puſtules were filled with matter. Dr. Hunter, Dr. Leake, Mr. John Hunter, Mr. Cruickſhanks, and Mr. Falconer, all concurred

curred in opinion that the eruption on the child was the ſmall-pox.

Ph. Tr. V. 70. p. 28.

MR. HUNTER having paid particular attention to this caſe, I ſhall ſubjoin ſome of his reflections upon it.

In the firſt place, he obſerves "there can be no doubt but the mother had the ſmall-pox, and that it went through its regular ſtages."

"Secondly, the diſtance of time when ſhe had the ſmall-pox before delivery, joined with the ſtage of the diſeaſe in which the child was born, perfectly agrees with the poſſibility of the infection being caught from the mother.

"Thirdly, the external appearance of the puſtules was perfectly that of the ſmall-pox."

Not

Not ſatisfied with theſe leading circumſtances, and external appearances being ſo much in favour of their being the variolous eruption, Mr. Hunter obſerves, "they were not an abſolute proof of its being the genuine ſmall-pox"—he therefore proceeds to inveſtigate "how far all the circumſtances correſpond or are ſimilar to the true ſmall-pox."

He obſerves, that in the preſent caſe we can have no poſitive information reſpecting this child having the fever which precedes the ſmall-pox—or the progreſs and declenſion of the eruption, which in the ſmall-pox is pretty regular, although both are preſumable; but even theſe, he juſtly obſerves, are not abſolute proofs of the ſmall-pox.

After mentioning theſe uncertain ſigns, he ſtates what he conceives to be the pure characteriſtic of the ſmall-pox,

which is—" *the formation of a ſlough, or a part becoming dead by the variolous inflammation.*"

Applying this to the caſe under conſideration, Mr. Hunter obſerves—" In the preſent caſe, beſides the leading circumſtances, mentioned in the caſe of the mother, correſponding with the appearances of the child, and the external appearances themſelves, we have in the fulleſt ſenſe the third and real, or principal character of the ſmall-pox, viz. the ſlough in every puſtule; from all which I think we may conclude, that the child had caught the ſmall-pox in the womb; or at leaſt, a diſeaſe, the effects of which were ſimilar to no other known diſeaſe."

As Mr. Hunter, in opening the bodies of thoſe who had either died of, or died while under the ſmall-pox, had always examined carefully to ſee whether any internal cavity, ſuch as the *æſophagus, trachea,*

trachea, ſtomach, inteſtines, *pleura*, *peritonæum*, *&c.* had eruptions upon them or not, and never finding any in any of thoſe cavities, he ſaw the moſt favourable opportunity of clearing up this point in the preſent caſe. He therefore very attentively examined moſt of the internal cavities of this child, " but obſerved nothing uncommon.". In this reſpect likewiſe, therefore, the preſent caſe exactly agrees with the true ſmall-pox.

DR. WRIGHT relates the caſe of a negro woman, about twenty-two years of age, and big with child. The eruptive fever was ſlight, the ſmall-pox were few, diſtinct, and large, and ſhe went through the diſeaſe with very little trouble, till on the fourteenth day from the

eruption, ſhe was attacked with a fever, which laſted only a few hours. She was however taken in labour the ſame day, and delivered of a female child, with the ſmall-pox on her whole body, head, and extremities. They were diſtinct and very large, ſuch as they commonly appear on the eighth or ninth day in favourable caſes. The infant died the third day after ſhe was born.

Ph. Tr. V.

A WOMAN who had been inoculated, had a child born nine weeks after inoculation, at the full time, with diſtinct marks of the diſeaſe, though the mother had very few eruptions.

Dimſdale's Preſent Method of Inoculation, p. 22.

DR. BLAND relates, from the authority of a midwife on whom he can depend, that in July 1781, Mary Gatton, of Princes-ſtreet, Weſtminſter, was attacked with the ſmall-pox. She was then in the ſeventh month of her pregnancy. The diſeaſe proved to be of the confluent kind, and was attended with conſiderable fever. Six days after the turn of the pock, or about eighteen from the firſt attack of the eruptive fever, ſhe was taken in labour and delivered of a child which ſeemed to have been dead five or ſix days. Its body was covered with confluent ſmall-pox. The puſtules were white and full of matter, and, from their ſize, ſeemed nearly to have attained their maturity.

Medical Journal, V. 2. p. 205.

MR. ROBERTS inoculated Mary Sticks, near the ninth month of her pregnancy, on the 14th of November 1783. On the 21ſt the eruptive fever commenced, and the ſmall-pox, which was not very numerous, came out the third, on the 28th ſhe fell into labour, and on the 29th was delivered of a dead child. The body of the child was covered with the ſmall-pox, the baſes of which were in a gangrenous ſtate.

Medical Journal, V. 5. p. 400.

MR. JENNER inoculated "Jane Parker, aged 27, on the 25th of May 1785, being then in the eighth month of her pregnancy. On the 1ſt of June the eruptive fever commenced. The eruptions

tions (few in number) appeared on the third day. She recovered and went about her buſineſs as uſual. On the 18th of July ſhe felt ſymptoms that convinced me the child was dead, and on the 23d, ſhe was delivered of a dead child, with about thirty large puſtules on its body, the baſes of which were in a gangrenous ſtate."

Medical Journal, V. 7. p. 165.

MRS. EVE, then in the eighth month of her pregnancy, was ſeized with the ſmall-pox, the puſtules were diſtinct, yet uncommonly numerous. On the eleventh day they began to turn; and on the twenty-ſecond day her labour took place, which, according to her reckoning, was a fortnight before the regular period.

The child at the time of its birth was covered with diſtinct puſtules all over the body: they did not appear to be full of matter till three days after; at which time ſome pus was taken on a lancet, with which a child was on the 2d of December, inoculated on both arms.

The arms inflamed, and the 11th of December the child ſickened, and was affected with all the ſymptoms which uſually precede the eruption. On the 12th the ſickneſs and fever abated, the puſtules of the diſtinct ſort of ſmall-pox made their appearance, and the child having regularly gone through the ſeveral ſtages of the diſtemper, was perfectly well in three weeks.

Mr. Lynn thinks it proper to obſerve that Mr. Findlay and Mr. Holladay, ſurgeons, were preſent both at the taking of the

the matter and at the ſubſequent inoculation of the child.

Singular Caſe of a lady, by W. Lynn.

Caſes in which it appears the Children were not infected with the Small-Pox in Utero.

CASE I.

MRS. SQUIRES, of Northfleet, in the laſt month of her pregnancy in the year 1780, was on the Thurſday or Friday taken with fever and its uſual attendants: on the Saturday ſhe was delivered. About two hours after delivery the ſmall-pox appeared;—was very full of the coherent kind. She died on the Friday. The

The child died the Tueſday week following, having lived nine days: it died unexpectedly. How long it was ill, or in what manner it was affected, I was not able to learn; all the perſons, however, who were preſent, agree that there was not the leaſt appearance of any eruption: it is not impoſſible, however, but it might have died in one of thoſe fits which frequently precede the eruption of the ſmall-pox.

CASE II.

MRS. CLIFTON, of the pariſh of Northfleet, ſometime in the year 1781, was ſeized with a very mild ſort of the ſmall-pox, in the ſeventh month of her pregnancy. She was delivered at the uſual time, and the child was very healthy,

thy, it had a few ſmall ſpots on it, but the midwife, who attended, ſaid they had not the leaſt reſemblance to the ſmall-pox.

This child I inoculated in May 1786; every ſtage of the diſeaſe was diſtinctly marked. It had about twenty puſtules. One or two children inoculated with matter from his arm, was infected as uſual.

CASE III.

MRS. LEE, of the pariſh of Northfleet, in the eighth month of her pregnancy, was in July 1780 attacked with the ſmall-pox: ſhe had the eruption extremely full, and nearly as bad as I ever remember to have ſeen; ſhe however recovered, but it accelerated her delivery about a month. There was not the leaſt appear-

ance

ance of the ſmall-pox or any other eruption on the child.

This girl I inoculated in November 1787; ſhe had about twenty eruptions, but being of a delicate conſtitution, and having lived too low, they did not ſuppurate; the arm however had quite the uſual appearance.

CASE IV.

I am informed by Mr. Thompſon of Rocheſter, that he attended a lady in the diſtinct ſmall-pox, who was about five months advanced in her pregnancy. The child was inoculated ſome time after delivery, and had the ſmall pox*.

A LADY

* It may not be improper to make mention of the following fact. Mrs. Colyer, of Southfleet, had the *meaſles* juſt one week before ſhe was delivered of a daughter.

A LADY of quality, whom Boerhaave had attended with good ſucceſs, in a very bad and confluent ſmall-pox, and, in the ſixth month of her pregnancy, was delivered when her time was up, of a healthy boy, on whom not the leaſt trace of the diſorder could be found.

Van Swieten, Vol. XV. p. 17.

A WOMAN was taken ill of the ſmall-pox, in the fourth month of her preg-

daughter. This infant had no appearance of the diſeaſe when born, and it was generally expected ſhe never would have it; but ſome years after the meaſles were very frequent, and ſhe, among many others, contracted the diſeaſe.

nancy,

nancy, from which ſhe apparently narrowly eſcaped, and, when her time was out, was delivered of a healthy and pretty ſtout boy, on which there is no mention made of any eruptions, or marks of them having appeared.

Van Swieten, Vol. XV. p. 212.

" A WOMAN was delivered of a male child at the ordinary time, herſelf as well as the infant being in good health, notwithſtanding that, in the fifth month of her pregnancy, ſhe had the ſmall-pox in a ſevere manner, of which diſeaſe, however, there did not appear on the body of the child, any mark which could teſtify,

tify, that he had been infected in the womb."

Mauriceau's Obſer. 576, or Medic. Tr. Vol. II. p. 317.

SIR G. BAKER relates, that—" Two pregnant women having been inoculated, had the ſmall-pox in a very favourable manner, and afterwards brought forth their children perfectly healthy at the uſual time. Both theſe children, when they had attained the age of about three years, were inoculated *with effect*, and had a moderate eruption."

Medical Tranſactions, Vol. II. p. 314.

SIR

SIR G. BAKER mentions a caſe which fell under the obſervation of Dr. Clarke of Epſom. " A woman, towards the end of her pregnancy, had the ſmall pox, from which ſhe narrowly eſcaped. Five weeks after the criſis, ſhe was delivered of a healthy female child, who having numerous marks on her ſkin, was judged, by all who ſaw her, to have undergone the ſame diſtemper before her birth. However, at the end of twelve months, ſhe had the ſmall-pox in a very ſevere manner. Both the mother and child were lately living at Epſom.

Mr. Hunter's Paper, Phil. Tr.

" DR. HUNTER thought the eruption ſo like the ſmall-pox, that he could hardly doubt;

doubt; but ſaid that, in all other caſes of the ſame kind, that he had met with, *the child in utero had eſcaped the infection.*"

Mr. Hunter's Account, Ph. Tr. Vol. LXX.

"THE infection from an infected mother is conceivable and * common enough"—yet no particular caſe is brought forward in ſupport of this opinion. In a note, however, he, ſays *"yet this is not conſtantly the caſe—an ingenious anatomiſt lately aſſured me, he opened the body of a woman, far advanced in her pregnancy, who died of the ſmall-pox, without imparting the leaſt viſible infection to her fruit."

Kirkpatrick. p. 21.

DR. DIMSDALE has ſince his firſt publication, ſeen inſtances in which two pregnant women were inoculated, and each had a plentiful eruption of the ſmall-pox: three or four years afterwards he inoculated the children, and both had a tolerable number of puſtules.

Dimſdales's Tracts on Inoculation, or Med. Journal. vol. II. page 157.

MR. ROBERTS relates that Eliz. Boon, in the eighth month of her pregnancy, was inoculated on the 15th of November, 1784. On the 20th the eruption appeared, and the fever did not abate. On the

the 27th her pains came on, and ſhe was in a few hours delivered of a living child. There was not the leaſt trace of eruptions on any part of the body of the child, which died in about ten days, with a complaint in its bowels.

Medical Journal, Vol. V. page 400.

MARY JEFFRY, in the eighth month of her pregnancy, was inoculated on the ſame day with Eliz. Boon; ſhe paſſed through all the ſtages of the diſeaſe, with as little diſturbance as any perſon I ever ſaw: and, three weeks afterwards, was delivered of a living child, without any appearance of the diſeaſe upon it.

The ſame.

MR. JENNER relates that Mary Ellis, aged 42, in the ninth month of her pregnancy, was inoculated May 25th, 1785. On the 1ſt of June the eruptive fever came on, together with pains, reſembling thoſe of labour. She had few eruptions, and did well. On the 10th of June ſhe fell down ſtairs: this accident brought on labour, and ſhe was delivered of a dead child, which had no appearance of eruption on any part of its body.

(It ſhould ſeem that this child might have died before it could have received the infection, or at leaſt before the eruptions could have made their appearance.)

Medical Journal, Vol. VII. page 165.

REBECCA

REBECCA GILL, in the ninth month of pregnancy, was inoculated June 6th. On the 13th the eruptive fever commenced, and on the 16th the eruption appeared. On the 18th ſhe was delivered of a living child, without any appearance of diſeaſe upon it.

The ſame.

M. TWINING, aged 38, was inoculated July 1ſt. in the fifth month of her pregnancy; ſhe had the diſeaſe favourably, was delivered of a living child, at the end of the ninth month, without any appearance of diſeaſe upon it.

The ſame.

THAT the animal œconomy ſhould not obſerve preciſely the ſame law, under the ſame circumſtances, has excited the ſurprize of many attentive obſervers: much might be added to what has already been written on this intereſting ſubject, at preſent, however, I ſhall content myſelf with ſtating a few circumſtances that occurred under my own obſervation, which, although they do not by any means entirely clear up the difficulty, yet I am of opinion, may aſſiſt in explaining why a woman, in the ſmall-pox, ſo ſeldom communicates the infection to the fœtus in utero.

Some time ſince, I had occaſion frequently to obſerve, that *very young children* had been repeatedly inoculated, and

for

for ſeveral weeks conſtantly expoſed to the worſt kind of natural ſmall-pox, without any effect. Soon after, the meaſles became unuſually rife, of a putrid nature, and much more contagious than I ever obſerved them before or ſince: here again I attended in ſeveral families, where the *young infants* (particularly when under two months) were the *only* part of the family that eſcaped the diſeaſe, although expoſed, a conſiderable time to the infectious air, and lying all the night cloſe to other children paſſing through every ſtage of the complaint, and, conſequently, perpetually inhaling into their lungs the very eſſence of infection; nay, I have been informed of more than one inſtance, where, in addition, the mother had the diſeaſe, and the child, (although conſtantly in her arms, breathing the air from her lungs reeking with putrid par-

ticles, and ſucking the milk, impregnated ſtrongly, as we ſhould think, with the diſeaſe,) has for ſome months withſtood the infection!

The perpetual repetition of what I have juſt related, very much ſurpriſed me, and the ſubject of this paper being about that time much in my mind, I was ſtruck with the ſimilarity of the circumſtances, and concluded, that nature, for the beſt and wiſeſt purpoſes, had ordained, that very young infants ſhould be ſo *extremely unſuſceptible* of theſe diſeaſes, which occaſion ſuch havock among thoſe who are older, even when they ſeem to have the advantage on their ſide of health, ſtrength and a vigorous conſtitution. To me I acknowledge, the appearances in favour of ſuch an idea are very ſtrong; but whether this is really the caſe, and whether others have obſerved the ſame general exemption

CASES of CHILDREN which are said to have been INFECTED with SMALL-POX in UTERO.

By whom related, and where.	Period of Pregnancy.	Natural or Inoculated.	Degree of Diſeaſe.	Interval between 1ſt of Erup. Fever and Delivery.	Degree of Diſeaſe in the Child.	State the Child was born in.
Mr. Wood.	9 month.	natural.	the woman was dead, but the child was extracted by the cæſarian operation.		very numerous.	dead.
Mr. Sergeant.	7 month.	inoculated.	favourable.	21 days.	diſperſed all over the body.	alive.
Mr. Derham, Ph. Tr. 337. p. 165.		natural.	mild.	about 20 days.	extremely full.	dead.
Van Swieten, vol. 15. page 16.		natural.			extremely full.	alive.
Dr. Watſon, Ph. Tr. vol. 46. p. 235.		the woman had had the diſeaſe.			evident marks.	alive.
Van Swieten, vol. 15. page 17.					4 or 5 pocks.	alive.
Dr. Mead's Works, page 252.	7 month.	natural.	extremely bad.	about 14 days.	the child was ſeized with the eruption four days after birth.	
Dr. Mead's Works, page 253.	about 7 months.	the woman had had the diſeaſe.		about 2 months.	extremely full.	dead.
Mr. Hunter, Ph. Tr. vol. 70, p. 28.	6 month.	natural.	mild.	26 days.	very full.	dead.
Dr. Wright, Ph. Tr.		natural.	mild.	17 days.	full.	alive.
Dr. Dimſdale, 1ſt Treatiſe, p. 22.	about 7 months.	inoculated.	mild.	9 weeks.	diſtinct.	
Dr. Bland, Med. Journ. v. 2. p. 205.	7 month.	natural	confluent.	18 days.	confluent.	dead.
Mr. Roberts, Med. Journ. v. 5. p. 400.	9 month.	inoculated.	mild.	8 days.	confluent.	dead.
Mr. Jenner, Med. Journ. v. 7. p. 165.	8 month.	inoculated.	mild.	7 weeks.	diſtinct.	dead.
Mr. Lynn, Singular caſe of a lady.	8 month.	natural.	uncommonly numerous.	25 days.	covered all over the body.	alive.

CASES in which it appears the CHILDREN were NOT INFECTED with the SMALL-POX in UTERO.

By whom related, and where.	Period of Pregnancy.	Natural or Inoculated.	Degree of Diſeaſe.	Interval between 1ſt of Erup. Fever and Delivery.	State in which the Child was born.	Event of Inoculation.
Mr. Kite.	9 month.	natural.	confluent.	3 days.	alive.	died 9th day.
Mr. Kite.	7 month.	natural.	very mild.	7 weeks.	alive.	ſucceeded.
Mr. Kite.	8 month.	natural.	confluent.	1 month.	alive.	ſucceeded.
Mr. Thompſon.	5 month.	natural.	diſtinct.	4 months.	alive.	ſucceeded.
Van Swieten, vol. 15. page 17.	6 month.	natural.	confluent.	3 months.	alive.	
Van Swieten, vol. 15. page 212.	4 month.	natural.	ſevere.	5 months.	alive.	
Mauriceau's Obſer. 576.	5 month.	natural.	ſevere.	4 months.		
Sir G. Baker's Med. Tr. v. 2. p. 314.		inoculated.	favourably.		alive.	ſucceeded.
Sir G. Baker's Med. Tr. v. 2. p. 314.		inoculated.	favourably.		alive.	ſucceeded.
Mr. Hunter, Ph. Tr. vol. 70.	about 8 months.		ſevere.	6 weeks.	alive.	had the natural S.P. in ſevere man.
Dr. Dimſdale's Tracts.		inoculated.	plentiful eruption.		alive.	ſucceeded.
Dr. Dimſdale's Tracts.		inoculated.	plentiful eruption.		alive.	ſucceeded.
Mr. Roberts, Med. Journ. v. 5. p. 400.	8 month.	inoculated.	diſtinct.	10 days.	alive.	died 10 days.
Mr. Roberts, Med. Journ. v. 5. p. 400.	8 month.	inoculated.	mild.	4 weeks.	alive.	
Mr. Jenner, Med. Journ. v. 7. p. 165.	9 month.	inoculated.	mild.	9 days.	dead.	
Mr. Jenner, Med. Journ. v. 7. p. 165.	9 month.	inoculated.	mild.	5 days.	alive.	
Mr. Jenner, Med. Journ. v. 7. p. 165.	5 month.	inoculated.	mild.	4 months.	alive.	

emption of very young infants, future obſervation may determine; if, however, it ſhould generally be found to be ſo, it may, upon the ſame principle (that is, the younger, the weaker the infant is, the leſs of life it poſſeſſes, the leſs ſuſceptibility it has alſo for theſe complaints) be explained, why the fœtus in utero ſo ſeldom is affected with the ſmall-pox.

Nov. 9th, 1792.

AN ACCOUNT

OF SOME

ANOMALOUS APPEARANCES

CONSEQUENT TO

THE INOCULATION OF THE SMALL-POX.

CASE I.

Miss Cruden and Miſs Henrietta Cruden were inoculated on the 19th of May 1787, with freſh matter from ſome children who were ſaid by a ſurgeon of this place to have paſſed through the diſorder in the uſual manner.

2d. day.—The inciſions were ſomewhat inflamed.

4th.—The inflammation increaſed—it was more conſiderable on the arm of the eldeſt, and from that circumſtance I ventured to ſay that ſhe would paſs through the

complaint mildly. It is her caſe only that I ſhall now relate.

5th.—Was taken ill, and appeared as children beginning to ſicken uſually do: the arm had that kind of appearance it commonly has, when the patient firſt begins to complain.

6th.—Had a very reſtleſs, feveriſh night—but grew much better when taken out into the air.

7th.—Paſſed an eaſier night than the laſt, though but a very indifferent one. The inciſion on the arm had about one large drop of matter upon it, which was accidentally rubbed off as I was preparing to take ſome on the points of my lancets. There were two or three ſpots out, which appeared to the friends to be variolous eruptions; but they never ſuppurated.

8th.—

8th.---She appeared quite well---the arm ſcabbed over---and I did not heſitate to ſay, ſhe was perfectly ſecure from any future inconvenience from the ſmall-pox.

In delivering this opinion, I thought myſelf warranted not only from my own experience, (never having been able to communicate the ſmall pox to any patient whoſe arms had inflamed, and who had even a much leſs degree of fever,) but likewiſe from the obſervation of Baron Dimſdale, who has related ſeveral caſes where the diſeaſe happened very ſuddenly after the infection, and where no eruptions have appeared, or if any have, they have not looked like true pocks, nor maturated like them. He ſays, " I have " ſeen ſome caſes wherein the diſeaſe has " happened ſo ſuddenly after infection, that,

" that the whole affair has been terminat-
" ed, purges taken, and the patient re-
" turned home perfectly well in a week's
" time, before others inoculated at the ſame
" time, from the ſame patient, and under
" the ſame circumſtances, have begun to
" complain." P. 47. " No eruption
" appears at the time it may be expected,
" but the arm gets well very ſoon, and
" the diſeaſe is at an end. There have
" however been ſome examples where a
" few eruptions have appeared, and prob-
" ably in conſequence of the inocula-
" tion; yet the puſtules have not looked
" like the true pocks, nor maturated like
" them, nor laſted longer than three days,
" about which they for the moſt part
" died away." P. 49. " When ſub-
" jects of this ſort firſt occurred in my
" practice, I was in doubt whether they
" were quite ſecure from any future at-

tacks

" tacks of the diſtemper; and in order to
" try whether they were ſo or not, I
" inoculated them a ſecond time, and
" cauſed them to aſſociate with perſons in
" every ſtage of the diſeaſe, and to try
" all other means of catching the infec-
" tion; and this method has been prac-
" tiſed with the generality of ſuch patients
" ever ſince; *yet without a ſingle inſtance*
" *of its producing any diſorder*; ſo that I
" now make no ſcruple of pronouncing
" them *perfectly ſafe.*"

Having mentioned theſe circumſtances I now proceed to relate the ſequel of the caſe.

I was ſo thorougly ſatisfied that this young lady had the diſeaſe, that I did not inoculate her again, till repeatedly urged to it by ſome of the family—but to ſatisfy them, I inoculated her again, on

the 2d of June, 14 days from the time of the firſt inoculation, when the inciſions were quite well. She was now inoculated from a lad under the eruptive fever.

2d day after the ſecond inoculation—the inciſions were ſomewhat inflamed, and had the ſame appearance as after the firſt inoculation. The inflammation encreaſed very little for eight or ten days.

17th.—She became ſick and feveriſh, and appeared to be affected in exactly the ſame way as with the preceding inoculation.

19th or 20th.—Very full of a raſh and a few ſmall-pox among them, but ſhe was as well as thoſe uſually are, who paſs through the diſeaſe mildly.

The raſh gradually died away in two or three days, and there were 72 puſtules which maturated properly, and turned on the

the ſeventh day:—they were moſt evidently variolous.*

The youngeſt ſiſter paſſed through the complaint from the firſt inoculation in the ſame ſlight manner without any eruptions ſucceeding the fever—ſhe was therefore inoculated a ſecond time, but without effect: and has ſince been repeatedly expoſed among thoſe who have had the ſmall-pox without the leaſt inconvenience.

Several inſtances are recorded of anomalous appearances attending the inoculation for the ſmall-pox:—The caſe juſt re-

* On Account of the peculiarity of this caſe, and to prevent any diſpute about it, I was deſirous that it might be ſeen by other medical gentlemen,—a phyſician of London who was at that time viſiting me, accordingly ſaw her, and immediately pronounced it to be the ſmall-pox; indeed it was ſo evident there was no poſſibility of being miſtaken.

lated reſembles none that I have met with ſo much as that of the Ducheſs of Boufflers, who was univerſally believed to have had the diſeaſe twice, once by inoculation, and again by infection from the natural ſmall-pox---indeed Mr. Gatti the celebrated inoculator at Paris repeatedly aſſured the Ducheſs that the ſmall-pox had taken effect, and that ſhe had nothing further to fear from that diſeaſe.---And it is natural to conclude that he was particularly attentive to the appearances of the arm in a patient of ſuch rank and conſequence:---But notwithſtanding, it appears to me, that the diſeaſe of my patient was more diſtinctly marked than the diſeaſe of M. Gatti's patient---for it ſhould ſeem that although the arms of both ſuppurated very well, yet that the ſymptoms of fever were very ſlight and continued only a few hours in the Ducheſs---whereas the

fever

fever was pretty ſharp nearly three days on my patient, and during that time ſhe experienced the ſame relief that variolous patients always do, on expoſure to the air.

CASES II. III. and IV.

The three children of Mr. Colyer of Dundale, one of a year and half, another of three years, and the other of four years old, were on the tenth of February, 1790, inoculated by me with matter from a woman, on the fifteenth day after the eruption of the natural ſmall-pox, and who was extremely full of the diſtinct ſort.

The inciſions on the arms inflamed properly, and on the ſeventh or eighth day they began to have the common febrile ſymptoms in a moderate degree—

ſatisfied that they *had* the diſeaſe *effectually* and that they would get through it ſafely, I did not as they lived at ſome diſtance in the country, ſee them any more, I was informed, however, that the eldeſt and the youngeſt had a few eruptions, and the other a conſiderable number, which thoſe who were about the children ſaid had every appearance of true variolous puſtules.

About one month from the time of the inoculation, the eldeſt of the children became very feveriſh, and after a few days had an eruption of puſtules, which I ſaw the ſeventh day of the eruption, and found to be, beyond the poſſibility of a doubt, the ſmall-pox—the child was very full of the diſtinct kind, but the diſeaſe terminated favourably.

Eight days from the attack of the eldeſt, one of the others became ill, and had

had the ſmall-pox alſo, but in a milder degree.

And eight days from the attack of the ſecond, the third was affected in the ſame manner—it had not ſo many as either of the others, but they were moſt evidently the true ſmall-pox.

The mother informed me, that ſome time after the eldeſt had recovered from the inoculation, he met a child very full of the ſmall-pox, from whom ſhe ſuppoſes, as indeed is moſt probable, the ſecond diſeaſe was caught.

That the matter with which theſe children were inoculated was really the true variolous matter, will not admit of the ſmalleſt doubt, for independent of the improbability of my miſtaking a very full and large ſpecies of the ſmall-pox, which

paſſed through every ſtage in the moſt diſtinct and regular manner, for any other eruption,—it was taken from a woman travelling through the country, but who became ſo very ill as to be unable to continue her journey, and from this individual (for there was no one beſide herſelf that I could learn, had it) the ſmall-pox was, both by natural and artificial infection, propagated more extenſively, than I ever recollect to have known on any former occaſion.

That the inflammation of the arms made the ſame progreſs, and had the *appearance* inoculated arms uſually have, is very certain---but whether it was *really* the variolous inflammation, I am unable to determine, as I did not inoculate any one from them, a circumſtance I ſhould by no means have omitted, if I had entertained the leaſt doubt of the fact.

The

The eruptive fever made its appearance at the uſual time, the ſeventh and eighth days; it continued two or three days, and then the eruptions made their appearance; what were the preciſe appearances of thoſe eruptions, and whether they were really variolous, I cannot determine, as I did not ſee them, or cauſe any one to be inoculated from them.

About the latter end of September all theſe children caught the chicken-pox; (Varicella of Dr. Cullen;) after a ſlight fever of two days, watery eruptions made their appearance; theſe continued about two days, never more than three, then ſcabbed over, and ſoon became well.

CASE V.

J. Wallis, of the pariſh of South-fleet, three years and an half old, was inoculated in March 1790—arm inflamed, and had the ſame appearance as many other children that were inoculated at the ſame time. He ſickened rather earlier than the other children; the fever abated on the ninth day; and three or four puſtules made their appearance, which were conſidered by every one as exactly like the ſmall-pox. I was informed that the arm looked much inflamed, and that it contained a quantity of matter, as it ſtained the linen very much.

Exactly ſeven weeks after inoculation, the natural ſmall-pox appeared—I ſaw the child on the ſeventh day of the eruption, at

at which time its face was extremely full of a very fine and diſtinct ſort.

CASE VI.

Mary Miller, thirteen years old, was inoculated at the ſame time—the arm roſe very well, but was more inflamed, and contained even a larger quantity of matter than the arm of the child juſt mentioned; ſhe was not obſerved to be at all ill, or to have any eruptions.

Seven weeks from the inoculation ſhe was ſeized with a fever, and in two or three days a very fine ſort of ſmall-pox came out upon her, which I ſaw fully maturated on the ſeventh day.

The arm muſt have been very much inflamed with the firſt infection, for when I ſaw her eight weeks afterwards, a very large

large ſcab, equal in ſize to a ſhilling, and an eighth of an inch thick, remained upon it, notwithſtanding the ſmall-pox had attained their heighth.

CASE VII.

Elizabeth Hart, two years old, was inoculated at the ſame time the other children were,—the arm inflamed very well and had matter in it, ſhe began to ſicken on the ſeventh day, continued ill two days, then grew better, and as ſhe grew better, ſeveral eruptions came out, which were taken to be the ſmall-pox:—ſeven weeks afterwards, however, ſhe was taken with the natural ſmall-pox, and I ſaw her when they were at the heighth.

The

The children which were the ſubjects of the laſt three caſes were, with a great many more belonging to the pariſh of South-fleet, inoculated at the ſame time. They were inoculated indiſcriminately with the reſt, ſome of whom had the ſmall-pox to ſuch a degree as to leave no room to doubt the fact.—The natural ſmall-pox has ſince been much, and in a great degree, in the neighbourhood, ſo that almoſt all the inoculated children were conſtantly expoſed to the infection, and muſt inevitably have caught it, if they had not already paſſed through the diſeaſe.

It is clear in the caſes juſt related, that a diſeaſe of ſome kind was propagated by inoculation—*the inciſions inflamed as they uſually do in the real ſmall-pox—the fever commenced at the moſt common period—continued the ſame length of time—and terminated*, (except in the firſt caſe) *in the eruption*

eruption of puſtules, but few of theſe puſtules indeed, as I underſtood, have maturated completely, but every one knows that this is frequently the caſe in the real ſmall-pox when the eruptive ſymptoms have been moderate.

Such was the real ſtate of theſe patients —and every one is at liberty to draw ſuch concluſions from them, as he may think they will admit of. I will not hazard an opinion upon their caſes—but I will with great diffidence venture to aſk—whether theſe anomalous caſes may not be in ſome meaſure explained in this manner?—That the firſt diſeaſes were not the true ſmall-pox, will I imagine be univerſally allowed, as all the patients had it ſome time after in a manner ſo deciſive as not to leave the leaſt room for doubt: and I do not believe there ever was a well authenticated inſtance of the ſmall-pox occurring

twice

twice in the ſame perſon—the reſemblance however between the two diſeaſes is ſo remarkably ſtriking, that it ſhould ſeem to point out there was ſome very intimate connection between them :—ſo very cloſe indeed do they appear to be connected, that I am diſpoſed to conſider the firſt as ariſing from a *certain degree* of variolous infection, but which infection was not ſufficiently powerful to propagate the diſeaſe fully and completely.

This anomalous complaint then appears to depend upon a certain degree of feebleneſs or impotency in the infecting matter, which may perhaps be thus accounted for.

So long as the variolous matter continues unaltered and poſſeſſes its common properties, it is capable of producing the ſmall-pox, when applied to a body that has not previouſly had the diſeaſe—but every

every one knows, that when variolous matter has been kept a length of time, particularly if it has not been thoroughly dried, and the air properly excluded from it, it entirely loſes its property of propagating the diſeaſe :—the loſs of this property as I take it, is owing to the ſpontaneous fermentation which the matter undergoes—if it proceed to a particular degree, its nature is ſo entirely altered, that it either does not produce any effect whatever, or elſe a *ſimple* inflammation on the part to which it is applied : but it appears to me, that when the matter is juſt *beginning to change its quality*, and before it has made any material progreſs, that it is then capable of producing an effect, not only upon the part to which it is applied, but upon the conſtitution at large :—this effect will not be exactly the ſame as that produced by the pure matter, becauſe its

its nature is in ſome meaſure altered, but it will ſtill reſemble it in a certain degree, and the reſemblance will be, in proportion as the matter partakes more or leſs of its original properties:—hence it may be conceived that the arm ſhould inflame at the uſual time, and have the uſual appearances —that it ſhould be abſorbed, and produce its effect on the habit at the common period—that the fever ſhould continue the uſual length of time, and terminate in an eruption of the ſkin;—but that this eruption does not partake ſo perfectly of the variolous property, but the conſtitution will undergo another and more perfect change, upon the application of a more perfect and powerful cauſe.

It ſtill remains to ſhew how this idea may be applied to the caſes under our conſideration.

With reſpect to the caſes of the three children related in Caſes II. III. and IV. I very well remember inoculating them with matter taken from the only remaining puſtule on the body of a woman, on the fifteenth day of eruption, when ſhe appeared perfectly recovered, and all the other puſtules were dried away.—Under theſe circumſtances it is natural to conclude, that this matter was ſomewhat altered in its properties, and conſequently liable to produce an irregular diſeaſe.

As to the others I could not obtain ſufficiently correct information from whence the matter was procured with which they were inoculated.—I will therefore only obſerve that it is a very frequent practice, particularly when many are to be inoculated, and in the country: to collect a

quantity

quantity of the matter upon lint, to incloſe it in a vial, and to inoculate from this as occaſion may require:—in a certain time the matter commences its fermentation—and if any is uſed at the preciſe period I have hinted at, the diſeaſe in queſtion may then be produced.

It may perhaps be objected to this, that variolous matter with which people are inoculated muſt be ſo frequently in a ſtate of fermentation, that the diſeaſe about which we have been treating, muſt, if it depends upon ſuch circumſtance, have been much more general than we in reality have reaſon to believe it has been.—To this I anſwer it is at one preciſe period, and then only, that I conſider the matter as being able to produce ſuch effect, and that it is probable

it may be in this ſtate only a very ſhort time, for if it has not commenced its fermentation, it will produce the true ſmall-pox—and if that proceſs has advanced the ſmalleſt degree too far, it will not then produce any conſtitutional effect whatever.

Whether this idea is properly founded, it might be of ſome conſequence to determine—but at any rate we may, from the caſes related, gain one piece of uſeful and important information—never to employ variolous matter except when it is perfectly freſh; and not to be too confident that the patient has abſolutely had the ſmall-pox, unleſs the puſtules have paſſed through a regular maturation.

The

The following caſe has occurred ſince the former were written ;——as ſuch do not, I believe, by any means frequently happen, and as it is an additional proof of the neceſſity of attending to the advice juſt intimated, it may not perhaps be improper to relate it in this place.

CASE VIII.

Elizabeth Brazier, three years old, was inoculated by the ſame perſon who inoculated Wallis, Miller, &c. and almoſt at the ſame time.

Her arm roſe very well, and the fever came on at the uſual time, after which

about thirty puſtules made their appearance---they continued out ſix or ſeven days.

Her parents afterwards informed me, that in the month of May ſhe caught the natural ſmall-pox from ſome of the neighbours, and that ſhe was as full as ſhe poſſibly could be.

CASE IX.

Mrs. Childmaid's child, 14 months old, was inoculated on the twenty-firſt of September, from a boy extremely full of the confluent ſmall-pox, on the tenth day of the diſeaſe. The child's arm inflamed conſiderably, and had exactly the ſame appear-

appearance as its ſiſter's, who was inoculated at the ſame time, from the ſame boy, and who ſickened on the ninth day. This infant however, notwithſtanding the three inciſions, inflamed to the extent at leaſt of a ſilver three-pence, and ſuppurated equally as much as thoſe of its ſiſter; had no eruptions, nor was any feveriſhneſs perceived.

From the general event of my own practice, as well as the authority of Baron Dimſdale and others, more particularly explained in the firſt caſe related in this Memoir, I ſhould have concluded this child was perfectly ſecure from any future infection; but the event of that caſe determined me to inoculate him again; this was accordingly done on the fifth of October with freſh matter from the brother of the boy, I before inoculated him

from, on the tenth day of a very full and diſtinct ſort.

I ſaw him on the eleventh of October —the four inciſions were very much inflamed, each to the extent of my thumb nail :--in the afternoon the child was perceived to be ill—he became feveriſh and paſſed a very reſtleſs night.

12th.—continued in the ſame ſtate and paſſed a very reſtleſs night.

13th—the child was much better: a few ſmall eruptions perceivable. The inciſions ſcabbed over, but conſiderable quantity of matter underneath.

The eruptions to the amount of about thirty or forty gradually increaſed in ſize, and on the twentieth began to be incruſted over:—they were beyond the poſſibility of a doubt, the true ſmall-pox.

The

The laſt ſcab from the firſt inoculation was picked off, at the time the eruptions turned, that is one month after the matter was inſerted

A

RUPTURE OF THE UTERUS,

TERMINATING FAVOURABLY.

RUPTURES of the uterus ſo very generally terminate in death, that I believe, even at the preſent day, there are many who do not conceive an inſtance ever occurred that terminated in recovery, that ſuch caſes however have really happened, cannot ſurely be doubted by thoſe who have ſeen Dr. Douglas's account of Mrs. Manning's caſe, and Dr. Hamilton's caſe in his outlines of Midwifery. Perhaps to theſe may be added the caſe Dr. Douglas mentions from Heiſter, and another from Peu;

Peu; but beſides theſe I do not believe there are on record any inſtances well authenticated, that terminated favourably. As theſe caſes therefore are ſo very rare and uncommon, I am ſatisfied the Society will with pleaſure receive an account of one which terminated in the moſt favourable manner. It occurred under the obſervation of a very particular friend of mine, Dr. Beugo, of Rocheſter, who was ſo good as to tranſmit it to me, and I ſhall beg leave without further preface to lay it before the Society.

The CASE of MRS. WILLIAMS.

Mr. Stanton's account.

April 29th. 1791. Was deſired to viſit Mrs. Williams who was of a relaxed habit

bit of body, about twenty-eight years of age, and in the ſeventh month of her pregnancy.

Nothing material had occurred during the former part of her pregnancy, but a day or two previous to my ſeeing her, a very profuſe hæmorrhage had taken place, and ſhe had ſlight pains in the region of the uterus.

30th. The pain very materially encreaſed, the hæmorrhage had been very inconſiderable. A glyſter was thrown up, which produced a ſufficient evacuation, and a few drops of tr. opij were given in a mixture of nitre and pulv. tragac. c. the pain continued very violent, and towards evening began to bear down.

Upon examination I could not diſcover the os internum the leaſt dilated.

May

May 1ſt. On examining at one o'clock in the morning, I found the membranes ruptured, and the os internum ſo much dilated, that I clearly diſcovered the preſentation of the ſhoulder, the hand and arm being ſituated behind the child: The patient appearing much exhauſted, and her attendants extremely anxious about her ſafety, I ſolicited the aſſiſtance of Dr. Beugo; but before his arrival, I endeavoured (during an interval of pain) to bring the arm forward, in order to proſecute the turn with the greater facility; which I accompliſhed much ſooner and with greater ſucceſs than I expected. The fœtus was highly putrid, and from appearance, muſt have been ſometime dead.

Waiting in vain, for a pain to aſſiſt in extracting the placenta, I was forced to introduce my hand into the uterus (as the

the funis was perfectly rotten) and withdrew the greater part of it. On the ſecond attempt, to bring away the remainder, I diſcovered a very alarming laceration through the poſterior and inferior part of the uterus. Dr. Beugo now entering the room and examining, expreſſed his ſurpriſe, feeling diſtinctly the inteſtines and their convolutions.

May 2nd. The patient much better than I expected, notwithſtanding ſevere pain about the uterus and abdomen, which I was pleaſed to find alleviated by an enema of milk, ſoft ſugar, and oil, ſhe afterwards took a mixture of nitre and opium.

The third day after delivery, the pain great, the diſcharge highly tinctured with blood.

On the fourth day, the pain very little, the diſcharge trifling, repeated the medicine as before.

The fifth day, entirely free from pain. From that time altered her plan of regimen, when ſhe every day recovered her ſtrength, and at the end of three weeks purſued her uſual domeſtic employment.

Dr. Beugo's Account.

As ſoon as I introduced my fingers as far as the lower part of the ſacrum, I met with a large clot of blood, as big as an ordinary egg, which I found, upon the re-introduction of my hand, had lain oppoſite to an opening, over which hung a looſe jagged flap; and behind it I met with ſeveral convolutions of inteſtine, which I took between my fingers and thumb, to be aſcertained of what they were; in this manner I traced at leaſt three

three convolutions: diſtinctly perceiving at the ſame time the meſentery, and afterwards I puſhed the whole up with my fingers beyond the middle of the hollow of the ſacrum; but on with-drawing my fingers, the convolutions deſcended alſo, tho' not quite ſo low as at firſt I found them. Through the opening my four fingers could eaſily paſs. It ſeemed to be about the middle of the hollow of the ſacrum. I afterwards drew back my fingers, and found the cavity of the uterus conſiderably contracted above that point.

In addition to Mr. Stanton's account, I have only to add, that no ſickneſs or vomiting came on. She did not complain of faintneſs, and no particular alteration was perceived in the pulſe; in ſhort, neither at the time I firſt ſaw her, which was immediately after the rupture

muſt have taken place, or at any ſubſequent period did ſhe appear to ſuſtain any material inconvenience from the accident. I was, from one circumſtance or another always prevented examining the ſtate of the diſcharge, but I was repeatedly informed, that it was in proper quantity, that it had the uſual appearance, and that no matter was at any time to be perceived. She was ordered a low cooling diet, and ſuch medicines as were calculated to avoid general inflammation.

She has ſince had another child at the full time without any particular diſturbance, trouble or uneaſineſs, perceptible from the circumſtances of the rupture. She thinks the whole proceſs of labour and recovery, with this laſt child, was in all reſpects like that with the firſt child.

She

She always before was ſubject to a conſiderable degree of fluor albus, and has been with no remarkable degree of difference ſtill ſubject to the ſame.

Caſe of an unuſually large Abceſs, ſeated between the Peritonæum and Abdominal Muſcles, from which the matter appeared to be diſcharged, ſometimes by the external Opening, and at other times by Expectoration.

On the 16th. of Auguſt 1784. I was deſired to viſit Mary Galloway, a married woman, aged thirty-ſix years.

Her chief complaint was a prolapſus uteri, which ſhe firſt perceived on recovering from a very quick labor in the year 1772, from which time it had gradually increaſed, and was now the largeſt and moſt complete I ever ſaw.

I was informed that the day preceding my viſit, ſhe had been attacked with a ſlight ſhivering, ſucceeded by ſevere pain

and ſoreneſs over the whole abdomen; the pain however ſoon abated, and by the time I ſaw her had entirely ceaſed.

As the uterus had been diſplaced ſo long, and was ſwelled ſo conſiderably, I prepared for its reduction by repeated gentle aperients and frequent fomentations. After uſing theſe means a few days, I reduced the uterus, though not without conſiderable difficulty, and applied a peſſary with a ſtem, ſecured (as I thought) very properly, with compreſſes and bandages, but it was equally ineffectual.

In a ſhort time the abdomen again became painful and ſwelled conſiderably; and the prolapſus increaſed in proportion. After uſing fomentations, cataplaſms, &c. during four or five days, a fluctuation was evidently perceptible; a ſmall veſication appeared

peared on the navel, and the next day there was an immoderate diſcharge of fœtid, acrid matter, from a ſmall opening in the umbilicus, juſt large enough to admit the head of a probe. This continued about twelve hours, in which time the quantity of matter evacuated amounted, as nearly as I could gueſs, to ten or twelve pints. I ſaw her half an hour after it had burſt, and on introducing my probe, as ſhe lay on her back, I paſſed it in a perpendicular direction quite to the point, and I likewiſe was able to paſs it under the integuments, and as I thought abdominal muſcles, in an oblique direction towards the anterior part of the left criſta Ilii.

Her pulſe which beat from 130 to 140 ſtrokes in a minute, was irregular and extremely feeble: her tongue was covered with a thin, dry, browniſh ſordes; her teeth

teeth were free from moiſture, and white like a dead bone; her fleſh was greatly emaciated and her whole countenance truly hippocratic.

I obſerved above that on introducing the probe, it paſſed immediately and very readily down towards the ſpine; next morning when between ten and twelve pints were diſcharged, I found it impoſſible paſs the probe in the ſame perpendicular to direction, though it went very readily four or five inches towards the left ilium; ſo that, without exerting a greater degree of force, or examining more minutely, than we thought prudent, we could not determine whether the diſeaſe was or was not ſeated in the cavity of the abdomen.

Notwithſtanding the reduced ſtate my patient was in, and the little probability there ſeemed to be of her recovery, I did not

not heſitate to adviſe her to have the opening enlarged, with a view, not only of allowing a free exit to the matter, but likewiſe to give us an opportunity of aſcertaining the nature and ſeat of the diſeaſe, and in conſequence, determining what might be proper to be purſued in future: but all the arguments I employed were of no avail, as ſhe obſtinately perſiſted in refuſing to permit the uſe of the ſcalpel. She was alſo equally averſe to the application of a cauſtic or ſeton.

I therefore adviſed her to be kept as clean as her ſituation would allow, and the room to be properly ventilated; at the ſame time recommending ſuch a poſture as would facilitate the diſcharge of the matter; and directing an aſſiſtant to preſs in the courſe of the ſinuſes ſeveral times in the day.

For

For ſome time the patient's ſtomach had been ſo irritable, as not to retain the bark in any form, but now ſhe was able to take it together with an anodyne at night. The uſe of theſe medicines was followed by more reſt at night, an abatement of the quickneſs of the pulſe, and ſome little inclination for nouriſhment.

It gave me great pleaſure to perceive the advantage we gained from this mode of treatment, notwithſtanding the immoderate quantity of matter diſcharged during the firſt week, after which time the quantity of it daily leſſened, the fever abated, her ſtrength, ſpirits, and appetite, increaſed; and on the twenty-firſt day, from the time the abceſs burſt, the wound was healed.

It was a conſiderable time before ſhe compleatly recovered her health, but ſeveral

ſeveral months are now elapſed, and ſhe has had no return of her complaint.

During my attendance, I obſerved a circumſtance which ſurprized me not a little; it was this: at the time I firſt ſaw her, ſhe was troubled with a ſhort cough, which was at firſt dry, but on the third day after the abceſs burſt, the matter from the opening almoſt ceaſed to flow, and ſhe expectorated a vaſt quantity of what appeared to me to be pus, mixed with frothy mucus, equal in meaſure as was ſuppoſed, to the diſcharge which ought to have been evacuated from the wound in the ſame time. This expectoration, the firſt time, continued twenty four hours, and it afterwards returned ſeveral times, laſting from ſix to eighteen hours each time: it would then nearly ceaſe, and the matter would ſoon after run as freely as before from the wound. This

expec-

expectoration of pus alternating with the diſcharge from the opening, continued till the wound almoſt healed, and then finally ſtopped. The two diſcharges never occurred, except in a very trivial degree, at the ſame time.

The circumſtances of this caſe render it very probable, that the tumor was not encyſted, but that it was ſeated between the peritonœum and abdominal muſcles. Suppoſing this to have been the caſe, it may ſeem wonderful, that the diſcharge ſhould not have made its way into the cavity of the abdomen, rather than by the umbilicus: however, when we recollect that the external lamina, or what may be more properly called the cellular ſubſtance, of the peritonœum, is in ſome ſubjects a very thick and firm membrane, and that the integuments are much thinner at the umbilicus, than at any other

part

part of the abdomen, it will in a great meaſure relieve us from this difficulty.

About ſix months after the date of my former account, the patient began to be affected with ſymptoms of pulmonary conſumption; and in the latter end of November 1786, when I was again deſired to ſee her, I found her in the laſt ſtage of that diſeaſe.

She informed me, that ſhe had not had either pain or ſwelling in the abdomen ſince I laſt ſaw her; and that the prolapſus utery had occaſioned ſcarcely any inconvenience. On examining the abdomen, which on account of her emaciated ſtate, I was enabled to do very accurately, there appeared for the ſpace of

two

two inches round the navel, to be a complete opening through the abdominal muſcles down to the peritonœum; but the integuments were very ſound, and there had never been any tendency to a protruſion of the inteſtines.

In a few days ſhe died. I lamented I could not aſcertain the preciſe ſtate of the parts that had been ſo peculiarly affected; but an unlucky concurrence of circumſtances prevented my opening the body.

Account of an extraordinary diſorder in which the patient after ſuffering amputation of the thigh for a carious ulcer on the leg, was at different times attacked with the ſame painful ſenſations, and which as ſhe imagined occupied exactly the ſame place as before the limb was removed.

Mrs. Evans, aged 40, corpulent and of a plethoric habit, was thirteen years ſince attacked with an inflammation on her left inſtep, which at firſt was of ſmall extent, but in a ſhort time it increaſed conſiderably. The inflammation ſpread round the ancle and up to the knee, ulceration ſoon

took place and the tibia became carious nearly throughout. It was from the beginning attended with excruciating torture, notwithſtanding every remedy was made uſe of which the ſkill and experience of an eminent Surgeon could ſuggeſt, —bleedings both topical and general frequently repeated, emollient and anodyne fomentations and cataplaſms, with the free uſe of opium internally, alleviated the pain, while cauteriſing, perforating, and raſping the bone, procured ſeveral exfoliations.—In this manner did they for ſeveral months procraſtinate the unhappy hour when ſhe was to ſuffer amputation; but the flame broke out with redoubled violence, occaſioning fever with a long liſt of dreadful ſymptoms that was nearly putting an end to her miſerable exiſtence, and in this extremity, that operation was recom-

recommended above the knee, as the only probable means of ſaving her life.

To this operation ſhe moſt willingly ſubmitted, naturally concluding it would either remove her agonizing complaint or put a period to her exiſtence; but even in this expectation, the unhappy woman was wretchedly miſtaken, for in a few days after her leg was removed, *ſhe was attacked with her old diſorder equally excruciating and diſtreſſing as before, and in her imagination occupying exactly the ſame place, that is, all the ſpace between the ancle and the knee!* in this ſtate ſhe continued three or four days, it then went off ſuddenly. The ſurgeons endeavoured to perſuade themſelves this was little more than that common ſenſation which every one experiences after amputation in a greater or leſs degree: a very ſhort time

however fully convinced them, there was ſomething more extraordinary in this caſe than is uſually obſerved in others, for in about ſix weeks, the ſame painful ſymptoms occurred again, and during the ſpace of ſeven years generally returned once in about two months. Since that time the returns have been far leſs frequent, not having in general more than one fit in a year: when however they do come, they are commonly more violent and continue a greater length of time.

The pain is preceeded by ſhivering and ſickneſs of the ſtomach, after which the ſkin becomes hot, the pulſe rather quick and full, and the tongue white. The ſtump during this painful period is not in the leaſt ſwelled or inflamed, it may even be preſſed very hard with impunity, but when the pains are very ſtrong the flexor

muſcles

muſcles of the thigh ſometimes act ſo ſuddenly and forcibly that the mutilated member is repeatedly jerked upward with ſo violent a motion, that ſhe cannot with the aſſiſtance of her hands retain it in the uſual poſition.

The complaint ſometimes goes off gradually and ſometimes it leaves her in an inſtant; when it happens in the manner laſt mentioned, it flies immediately to the throat and ſtomach, occaſioning as nearly as I can comprehend, the ſame ſenſations as are experienced by perſons who labor under that diſtreſſing ſymptom the globus hyſtericus.

The mode of treatment which I have by experience found the moſt ſerviceable during the fits, is, firſt to take away about ten oz. of blood, and to repeat the

operation occaſionally; afterwards, the following pills. Rj Extr. Thebaic.—Camphor. aa ϑ—Calomel qr. viij—Tart. Emetic qd. ij—Cons. Cynoſb. q. s ut fl. Maſſa, divid in 20 pils—of theſe ſix are to be taken immediately and three or four every hour, or half hour, till the pain is abated or till they procure ſleep—theſe keep the bowels pretty open, ſometimes occaſion a little ſickneſs, and when properly perſevered in, always procure eaſe; but notwithſtanding this plan is had recourſe to immediately, it is generally three or four days and ſometimes ſix or eight before ſhe is quite free. The moſt violent fit ſhe ever experienced threw her into a rheumatic fever, which confined her to the bed ſeveral months.

A great variety of medicines, particularly the Bark, Extract of hemlock and Calomel,

Calomel, have been given in the intervals, but they did not appear to have any influence either in preventing the repetition, or diminiſhing the ſeverity of the fits. Setons, iſſues and perpetual bliſters have been frequently applied, but no diſcharge of any importance could ever be procured from either, latterly however, it has been obſerved that a few days preceeding and during the whole time of Menſtruation, (which ſince the Amputation is in general very regular both as to quantity and time) a portion of blood is diſcharged by the iſſue, which ſtops as ſoon as that period is over.

About ſeven years ſince, ſhe was very much ſubject to head-achs, for which ſhe took the Gum pills with apparent advantage: theſe pains afflicted her at times for two or three years, and when they left her, the other leg became frequently af-

fected with an eryſipelatous inflammation ſeated juſt above the outer ancle, and extending about the ſize of the palm of the hand; in the middle there is generally a ſmall ulcer, which altho' it has not the appearance is often attended with very violent pain, but neither the fibula or its perioſteum ſeem any ways diſeaſed. Medicines of various ſorts, and applications of almoſt every nature, have been tried, but in general without ſucceſs; laudanum on lint, or mixed with a ſoft poultice, was found to ſit eaſieſt, but ſhe has lately uſed fomentations and cataplaſms prepared with freſh hemlock and has experienced greater advantage from them than from any other application. The iſſue was directed to be kept open and a ſeton was again inſerted into the neck with a view of obtaining as great a diſcharge from the conſtitution as could readily be procured.

She

She was likewiſe ſometime ſince much troubled with an obſtinate ſore throat, but on inſpecting the parts they were no ways altered from an healthy ſtate; frequent bliſtering and ſtimulating applications were of the moſt tho' not of any very great advantage, every thing elſe ſeemed to do no good: it continued about two months, then went off ſpontaneouſly.

That the whole of this perſon's complaints, altho' they appear under various forms, proceed from the ſame cauſe, appears very evident, and it is equally plain, that the prediſponent cauſe is a very high degree of irritability of the nervous ſyſtem: but what the proximate cauſe is, I am unable to determine: thus far however I can with propriety obſerve, that once immediately after an unuſually ſevere ſtorm of thunder and lightning,

ſhe

ſhe had a very violent attack, and ſeveral times it has come upon her, at or near the time of the full and change of the moon.

Two or three years after the preceeding account was written, Mrs. Evans was ſuddenly attacked with an apoplexy which in leſs than twenty four hours proved mortal. The next day I opened her head, and from the left ventricle removed a coagulum of blood weighing I ſhould apprehend about two ounces, which was undoubtedly the cauſe of her death.

In a caſe ſo myſterious and which ſo nearly reſembled what is commonly underſtood by " nervous affection"—(which in my mind implies a diſordered action, rather

rather than a diſeaſe)---it was not reaſonable to expect that much light would be thrown upon the ſubject by diſſection—I however paid particular attention to every part of the brain, but could not diſcover any thing remarkable or preternatural except a ſmall bone about twice the ſize of a barley corn attached to the falciform proceſs of the dura mater—it was rather ſmooth than rough, and did not appear to have injured or inflamed that part of the brain upon which it preſſed,——whether it might have irritated the brain or nervous ſyſtem or have had any influence in the production of the above uncommon complaint (ſimilar to which I never ſaw, heard or read of one) I leave others to determine; if my recollection does not fail me however, ſeveral writers have mentioned extraordinary

dinary and unaccountable ſymptoms having ſometimes occurred in caſes where upon diſſection, a depoſition of bony matter was found on ſome part of the falciform proceſs.

Recommendation of Electricity for the cure of the Cataract: illuſtrated by a caſe.

Mrs. Bray of Graveſend, a widow, aged ſixty, much ſubject to hypochondriac affection, was, in May, 1785, without any apparent cauſe, ſeized with a pain in the fore part of her head, and ſhortly after with a conſiderable dimneſs of ſight: in a few days theſe ſymptoms became ſo urgent, that my aſſiſtance was requeſted.

I was then informed the pain occupied the entire fore part of the head, both internally, and externally, but that it was more particularly ſevere in the ſpace between the temples: it was ſaid to be neither burning, pricking, nor pulſatory, but dull, heavy and conſtant, neither changing its place,

nor

nor becoming intermittent, or even remittent, it was the ſame in an horizontal and in an erect poſition and it did not ſeem materially increaſed either by coughing, ſneezing, or a long continued inſpiration.

Her pulſe was natural, both as to ſtrength and quickneſs. Her tongue was moiſt, and ſomewhat white. There was no giddineſs, or tendency to delirium, and all her ſenſes, that of ſeeing excepted, were perfectly clear.

Her appetite and ſleep had almoſt forſaken her; her ſpirits were extremely low and her countenance carried indubitable marks of the anxiety of her mind.

On examining her eyes, I found the cryſtalline humours changed to a pearl colour, and obſerved two or three ſpecks, the remains of former inflammations, on the cornea of one eye; one of theſe

ſpecks

ſpecks was ſituated immediately before the pupil, ſo that it prevented my having a perfect view of the cryſtalline; and as in ſome meaſure it excluded the rays of light from falling on the retina, it probably occaſioned the iris to have very little motion. Whether this, however, was really the reaſon or not, I will not determine; but the fact is, the pupil of this eye was much ſmaller than that of the other, and it had likewiſe leſs motion.

She very readily perceived the light, and was capable of diſtinguiſhing bright and luminous objects; but the darker colours made very little impreſſion upon her; and what rather ſurpriſed me was, that ſhe appeared to be nearly as ſenſible of the light, &c. with that eye which had ſpecks before the pupil, and which had little or no motion in it as with the other,

other, which was perfectly free from thoſe circumſtances.

A large bliſter was applied to the neck, ſome æthereal ſpirit was frequently held to her forehead, and ſhe was directed to take ſome gentle phyſic. By theſe means the pain in the head was very much alleviated, and in a few days, it entirely ceaſed. The opacity of the cryſtalline humors, however, did not abate, and her blindneſs, if there was any alteration, ſeemed rather to increaſe. The extraction of the humour was recommended; but ſhe perſiſted in the determination of ever remaining in her preſent wretched ſituation, rather than ſubmit to that operation.

That nothing might be omitted from which even the moſt diſtant probability of

ſucceſs

ſucceſs might ariſe, I determined to try the effects of electricity, thoroughly perſuaded of the total inefficacy of every other, remedy, and indeed, from this wonderful agent, my expectations were not very ſanguine.

The electric fluid, therefore, was, by means of a wooden point, drawn from the cornea, while ſhe ſat on the inſulated chair, daily for the ſpace of a month. The operation each time was continued about a quarter of an hour. At the expiration of the month I did not perceive the opacity of the humours was at all diminiſhed, nor did my patient think that her ſight was in any degree altered for the better. I was unwilling, however, to relinquiſh the only plan from which I could reaſonably expect to derive any benefit, and therefore reſolved

to direct ſmall ſparks through the diſeaſed humours; this was done about a week, and then very ſmall ſhocks, from a jar containing about an hundred inches of coated ſurface, were ſubſtituted in their place. The gentleſt ſhock however, that could be given from this was ſo powerful, and irritated her ſo much, that a ſmall vial, with no more than twelve inches, was uſed in lieu of the larger one: forty or fifty ſhocks from this, of not more than one tenth of an inch in length, were daily directed through each eye, and theſe ſhe bore tolerably well; but if either their number or ſtrength were materially increaſed, it occaſioned a ſevere pain in the head.

Soon after this courſe had commenced, ſhe began to ſee ſomewhat diſtinctly; and when it had been continued a month, ſhe

was

was ſo much benefited as to be able to read, at one time, ten or twelve pages of very ſmall print, and to hem an handkerchief in a tolerable manner, equally well indeed, I was informed, as ſhe had done two years before.

The cryſtalline humours were now almoſt, if not entirely, as clear as is uſual in people of her age, and, in ſhort, ſhe was altogether infinitely better than my moſt ſanguine expectations could have allowed me to hope.

I mentioned, in the beginning of this account, that my patient was, at times, ſubject to hypochondriac affections: I am extremely concerned to have occaſion to add, that about this time, ſhe was again attacked, with that complaint, which now reſembled the diſeaſe treated of by Sauvages under the title of Hypochondriaſis Melancholica.

This unfortunate occurrence cloſed our proceedings, and with that, every idea of farther recovery vaniſhed.

I was firſt induced to make trial of electricity in this caſe, by reflecting on the great advantage I had in many inſtances received from its application in obſtructions of various parts of the body, but more particularly in inflammations of the external coats of the eyes; and that whether the inflammation was mild or ſevere, recent or of long ſtanding: in ſhort, whether it was a truly acute inflammation, or merely a relaxation and over diſtention of the veſſels in conſequence of inflammation, I do not recollect a ſingle inſtance in which it did not effectually anſwer my expectations.

The

The real cauſes of theſe opacities are probably unknown; but when we recollect that the capſula of the cryſtalline humour is ſupplied with capillary veſſels from ſome of the ſmall ramifications of the ocular artery, and that veſſels have been ſeen running from the capſula into the body of the humour itſelf, we can eaſily conceive that inflammation and obſtruction may, upon the application of certain exciting cauſes, juſt as readily occur in theſe veſſels as in thoſe of the cornea, ſclerotica, or any other part. Now, as I before mentioned, that in inflammations and obſtructions of the external membranes of the eye, I had applied electricity with greater advantage than any other means; and, as I conceived it probable there was ſome analogy between thoſe diſeaſes and the caſe under conſideration, I was induced to employ the ſame remedy.

And although electricity in the above caſe did not effect a cure, yet the advantages derived from it were ſo very evident, and ſo infinitely ſuperiour to what I ever ſaw produced by any other means, that I have no doubt but a complete cure would have been accompliſhed, if our operations had not been prematurely ſtopped; and I am the more diſpoſed to be of this opinion, ſince I have read Dr. Knox's account in the ninth volume of the Medical Commentaries, of cataracts in both eyes removed by electricity. It does not appear, however, that his patient was affected in ſo great a degree as the ſubject of the caſe I have related; but I am much inclined to think, that if the remedy had been more powerfully employed, the cure would have been conſiderably expedited.

A variety

A variety of medicines have at different times, been recommended for the removal of cataracts; but now that the nature and ſeat of the diſeaſe are thoroughly aſcertained, very little confidence is placed in any of them, even in the moſt recent caſes, and under the moſt favourable circumſtances. Mercury is, I believe, allowed to ſtand at the head of theſe remedies; and I have once or twice ſeen good effects ariſe from its uſe in caſes which were ſuppoſed to be incipient cataracts. I have likewiſe, in more inſtances than one, ſeen the ſame medicine exhibited in caſes of ſome ſtanding, and where the opacity was nearly complete, but it was never attended with any advantage.

The inefficacy of theſe remedies has induced practitioners to lay them aſide,

and rely entirely for the cure on the removal of the humour.

It is with the view of calling the attention of medical gentlemen to a new remedy, that the preſent caſe is laid before them; and as it is a ſubject extremely intereſting to humanity, comprehending nothing leſs than the happineſs or miſery of many unfortunate individuals I have not a doubt but it will receive, what it appears in an eminent degree to merit, a fair and candid trial: it is that which will determine its efficacy, and by that it muſt ſtand or fall. If, as we have reaſon to expect, it ſhould, by experience, be found to prove ſucceſsful, the ſight will be more perfect than when either depreſſion or extraction has taken place; as in the former caſe, the lens is merely rendered tranſparent, whereas in the latter it is entirely

tirely deſtroyed, and conſequently the patient cannot have a diſtinct viſion without the aſſiſtance of a convex glaſs, as a ſubſtitute for the humour which is loſt. If, on the contrary, it ſhould not be found to ſucceed, we have the ſatisfaction of knowing that if it be judiciouſly applied it cannot produce the leaſt inconvenience.

I cannot conclude without obſerving, that it appears to me, the more powerfully electricity is applied, provided it does not irritate too much, or occaſion too great uneaſineſs, the more likely will it be to haſten the cure. No particular degree of force, can, with propriety, be fixed on as a ſtandard; for a weak, delicate, irritable woman will be as much affected by a moderate ſpark, as a hearty, ſtrong, robuſt man will by a ſmart ſhock. Its

ſtrength,

ſtrength, like the doſe of an active medicine, muſt be accommodated to the habit and conſtitution of the patient.

By beginning moderately, and increaſing its ſtrength gradually, we ſhall be certain to avoid doing any miſchief, and ſhall readily be able to aſcertain the bounds beyond which we muſt not proceed. I would therefore adviſe, that at firſt, a ſtrong current of electrical aura be directed through the diſeaſed parts: this may be effected (after placing the patient in an inſulated chair) by running a pin through the hair, &c. ſo as to be in contact with the hind part of the head immediately oppoſite the eye we intend to operate upon, and connecting it with the cuſhion; at the ſame time, a director, with a wooden point communicating with the prime conductor of a powerful machine, is to be held

held at a ſmall diſtance from the eye and, on putting the cylinder in motion, the fluid will paſs from one point to the other, and conſequently *through* the diſeaſed humours.

When this has been repeated ten or twelve times, ſmall ſparks ſhould be ſubſtituted in its place. Theſe may very advantageouſly be given, by placing the knob of a director, connected with the electrometer, ſo as to touch the moſt prominent part of the eye, while the pin, connected with the negative conductor, is fixed as in the laſt method; and in this manner the ſtrength of the ſparks may be determined the ſame as ſhocks.

As ſoon as it is thought proper to have recourſe to ſhocks, it will be neceſſary, in addition to the laſt mentioned plan, to ſuſpend

ſuſpend a ſmall coated vial from the conductor, and to connect the pin with the outſide of the vial inſtead of the cuſhion.

There is ſtill another mode of applying our remedy, and it is from this modification of the electric fire I entertain the greateſt expectations, as it appears peculiarly adapted to anſwer our preſent purpoſe. It conveys a ſenſation between a ſpark and a ſhock, and is produced by means of a tube inſerted into the vial the lower end of which is coated, and in contact with a wire which paſſes through a ball on the top of the tube. As no particular management is required for this, farther than that already recommended for the application of the ſhocks, it will be unneceſſary to ſay any thing more upon the ſubject; and indeed I ſhould think it proper to apologize for having

having already taken up ſo much time, if I did not think theſe few hints might ſave thoſe ſome trouble who have not previouſly been in the habit of making the experiments.

Caſes of the Diſeaſe which is commonly called Paralyſis of the inferior extremities in conſequence of a curvature of the ſpine.

CASE I.

A Lad, in the twelfth year of his Age, of a fair complexion and a ſlender make, was, in September 1780, ſeized with a cold ſhivering, which continued about five minutes. A fever ſucceeded and run pretty high the whole night, but towards morning abated. A contraction of his legs enſued, attended with ſo much debility that he was unable to walk. He complained of pains all over his body, but more particularly about his ſtomach and

and the ſmall of his back. Theſe ſymptoms induced me to treat it as a fever ariſing from cold and irregularity. An emetic and ſome antimonial medicines were preſcribed, by which he was in ſome degree relieved.

The fever ſometimes remitted and at other times a complete intermiſſion took place, but without obſerving any regular period. When the paroxyſm came on, I was never able to diſcover, that it attacked with ſhivering or even chillneſs. The power of uſing his legs daily diminiſhed, and about the tenth day he was utterly incapable of moving them in the leaſt off the ground.

It occurred to me, that this paralyſis might probably be the conſequence of ſome tumour on the ſpine. I examined his back carefully, but at this time no ſwelling was perceptible. The cauſe, there-

therefore, appeared to me to be hid in impenetrable darkneſs. I attempted the uſe of ſeveral medicines; but the boy poſitively refuſed to take any of them. All I did therefore was to have the thighs and legs well rubbed with a ſtimulating embrocation; to apply a bliſter to the calf of each leg, and one to the ſacrum, where the nerves to the lower extremities paſs out. This plan on which my whole dependence was placed, did not by any means anſwer my expectation: but on the contrary, every ſymptom was manifeſtly aggravated, with the addition of many circumſtances which ſeemed to predict a ſpeedy and fatal termination.

I called on him at the end of a month from the time of the attack. He appeared then in a moſt miſerable ſituation; had a ſhort cough, a quick and weak

pulſe, a purging, very little appetite, and the *facies hippocratica* to the greateſt degree I ever obſerved. It was with the utmoſt difficulty he could ſit in his chair a few minutes; and when he did, the muſcles of his back were ſo remarkably weak they could not ſupport his body, but were bent double. It was extremely diſtreſſing to him to be moved in bed; and when any one either bent or extended his legs, it was attended with great pain, particularly in the hips.

In the courſe of my inquiries, I was informed a ſwelling had within three or four days appeared on the back. On examination I found it to be of the ſize of a large duck's egg, but neither much inflamed nor very painful, comprehending the third and fourth vertebræ lumborum. The ſpine was not diſfigured; nor could I perceive the ſpinal proceſſes

any

any ways affected. Its appearance might very properly be compared to a large abcefs beginning to form.

The boy now obſerved, he always had felt an uneaſineſs in that part ever ſince he received a blow there with a ſtone, which, he ſaid, happened in the morning of the day he was taken ill; and he recollected that it was with difficulty he could walk home, (which was about a mile diſtant) on account of a pain and weakneſs in his back. This was the firſt time he had ever mentioned the circumſtance of the blow. I was now perfectly convinced that all his ſymptoms proceeded from the injury done to the ſpinal marrow, or its membranes, by this accident; and immediately recollected the advice given us in ſimilar caſes by Mr. Pott. But his danger ſeemed ſo great, and the probability of any thing giving

him relief ſo little, that it was with a view to avoid the imputation of inhumanity, and to neglect nothing that ſeemed to promiſe even a probability of relief, rather than with any expectation of ſucceſs, that I determined to try the effect of an iſſue.

As he lived in the country, and there was no time to loſe, inſtead of applying a cauſtic, I immediately made an inciſion the whole length of the tumour, thro' the ſkin and adipoſe membrane down to the faſcia lumborum. Into this wound I put two ſmall beans. The parts did not appear much diſeaſed; no matter or any other fluid was evacuated, and the faſcia was uninjured, and of a ſilver hue.

The patient continued in nearly the ſame ſtate as before for three or four days, about which time the wound ſuppurated

favoura-

favourably. In the ſhort ſpace of a week the good effect of this diſcharge became evident; his countenance was more enlivened, his pulſe not ſo quick, and he could move his legs a little in bed. From this period he mended amazingly. At the end of a fortnight his appetite was good; his fever had entirely left him in the day, and he was but little diſturbed by it in the evening.

In three weeks, with a trifling aſſiſtance, he was capable of walking round the room. All this time the iſſue diſcharged freely; and in proportion as it diſcharged, the ſwelling gradually diminiſhed, ſo that in about one month from the time the inciſion was made, no remains of the tumour could be perceived.

His health every day improved conſiderably, and in five weeks he was ſo perfectly recovered, that his mother con-

cluding there could be no further occaſion for the iſſue, ſuffered it to heal.

For the firſt three months he walked a little limping, and before any material alteration in the weather felt a ſlight uneaſineſs in the part where he received the blow; but when I met him lately, carrying a load on his ſhoulders, he ſaid he was ſtronger than before the accident, and that he now never experiences the leaſt inconvenience in his back, either from working or weather.

Various inſtances have occurred of palſies, ſomewhat ſimilar to the preſent; but I have never heard, or read of one, where the diſeaſe ſo ſoon arrived at ſo great a height, where the cure was ſo quickly completed, or where the remedy was more ſtrongly marked with ſucceſs. No one, I preſume, will heſitate to pronounce the cure to have been entirely effected

effected by the iſſue, as no other means were purſued, and every ſymptom aſſumed a milder aſpect as ſoon as it began to diſcharge.

CASE II.

Was deſired to viſit Sarah Simmonds, about three years old, of a delicate complexion, ſoft flaccid ſkin, with light hair and blue eyes, from whoſe Mother I received the following account.

About ſix week or two months ſince the child appeared heavy, dull und unwilling to move; in a few days there came on a pain and weakneſs in the ſmall of the back, extending down the thighs and legs, ſo as to prevent her either walk-

ing far or briſkly, or ſtanding quite upright. In a ſhort time after, whenever ſhe attempted to move, her legs croſſed each other, and frequently threw her down: the knees and ancles, but more particularly the knees became contracted and rigid, they were not to be ſtraitned but with ſome pain and inconvenience, and ſhe found conſiderable difficulty in turning herſelf in bed.

This was her ſituation when I firſt ſaw her July 14, 1784.

In every one of theſe ſymptoms ſhe agreed perfectly with the accurate hiſtory given us by Mr. Pott, of the uſeleſs ſtate of the inferiour extremities in conſequence of a curvature of the ſpine, and I was firmly perſuaded, this proceeded from the ſame cauſe; but on having the child undreſſed and attentively examining the ſtate of the ſpine I could not perceive

ceive the leaſt protuberance: ſomewhat ſurprized at this, and not knowing what other cauſe to refer it to, was at a loſs what plan to purſue: however as an uncertain and innocent remedy, is undoubtedly at all times (but more particularly under ſuch diſtreſſing circumſtances) to be preferred to no remedy at all, I did not heſitate to adviſe an iſſue to be applied between the 2d. and 3d. vertebræ lumbarum, that being the place where the child repeatedly ſaid her pain and weakneſs was ſeated. The mother abſolutely refuſed to allow it to be done: but as ſhe was willing to ſubmit to any thing elſe, I recommended a pretty large bliſter to be laid on the ſmall of the back, and ordered it to be kept open a conſiderable length of time, and took my leave.

Nov.

Nov. 30. Was ſent for again, and informed the bliſter was kept running about a month, during which time, the ſymptoms were much alleviated and it was allowed to heal: ſoon after it was healed, all the old ſymptoms recurred, and with redoubled violence. When I ſaw her, ſhe was neither able to move her legs the leaſt when in bed, or ſuffer the ſmalleſt weight of the body to bear upon them when ſuported by an aſſiſtant: when ſitting (which ſhe could bear for ſome time tolerably well) they were contracted under her, and drawn acroſs each other; her neck bent conſiderably forward, and her head fell backward apparently ſupported on her ſhoulders by the back of the chair without any aſſiſtance from the muſcles of the neck; ſhe had the free uſe of her hands and arms, was very

very ſubject to fever, particularly every night, and her bowels had been coſtive thro' the greateſt part of the complaint.

I again had her ſtripped to examine her back, and now perceived a ſmall tumour ſituated on the ſeventh vertebra cervicis, but it was ſo ſmall, not exceeding the ſize of a common hedge nut, and ſituated ſo exactly on the ſpinal proceſs of one vertebra only, that not recollecting to have read of a ſimilar caſe in Mr. Potts treatiſe, I at firſt was not ſatisfied that the ſymptoms proceeded from it: but obſerving the neck to bend conſiderably forward from that part, and conceiving it likely from that circumſtance, as well as the whole hiſtory, that the body of the vertebra and the connecting ligaments were affected, I was at laſt thoroughly perſuaded it was the ſeat of the diſeaſe

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and therefore made an iſſue immediately upon the part.

When I next viſited her, the mother informed me that within 48 hours after the iſſue was cut and before it diſcharged properly ſhe was evidently better, that is, when ſhe was ſitting in the chair ſhe was able to move her legs a little and when lying in bed, ſtill better: on the 7th day, by the aſſiſtance of a perſon taking hold of her hands, ſhe was able to crawl acroſs the room, tho' it was with conſiderable difficulty ſhe could drag her leg after her. In a month ſhe was able to get out of her chair without any aſſiſtance and to walk nearly round the room, by taking hold of the chairs &c. The fever by this time had entirely left her, and her countenance became more healthy. As ſhe grew better it was perceived her left leg was much

much the worſt of the two, it was ſtill drawn under her, and ſhe complained of pain in the toes of that foot.

At the end of three months her health was perfectly re-eſtabliſhed, ſhe was able to run about as much and as well as before ſhe was taken ill: the curvature however remains much the ſame, and the left leg is, if any thing, weaker than the right.

An Account of the beneficial effects of a very liberal and long continued application of cold water in ſtrictured Herniæ, and in violent Conſtipation of the bowels.

I have in repeated inſtances of the moſt dangerouſly ſtrictured Herniæ, and in ſome where the operation was determined upon, and prepared for, ſeen the *long continued application of very cold water* relieve the patient like magic, and allow the hernia to be returned with the greateſt facility, when all the uſual powerful remedies have not produced the moſt trivial advantage. I am well aware that cold applications have been a long time in general

general uſe in theſe caſes: as they are uſually applied I know them to be inefficacious, or that they will only ſucceed in comparatively ſlight caſes; but in order to produce the full effect, it will be neceſſary to apply it to a much greater extent than is uſually done, or than may by many be thought prudent: but if it be not ſo done, it will not anſwer, and the miſerable ſufferer muſt periſh inevitably, or run the riſk of a moſt painful, dangerous and horrid operation. I might bring forward ſeveral inſtances in ſupport of what I have ſaid, but I think it neceſſary to ſtate only one, which indeed was the very worſt I ever ſaw.

Caſe

Caſe of a violently ſtrictured hernia.

—Evereſt, about 35 years old, had had a ſcrotal hernia ſeveral years, but as it uſually returned into the abdomen on laying in bed, and as it was ſeldom materially inconvenient to him, he had never applied a truſs, or paid any particular attention to it. One day however, ſoon after dinner, he was attacked with a very ſevere pain in the part—inflammation and tenſion came on, and a medical gentleman was immmediately ſent for—the ſymptoms had increaſed ſo rapidly, and the man was already in ſo alarming a ſtate, that he called in another: not long after I was ſent for, and I ſaw him about ſix hours from the firſt attack.

There was greater tenſion and inflammation over the whole ſcrotum than

I had ever ſeen in any caſe before—it was ſo much enlarged that the penis was entirely hid, and, ſo exquiſitly painful that he could ſcarcely bear it to be touched.

Before I ſaw him, he had been blooded and had taken ſeveral ſtrong purgations ---Warm fomentations had been applied, and the tobacco gliſter had been injected.

I immediately gave him an opiate and placing him almoſt upon his head, I made a gentle attempt at reduction, but without the leaſt proſpect of ſucceſs.

I was thoroughly ſatisfied that no remedies whatever, ſhort of the operation, would be productive of the leaſt advantage except it was a very liberal application of cold water; and from the many inſtances I had ſeen of its good effect in herniæ, and in conſtipated bowels, I determined to give it a fair chance for the

ſpace

ſpace of three hours, although from the very unuſual ſeverity of the ſymptoms, relief was ſcarcely to be expected from any thing but the operation, and this we agreed to perform as ſoon as it ſhould appear that the cold applications did not produce the deſired effect.

With this view, ſheets were thoroughly wetted with water, artificially cooled by the neutral ſalts, and daſhed over the ſcrotum, abdomen and thighs—and they were repeated every two minutes for three parts of an hour, without any other effect than that of abating the intenſity of the pain.

As this was what might be called a very fair trial, I began to deſpair——it occurred to me however, that in the moſt obſtinate caſe of obſtructed bowels I had ever witneſſed, the patient did not experience relief until he was weakened,

and lowered to ſuch a degree by the cold applications that prudence prevented its further continuance---I reſolved therefore in the preſent inſtance, to purſue the plan to the ſame extent as in that caſe.

Five or ſix pails full of water, freſh drawn, were ordered into the apartment; the patient was laid on his back over a tub, large enough to receive the water: one or two garden watering pots were filled with the water and the contents of one of them, poured over the ſcrotum; as ſoon as it was emptied, another was uſed in the ſame manner, and this proceſs was repeated until the patient *was ſo much chilled, and the powers of life ſo much reduced*, that it was thought proper to deſiſt:——at this time the tenſion of the ſcrotum was taken off, the parts became corrugated, and with the moſt trifling aſſiſtance, the herniæ was reduced.

Caſe

Caſe of a violent Conſtipation of the Bowels.

As the termination of this moſt obſtinate caſe is deciſively and unequivocally in favor of a plan, which does not ſeem ſufficiently regarded, and as it tends in a remarkable manner to confirm the propriety of a practice which is but imperfectly underſtood, becauſe it has yet ſcarcely been employed to its full extent, I hope it may prove a means of introducing it more generally into practice. I am alſo in poſſeſſion of ſeveral caſes of a ſimilar, altho' of a ſlighter nature, which I do not think neceſſary to recite, as they all terminated in the moſt favorable manner.

Daniel Donalſon, of a ſtrong, robuſt conſtitution, forty eight years old, and

formerly a ſailor, till October, 1785, enjoyed a good ſtate of health; but at that time while he reſided in a workhouſe in ſome part of Lincolnſhire, was ſeized with an irregular intermittent. It continued about three months, and then, by taking a very few medicines, (among which he does not believe there was any bark) it left him. From this period he dated the origin of his complaint; for ſoon after he was ſubject to pains in various parts of the abdomen, but more eſpecially in the left hypochondrium, and round the navel. When the pains were violent, the part affected became ſwelled, and the bowels were coſtive; but on ſtools being procured, he immediately grew eaſy, and the ſwelling diſappeared. He ſoon perceived that when a ſufficiently large quantity of fæces was accumulated, the ſame ſymptoms returned,

turned, and he was obliged to have recourſe to ſalts, or ſome other purging medicine, in order to obtain ſtools. In this manner was he generally attacked once every four or five days; but as the remedies he commonly made uſe of, had always given a temporary relief, I was not deſired to ſee him till the 23rd. of March, 1786, when he was taken much worſe, in conſequence of the medicine having failed in producing its uſual effect.

The pain with ſome degree of tenſion was general all over the abdomen, but immediately below the navel it was more ſevere. At this part there was a conſiderable ſwelling, which at firſt ſeemed a contraction of the abdominal muſcles, but afterwards it appeared more likely to be a collection of air or fæces confined in ſome part of the bowels. He had paſſed no ſtools for about a week, and his urine

had been made frequently, and in ſmall quantity; but there was no great appearance of inflammation or fever, for no rigors had attended; the pulſe was ſcarcely altered from a healthy ſtate, and as yet he was not attacked either with ſickneſs or vomiting.

Previous to my ſeeing him he had taken three ounces of ſalts, which had produced no effect; a ſtrong doſe of jalap and cream of tartar was then given, with no better ſucceſs. Extract. cathart. and calomel having given relief in a former fit, were now exhibited in large quantities, but with no advantage; at the ſame time clyſters were had recourſe to, which ſometimes were retained but frequently voided in the ſame ſtate as when injected. It ſeems unneceſſary to ſpecify every particular remedy which was made uſe of. It will ſuffice perhaps, to mention, that after

after bleeding, the purging ſalts, infuſion of ſenna, jalap, extract: cathart: calomel, caſtor oil, &c. were by turns employed; and as they occaſioned neither ſickneſs nor increaſe of pain, they were all given in much larger doſes than I had ever ventured on myſelf, or than I had known given to others. The clyſters were emollient, oily and purgative; ſometimes they were formed with a ſolution of turpentine, and frequently with a ſtrong infuſion of tobacco: the uſual quantity of each clyſter was a pint; this was ordered to be forcibly injected through a pipe with a bore larger than uſual.

The ſtate of the inferior part of the rectum had previouſly been aſcertained, but I now thought it adviſeable to examine whether any conſtriction exiſted in the lower part of the colon. With this intention, a candle nearly a foot in length,

was

was carefully introduced, but not the leaſt obſtruction was perceived: it was, however, ſuffered to remain till the tallow melted; and conceiving ſome benefit might ariſe from a ſoft ſubſtance lying ſome time in the part, this remedy was again repeated.

The warm bath was uſed; but it was evident he was in much greater pain while in it than before. As ſoon as he came out, a clyſter of the fumes of tobacco was blown up the rectum: he was again put into the bath, and while in it another ſmoke clyſter was injected, and one more was repeated when he came from it.

The ſame day a ſmall quantity of cold water was ſprinkled on his legs and arms, while he lay on a blanket in a warm room; but the next he was ſupported on the cold ſtones of a waſhhouſe perfectly naked

naked and this during a ſevere froſt, while a pailful of cold water was, at different times, daſhed over his legs and thighs and poured down his arms. This, inſtead of increaſing the pain, as the warm bath had done, made him much eaſier: the relief, however, was but of ſhort continuance, but it was the only effect it produced.

The day following, after a tobacco ſmoke clyſter had been given, he was ſick and vomited much. What he brought up taſted powerfully of the tobacco, and bore an exact reſemblance, both in appearance and ſmell, to the liquid fæces which were forced from him by the violent effort of ſtraining. Trivial as this evacuation was, yet, when the ſickneſs had ſubſided, he thought himſelf eaſier for it; I therefore encouraged the vomiting, by giving half a ſcruple of vitriol. alb. every half

hour

hour till it operated, which it ſoon did, once or twice, and with ſimilar effect.

Every meaſure had now been employed, from which I could ſuggeſt the moſt diſtant probability of ſucceſs; and the writings of the moſt eminent among the ancient as well as modern practitioners were in vain ranſacked for new remedies.* To thoſe which I had uſed, a fair and unprejudiced trial had been given. In particular, a liberal and almoſt unreſtrained uſe had been made of the ſtrongeſt purgatives, opium, æther, injections of every kind, (amounting, in number, altogether to fifty,) electricity, the warm bath, the

* I muſt except quickſilver, againſt which the concurrent teſtimony of many reſpectable authorities, as well as common ſenſe, militate ſo powerfully, that I did not uſe it.

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application of cold water;—remedies ſo juſtly extolled, and ſo much relied on in the advanced ſtages of theſe complaints,—but without the leaſt ſucceſs.

When I ſaw him on the fifteenth day of the diſeaſe, I found him in the following ſtate:—The bowels continued obſtinately conſtipated; the belly was hard, and immediately below the navel it was ſwelled ſomewhat irregularly: the pain was violent, but tenſive, at times remitting, and increaſing much on preſſure. The vomitings were frequent, ſometimes of a ſlimy matter, at others ſtercoraceous, having both the ſmell and appearance of liquid ſtools *. The pulſe was ſoft, weak, and irregular; the tongue brown, but

* Once being ſick after a tobacco ſmoke clyſter, what was brought up, he ſaid, taſted ſtrongly of tobacco; but I could never learn that any other clyſter had a ſimilar effect.

moiſt;

moiſt; the eyes ſunk in the ſockets, dull and heavy; the breathing ſhort, frequent, and attended with conſtant motion of the noſtrils; the hiccup was frequent and harraſſing; his appetite and ſleep had almoſt forſaken him; he had often a ſubſultus, ſometimes a tendency to delirium, and his urine was ſcantily ſecreted, and frequently voided with ſome pain, depoſiting a copious brown ſediment on ſtanding.

The patient had hitherto ſuſtained his complaint with great fortitude and reſolution, and had ſuffered every plan to be put in execution with ſingular patience; but being now become ſenſible of his extreme danger, he was anxious and dejected; deſpair was ſettled in his countenance, and he requeſted he might be permitted to die peaceably. This was his ſituation, and ſo dreadful did it appear, that

that an alteration for the better ſcarce entered my mind.

I join thoſe in opinion who think it better, in deſperate caſes, to have recourſe to doubtful or even dangerous remedies, than ſuffer the patient to be loſt without making uſe of any means to ſave him. Were we to obſerve this as an invariable rule; were we never to relinquiſh our attempts till they can no longer be employed, it would I am confident, be productive of many extraordinary recoveries. Every practitioner, who is guided by theſe ſentiments, can, doubtleſs, bring to mind ſeveral inſtances wherein his apparently vain and fruitleſs perſeverance has been crowned with the moſt unexpected ſucceſs. The termination, however, of the preſent caſe is ſo deciſively in point, that it is unneceſſary to ad-

adduce any farther proof in ſupport of the opinion.

Actuated by this principle, and revolving in my mind the effect of the various articles which had been uſed, I could but obſerve, that although no evacuation followed the application of the cold water, yet the patient was evidently eaſier after it; whereas quite the reverſe was the caſe while he was in the warm bath; for he was then in greater pain than uſual. This determined me once more to make trial of that remedy; but in order to derive any material advantage from it, I was perſuaded it would be neceſſary to urge it to a much greater length than I had hitherto. This was accordingly done, and to ſuch a degree, that nothing but the extreme danger of the patient could juſtify my having recourſe to ſuch deſperate proceeding.

As

As he was now much too weak to be removed into the waſhhouſe, he was ſupported; ſitting on the ſide of the bed, with his feet in a tub. In this ſituation two or three pails full of the coldeſt water were poured over his legs and thighs, ſo that his feet and ancles were of courſe conſtantly immerſed in the liquid. This operation was perpetually repeated for the ſpace of ten minutes, when he was ſo much affected by the intenſe cold, that I judged it prudent to deſiſt. He was wiped dry, and put to bed. Within the half hour, being then pretty well recovered, a pint and a half of cold water was injected by clyſter, and almoſt immediately after wet napkins were applied cold to the whole abdomen, and renewed as ſoon as they became in the leaſt warm. The effect of this treatment was ſo

ſtrongly marked, that it was really aſtoniſhing; for in a few minutes he had a profuſe evacuation of uncommonly hard and large fæces, and this was followed by ſeveral thinner ones. He was now comparatively eaſy: the ſwelling and hardneſs of the belly was conſiderably abated; he had no farther return of the vomiting or hiccup; and there was every appearance of ſpeedy recovery. The ſtools, however, notwithſtanding they were paſſed in great abundance, did not ſeem ſufficient to anſwer the intention completely. Several doſes of ſenna and ſalts, with warm relaxing and purging clyſters, were then again applied, but with no better ſucceſs than they had been before. At the expiration of two days I was apprehenſive our affairs were getting into the ſame channel as uſual, in conſe-

quence

quence of which I ordered the cold water clyſters and wet cloths to be repeated; and allowed him to take half a pint of cold water every hour till he had taken a quart. Theſe again procured a tolerably good ſtool, and I was in hopes that a proper repetition of purging medicines by the mouth and rectum would now be able to effect their purpoſe. Still, however, I was miſtaken, and at the end of three days more I had the mortification to find his bowels were as obſtinately conſtipated as at firſt.

Upon attentively conſidering the caſe at this period, it occurred to me that the firſt time the frigid operations were both internally and externally employed, the patient was extremely affected by the cold, and then a profuſe evacuation took place; but the ſecond time he ſeemed

little affected by it, the evacuation was leſs, and it was longer before it was procured. This determined me to proceed exactly in the ſame manner as I had done at firſt, accordingly two pails-full of water were poured over his legs and thighs till ſuch time as he became extremely cold, and then the cold clyſters and cold cloths were applied. The event now fully anſwered my moſt ſanguine wiſhes, for a profuſe evacuation enſued, and I had the pleaſure the next morning to find a common purgative had operated freely, and that the inteſtines were now completely unloaded.

It may not be improper to obſerve, that, notwithſtanding the enormous and uncommonly large quantity of purging medicines which he had taken, ſo far was a purging from enſuing, that it was neceſſary

ceſſary to continue their uſe, once in two or three days, for ſome time after the obſtruction was removed.

In about three weeks after the patient had overcome this complaint, he became aſcitic. As ſoon as this was perceived, diuretics of various kinds were had recourſe to, particularly ſquills and foxglove, but without effect. Cream of tartar, in the quantity of an ounce, was given every day; blood and mucus were evacuated by it, but no water. Upon the preſumption that the liver was concerned in the production of the diſeaſe, large doſes of mercurial ointment, with camphor, were rubbed over the region of that viſcus; and calomel, to the amount of ſix grains a day, was for ſome time adminiſtered; but, at the expiration of three weeks, the ſwelling had in-

creaſed ſo much, and was ſo painful, that it was neceſſary to draw off the water. Nineteen pints were evacuated; on ſubmitting part of it to a degree of heat ſufficient to coagulate the ſerum, part of it only coagulated, and that in an imperfect degree. The fox-glove was again had recourſe to; one grain of the powder was given twice a day for a fortnight: it then occaſioned ſickneſs and ſlight vomiting, but no increaſe of urine. He was tapped ſeveral times; but that, and in ſhort every other remedy, proved merely palliative: he ſtruggled till the beginning of December, and then died.

I very much wiſhed to examine the ſtate of the abdominal viſcera after death; but ſeveral circumſtances concurred in preventing me; I was the leſs anxious, however, about it, as in the ſpace of near nine

nine months he had no return of the ſtoppage in the bowels, except ſuch as readily gave away to a mild doſe of common phyſic.

Remarkable Recovery from Drowning.

James Wright, a private in the Weſt Eſſex Militia, about 35 years old, had had a fever juſt one week, which as near as I can learn was the *typhus mitior* of Cullen, or the *febris lenta nervoſa* of Huxham: the regiment early yeſterday morning marched from Billericay, and Wright thought himſelf ſufficiently well to be conveyed on the baggage waggon; about five o'clock however he grew much worſe and fell into a fit (*epilepſia febricoſa* I apprehend) which continued half an hour, he was delirious half an hour after, then grew better. About ten o'clock he croſſed the river with his company and returned again in the boat under a confuſed idea of bringing over ſomething he had forgot: when he was two thirds

acroſs

acroſs the river he fell over board, (as was ſuſpected and as I think moſt likely) in another fit—he immediately ſunk, but roſe again and continued floating, till boats from the ſhore could get to his aſſiſtance—how long he was in this ſituation cannot be exactly aſcertained: ſome who ſaw the whole ſay 15, ſome 20 minutes. I think however we may with perfect ſafety ſay 12 minutes, and leſs it ſcarcely ſeems poſſible, when we recollect he was two thirds of a mile diſtant, that it blew exceſſively hard and the tide run very ſtrong, beſides which ſomething muſt be allowed for getting the boats ready. The two men, Bray and Wadlow, who firſt arrived, declare *his body was entirely under water, and his head*, they ſay, *was two feet beneath the ſurface*—his great coat only floated:—whether he lay in this poſition the whole time is not known,

no

no one ſaw his head above water, but his legs were diſtinctly perceived ſo perfectly upright that his head muſt of neceſſity have been deeply immerſed: be it as it may, it ſeems univerſally allowed that the body from the moment it was in the water was entirely *paſſive*—he made not the leaſt attempt to ſwim, or even the moſt trifling exertion.

Wadlow kept his head above water until another boat came to his aſſiſtance—during this time he did not perceive the leaſt appearance of life, his head was bloated and his face black:—he was then removed into the boat, and on looſing his ſtock and waiſtcoat, Stewart ſays a general agitation ſeemed to take place;—it was only momentary, and neither that returned, or any other ſymptom of life was obſerved while he was conveying on ſhore, which muſt have taken up at leaſt

leaſt a quarter of an hour:—five of the men who took him up and brought him on ſhore are now before me, and on ſtrictly queſtioning them, *not one perceived the leaſt degree of reſpiration*---others who carried him to the publick houſe and were with him at leaſt five minutes before me, ſay, they did not obſerve he either breathed or moved.

I found him lying on his belly and face, blood iſſued from his noſtrils in conſiderable quantity, and the ſphincter ani had ſo far loſt the power of contraction, that the fæces paſſed from him on the leaſt preſſure.---I had him moved on the back, and his wet clothes immediately taken from him---this was by no means an operation eaſily accompliſhed, as he had on at leaſt three coats, but the exertion of removing them, and the rubbing the water off the cheſt, and upper part of

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the body, ſeemed to have a good effect, for he ſoon made the firſt feeble effort to breathe—no pulſe however could be perceived: he was inſtantly dried and warmed, and ſuch means uſed as the circumſtances of the caſe ſeemed to point out—the breathing was repeated; after ſome time a weak reſpiration was eſtabliſhed, and an irregular fluttering at the wriſt was perceived, which by degrees became more diſtinct and ſtrong.

His whole frame became affected with ſpaſmodic agitations, the features of his face violently contorted and many of the firſt attempts at deglutition ſeemed to threaten a freſh ſuffocation.

For ſeveral hours after the reſpiration and circulation were re-eſtabliſhed, very great apprehenſions were entertained that he would not ſurvive:—the hemorrhage from the noſtrils was ſufficient to alarm in his

his weak condition, and he lay in a mild epileptic ſtate an hour or more at a time. At ten in the evening I found him perfectly ſenſible, and without giddineſs or confuſion in the head: his pulſe very quick, large, and ſoft. The ſtimulants which had hitherto been adminiſted pretty freely, tho' with proper care, were now omitted, and an anodyne, with antimonial joined, were given in lieu.

He was viſited ſoon after ſix this morning:—he had ſlept very well in the night, and had neither pain or confuſion in his head:—he ſpeaks hearty and ſtrong; makes no complaint of any particular organ, and is very clear in his intellects: his fever is very conſiderable, but it would be wonderful indeed if it ſhould be leſſened by ſuch an accident: he however has repeatedly ſaid that he is better this morning, than he was yeſterday

morn-

morning before he fell overboard: indeed it is extremely evident that he has entirely overcome the effects of the drowning—his preſent ſymptoms being now merely a continuation of thoſe he had before. * I ought to have mentioned it in the body of this letter, but it will do very well to name here, that yeſterday morning was exceſſively cold and bleak—

* The cold to which this poor ſoldier, labouring under a bad fever, was expoſed, without deſtroying him, brought to my mind the following, related by Mr. Howard; " ſome ſailors in the phrenſy of the plague at Conſtantinople, have thrown themſelves into the ſea, and it is ſaid that on being taken out they have recovered," Howard on Lazarettos, p. 38.

" In mentioning the gaol fever, I ſhould have added I was well informed that a priſoner brought out as dead from one of the dungeons, on being *waſhed under the pump*, ſhewed ſigns of life, and ſoon after recovered. Since this I have known other inſtances of the ſame kind," Howard's appen. p. 125.

ther-

thermometer 38° the wind blowing quite a ſtorm from N. W. to the influence of which this poor fellow was expoſed from five in the morning till ten---the water of courſe equally cold, and the waves run ſo high and ſhort that the men ſay even if he could have ſwam, and had uſed every exertion to keep his head above the water, the waves muſt of neceſſity have continually covered him.

The nature and degree of the diſeaſe the man previouſly had upon him---his long expoſure to the violent wind and cold---the fits---the great length of time he floated in the water, and that there was reaſon from the concurrent teſtimony of thoſe who ſaw him to believe his head was covered---together with the injury the veſſels of the head appeared to have

ſuſtained

ſuſtained by the hemorrhage from the noſtrils, and the long obliteration and confuſion of the ſenſes—conſtitute this I think one of the moſt remarkable caſes I ever read or heard of: for this reaſon it may not be improper to mention that if any further teſtimony is required I can very readily ſend the thirteen men who were concerned in the caſe, ſome of whom were witneſſes of his ſituation under every circumſtance I have related.

Feb. 12. 1793.

CASES

OF

TETANUS, TRISMUS,

AND

OPISTHOTONOS.

CASES TERMINATING SUCCESSFULLY.

CASE I.

ELIZABETH WEBB, the ſubject of the preſent hiſtory, is about twenty five years old, of a ſhort ſtature, with dark hair and eyebrows, of a brown complexion, ſoft ſkin, and of a very irritable conſtitution, altho' not ſubject to hyſterical affections.——In November 1792 ſhe had a putrid ſore throat, and was for ſome time in an extremely dangerous ſtate; from this ſhe had ſcarcely recovered when her child died—her diſtreſs on this occaſion

was very materially increaſed by the ill uſage of her huſband, who ſome time after deſerted her and left her deſtitute ;—hearing he was at Chatham, ſhe went there, but found ſhe had been miſ-informed :—weak, low, and diſtreſſed to the extreme, ſhe ſet off with the intention of walking to London ;—before ſhe had reached the village of Northfleet (nine miles from Chatham) ſhe was overcome with fatigue, her ſight gradually failed her, and altho' ſhe was nearly unconſcious of what ſhe did, ſhe had ſome faint recollection that ſhe continued to walk half an hour after ſhe had loſt her ſenſes *

* It is of importance to remark, as in concurrence with the above circumſtances it muſt have aſſiſted conſiderably in the production of the diſorder—that ſhe always uſed, when in perfect health, to ſuffer prodigiouſly from nervous irritation in the head,

On

On Sunday, March 17, 1793, about noon, ſhe was found in fits on the road—ſomebody bled her, and attempted to get down remedies of various kinds, but not ſucceeding, and her complaint appearing of an uncommon nature, ſhe was ſent to the pariſh workhouſe, and I ſaw her about nine o'clock that evening.

She lay perfectly ſtill, without the leaſt apparent motion—and reſembled, as nearly as I could imagine, a perſon who had died in great agonies. The mouth was half open, but the lower jaw was immovably fixed, for with the utmoſt force I could exert I was not able to move it either one way or the other, even one tenth of inch—her head was drawn round

ſtomach, &c. at the time the catamenia were upon her: and they made their appearance previous to her ſetting out in the morning.

to the right ſide ſo that the left ear nearly touched the upper part of the ſternum, and the face was turned upwards; this was probably effected by the uncommon action of the left ſterno—cleido—maſtoidæus, for that and the platiſma myoides, were as hard as a ſtone—the trunk and body were bent forward: the arms were folded about the cheſt, and the legs were drawn up towards the nates—in ſhort every external muſcle in the body was inſtantly rigid and in ſtrong action, and I am ſatisfied ſhe might have been ſuſpended by any part of the body, even by the little finger (unleſs the muſcles or tendons had broken) without the leaſt relaxation whatever taking place.

Upon accurate examination, a very ſmall pulſe was perceivable, and ſo likewiſe was a very trivial degree of reſpiration, but the reſpiration ſeemed to be car-

carried on ſolely by the motion of the diaphragm. She was inſenſible to every kind of ſtimulus—pricking and pinching the ſkin—the volatile alkali applied to the noſe, and even dropped into the eye, did not produce the leaſt effect: repeated attempts had been made to get her to ſwallow, but to no purpoſe, for not one drop even of water could be got down.

The ſituation of this poor woman was dreadful beyond the comprehenſion of any one, who did not ſee her—I do not recollect that I was ever ſhocked ſo much by the appearance of any patient in my life, and I was ſo thoroughly impreſſed with the idea of the utter impoſſibility of her ſurvival, that I thought it unneceſſary even to attempt it.

In the morning however I not only found her alive but I found her better, her jaws were cloſed altho' equally fixed; the

the ſpaſms in her throat and ſtomach were ſomewhat abated, and her pulſe was more diſtinct, but ſhe did not appear to have the leaſt glimmering of ſenſe.

Trifling as the alteration was, I determined not to loſe one moment, or neglect one remedy from which the moſt diſtant advantage might be expected—with this view I began by giving ſome weak brandy and water, and in the ſpace of twenty minutes ſhe ſwallowed with infinite difficulty, and apparent danger, a ſmall wine glaſs full;—ſhe was then placed naked on the floor, and cold water was ſprinkled and daſhed over her till ſhe became ſo chilled that it could not with prudence be longer continued.

As ſoon as ſhe was removed to her bed, three drams of the ſtrongeſt mercurial ointment was ordered to be rubbed into various parts of the body, and ten drams more

more to be uſed in the courſe of the day; the powder of bark with wine was directed to be got down, in large quantities, as often as poſſible, and fifteen drops of laudanum were to be given every hour. In the morning ſhe began to move one of her legs, towards evening the motion encreaſed, and ſome glimmerings of ſenſe were evident.

On the 19th ſhe was comparatively very much better in every reſpect—had ſo far recovered her ſpeech and her ſenſes as to be able to give ſome account of herſelf—ſhe had taken the bark and wine in tolerable quantities, and at times without any material inconvenience—the diſtreſs in the throat much abated, but ſhe complained greatly of pain in the head and ſtomach: from ſome appearance of ſoreneſs in the mouth, the mercurial ointment

was

was diſcontinued, but every other part of the plan was to be perſevered in.

The 20th. In general ſhe was better—that is at particular periods her ſenſes were more perfect—her deglutition leſs difficult —and the rigidity of the muſcles leſs conſiderable.—Five or ſix times in the day, however, ſhe relapſed into a ſtate ſomewhat ſimilar to that in which I firſt ſaw her—at one time ſhe would lay perfectly extended and rigid, exhibiting the moſt perfect idea of a complete tetanus —at another, the contraction of the great muſcles of the back and loins would overcome the reſiſtance of their antagoniſts, and the body would be bent backwards in the form of an arch, the whole weight reſting upon the head and the heels—at another time, the abdominal muſcles would have the advantage, ſo that ſhe would be bent forward in the form of a ſemicircle—

ſome-

ſometimes ſhe would be drawn, to one ſide, and ſometimes to another—in ſhort, exhibiting in the ſpace, perhaps of an hour, all the variety of thoſe dreadful complaints, deſcribed by authors under the names of tetanus, triſmus, emphroſthotonos, pleuroſthotonos and opiſthotonos!—while in theſe fits the jaw was invariably locked, and the power of deglutition entirely ſuſpended—no human force could move a limb without hazard of fracturing its muſcles and tendons—no application however potent had the moſt inconſiderable effect upon her, and when ſhe revived, ſhe expreſſed herſelf utterly inſenſible of whatever had occurred during the fit.

To deſcribe minutely the particulars of this caſe, would be an endleſs taſk indeed;—a complete hiſtory would of itſelf

ſelf occupy a ſpace larger than the whole book, and would after all be attended with little real advantage——it will anſwer every good purpoſe to mention that at different times ſhe was taken with every poſſible variety of that moſt dangerous, and diſtreſſing diſorder—the TETANUS ——not *one day* elapſed in the ſpace of *fifteen weeks*, without ſeveral of theſe fits attacking her; ſometimes they amounted to twenty in a day, and continued upon her ten or even twenty minutes at a time, nay many days together ſhe could ſcarcely be ſaid to be out of them, for the leaſt noiſe, or the moſt trivial motion, occaſioned a return of the ſpaſms, and when they were not upon her, ſhe lay in a fainting, inſenſible ſtate.

It would be equally tedious and unintereſting to relate particularly and at length,

length, the mode of treatment I adopted; I ſhall therefore content myſelf merely with ſtating the general principles upon which I proceeded.

It has already been mentioned, that on the firſt day cold water was daſhed all over her---that thirteen drams of ſtrong mercurial ointment p. æ. had been rubbed in---and that bark, wine, and laudanum, were directed to be got down in large quantities——this plan of treatment, varied according to the prevailing circumſtances, was purſued through the whole complaint.

The application of cold water was not repeated after the firſt day. The mercurial was continued until it induced its febrile effect and ſoreneſs of the gums, which it did in two or three days: and when thoſe ſymptoms had ſubſided, they were

were again excited by a freſh application of the mercury. An ounce of bark, ſometimes more, was taken in the day, and at a medium, about a pint and half of wine: the portions of wine and bark however were very uncertain, ſome days they were taken in large doſes, in others ſcarce any could be taken, on account of the difficulty of ſwallowing. The quantity of laudanum was regulated by the ſeverity of the ſpaſms——in common ſhe might take three or four drams in the day, but ſometimes between two and three ounces.*

* My aſſiſtant having occaſion to attend a perſon whoſe thigh I had amputated in the ſame houſe, gave in the ſpace of fourteen hours, *one thouſand drops* of laudanum: it was remarked that the laudanum, in whatever quantity ſhe took it, never procured ſleep, or impeded the alvine excretion.

I con-

I conſidered her in very imminent danger until the beginning of May, when the diſorder began to abate: the middle of the month ſhe could admit of being taken down ſtairs, but ſhe could not walk acroſs the room for a fortnight after that time—indeed it was not until the latter end of June that ſhe was able to take even moderate exerciſe; if ſhe fatigued herſelf ſhe was certain to ſuffer more or leſs from the ſpaſms.

Since then her health has very much mended, but ſhe has been obliged to have frequent recourſe to the laudanum, on account of the ſpaſms in her ſtomach, and in various parts of the body; one third of a common wine glaſs is her uſual doſe.

About nine years ſince, this unfortunate woman, while ſhe was living at Mrs. Hardwines boarding ſchool at Greenwich, drank by miſtake a draught of beer, in which a large quantity of powder of cantharides had been mixed, and which was intended by the coachman as a love potion for his fellow ſervant. In half an hour, ſhe was taken with violent pain in the ſtomach, and bowels; great pain and difficulty of making water came on, and at length a total ſuppreſſion of ſtools and urine; the pain was ſo intenſe as to render her highly delirious for ſeveral days. The urine was regularly drawn off by the catheter—but a vaſt variety of means were uſed without ſucceſs, for the removal of the inflammation, and the obſtruction of the bowels—among theſe ſhe enumerated the following; an infinite number

number of purgative medicines of every kind; gliſters in great abundance—the fumigation of tobacco, three times a day for five days, continued fifteen or twenty minutes each time—the frequent uſe of the warm bath—and a copious application of cold water.—The coſtiveneſs notwithſtanding continued *twenty five* days, and ſhe imputed its removal to the uſe of crude quickſilver given in the doſe of one ounce twice a day. She had not a natural ſtool for twelve months after. She repeatedly aſſured me the cantharides did not produce the leaſt tendency towards the effect they were intended to accompliſh—that, however, might be owing to the *violence* of the inflammation—a much weaker doſe might have produced a different effect.

CASE II.

Elizabeth Wood, about twenty five years old, naturally of a weak conſtitution, and much broken down by illneſſes of various kinds, was attacked with a low fever:—in a month it abated; and then for a week ſhe was afflicted with ſpaſms in the bowels; while theſe were upon her, ſhe was taken with what the aſſiſtants called Hyſterics, but which in reality was a ſpecies of Tetanus, for the head and back were very much retracted, ſo as to form the arch, and there was conſiderable ſtiffneſs in every part, *except the jaw*, which was *never* perceived to be locked, although frequently convulſed, and the tongue was often darted

ſpaſ-

ſpaſmodically out of the mouth. There was conſiderable difficulty in ſwallowing when the ſpaſms were upon her, but when they were off, ſhe was capable of taking nouriſhment without any material inconvenience. She was always ſo much in her ſenſes as to know thoſe about her, but ſhe had often a certain degree of mild delirium and a wildneſs in her eyes.

The fits continued upon her the greateſt part of the day, and for nine days ſhe had not an interval of ten minutes at one time:—at the expiration of the nine days, however, all her ſpaſmodic and convulſive complaints, quitted her ſomewhat ſuddenly; her appetite returned, and ſhe gradually mended. As ſoon as ſhe began to grow better, a violent itch made its appearance which for a long time withſtood the uſual remedies.

I did not ſee this caſe until the eighth day of the diſorder:—very little had then been done either by diet or medicine, for ſhe had taken only three bottles of wine, and a little hollands, during the whole time, and one vial of drops, compoſed of one ounce of laudanum and two ounces of aromatic ſpirit.——I directed that forty or fifty drops of laudanum ſhould be given every two hours, and as much wine and ſpirits as could be got down:—what quantity that was I cannot ſay, but ſoon after the ſpaſms quitted her entirely, and ſhe has not had any return of them ſince.

Caſes

Caſes terminating fatally.

CASE III.

A young woman twenty years old, employed in getting in the harveſt, five or ſix weeks ſince run a thorn into her foot, but it healed in a few days without any inconvenience: ſince then has been expoſed to the night air: but it does not appear to have been in a degree any ways uncommon to thoſe kind of people.

On Monday, Sep. 6. in the afternoon, ſhe was taken with a chillineſs, and ſoon after ſhe perceived a foreneſs, and pain in the mouth, ſhe continued however to pick hops all this day, and by way of proving ſtill further that ſhe was not at

this time materially affected, I was informed that ſhe ſung ſeveral ſongs with conſiderable ſpirit.

On Tueſday——ſhe walked to the hop ground, about half a quarter of a mile diſtant: ſhe there picked hops the greater part of the day. In the afternoon ſhe complained of foreneſs and pain in her bones; and in the evening, for the firſt time ſhe mentioned the *ſtifneſs of the jaw.*

Wedneſday morning—appeared worſe: ſhe now complained much of her jaw, and of the pain in the bones: ſhe had ſudden convulſive twitches in her back, but none were obſerved in any other part. She drank ſome caudle—ſome milk—and likewiſe a little beer, but they were taken with ſome difficulty. In the evening the contraction in her back, and the ſtifneſs in the jaw, were materially increaſed;

creaſed; ſhe was however able to ſet up, and likewiſe to ſtand upon her feet.

Thurſday morning—ſhe was ſaid to be better, her jaw was more opened, and the pains in her limbs were eaſier—about noon ſhe became much worſe, and was convulſed all over, but at four o'clock ſhe was able, by the aſſiſtance of two people, to walk a ſhort diſtance to the cart that was to remove her to the Pariſh houſe.

Friday I ſaw her at two o'clock.—Her jaws were firmly and compleatly locked—the whole muſcular ſyſtem was in a rigid ſtate, but there was likewiſe a conſtant contraction in the muſcles of the neck, back, and loins, and which in ſome meaſure extended to every other part of the body.—Her pulſe was quick and feeble, and her ſenſes appeared very correct.

With

With much pains and patience, I introduced two or three grains of opium into the mouth, and afterwards a table ſpoonful of wine—on attempting to ſwallow it, the moſt dreadful ſpaſms inſtantly enſued; the body was rigidly bent backward, forming a moſt perfect opiſthotonus and the action of the muſcles of the throat and face was ſo intenſe as to threaten immediate ſuffocation: in ten minutes it ſubſided, and when ſhe had recovered her uſual ſtate we made another attempt—the ſame ſymptoms enſued, and they returned again on a third trial made a ſhort time after—in every one of theſe attempts a ſmall quantity of wine and laudanum was got down, and ſhe appeared more compoſed afterwards, I deſired that no opportunity ſhould be omitted of getting them down as often as poſſible.

I had

I had made ſeveral enquiries concerning her having pricked and wounded herſelf, but was conſtantly anſwered in the negative—on repeating the queſtion however ſeveral times, ſhe recollected what I have already mentioned at the beginning of the caſe, that five or ſix weeks before a thorn had run into her foot—as ſoon as I had this information I examined the part, and finding the ſcar very evident, made ſeveral deep inciſions into and about it, and having nothing better at hand, plugged them with pepper and oil of turpentine, intending to excite as great a degree of inflammation in the part as I could.

Cold water was poured over her ſeveral times in conſiderable quantities, and two ounces of the ſtrongeſt mercurial ointment was in the courſe of the afternooon and

night

night rubbed into the leg of the wounded ſide and into the neck and throat:—none of theſe remedies however produced any good effect, for ſhe died at ſeven o'clock next morning, having taken from the time I ſaw her (ſeventeen hours) eleven grains of opium—fifty drops of laudanum, half a pint of port, and five glaſſes of ſpirits.

CASE IV.

—— Balſover, a fine ſtout lad, about eighteen years old, was ſeen by Mr. Elyard, a young gentleman reſiding with me, Oct. 10, 1793. He was informed that

that he had had a foreneſs of the throat three or four days, but that the day before it had increaſed ſo much he could ſcarce ſwallow—at the ſame time a diſorder in the ſtomach came on, which increaſing with the foreneſs of the throat, rendered the ſwallowing much more difficult.

Mr. Elyard, immediately diſcovered that he had the Tetanus and Locked Jaw —all the muſcles of the body were in a ſtate of rigidity, but thoſe of the trunk, and inferior extremities, were more permanently affected. When he lay ſtill and the ſpaſms were moderate, his teeth might be ſeparated the tenth of an inch—but when from agitation of his mind, exertion of his body, an attempt at ſwallowing, or any other cauſe, the ſpaſms came on, the ſight was truly diſtreſſing—

it

it appeared as if every muſcle in the body was in a ſtate of the moſt extraordinary exertion—every two or three ſeconds the body would be bent a little backwards, ſo as to reſt on the head and the heels—in an inſtant it would become ſtrait, ſo that the patient would ſometimes for a quarter of an hour together he continually jumped up and down in his bed with conſiderable violence. At the ſame time the muſcles of the face became convulſed to a very conſiderable degree, inſomuch that the features were entirely altered, and the face, particularly round the eyes, was, from the violent action of the muſcles, inflamed ſo as to reſemble the eriſypelas. The jaws were then perfectly cloſed; and the intercoſtals, the diaphragm, and the abdominal muſcles, being affected in the ſame manner, reſpiration became very

very materially impeded. It was remarkable, but he appeared to have the free uſe of his tongue, when every other part of the body capable of ſpaſmodic action, but the ſurrounding parts more particularly, were ſo powerfully excited. Deglutition was wholly impracticable when the ſpaſms were upon him, and when they were off, it was attended with conſiderable inconvenience, very frequently inducing a violent return. His ſenſes appeared at all times to be very perfect.

On examination it was found he had run a thorn into the ſide of his thumb, and one, half an inch in length, was removed from thence, after having been there a fortnight.

Three drams of ſtrong mercurial ointment were directed to be rubbed in—as much

much wine and brandy to be given as poſſible, and one grain of opium every two hours.

11th.—I found very little attention had been paid to the directions given yeſterday, on account of the difficulty in getting the wine and medicines down; I however got him to take a doſe or two of laudanum and ſome wine, and poured cold water over his body and extremities for three quarters of an hour—I ordered it to be repeated ſeveral times in the day, but in the evening finding neither that or any of the other remedies had been purſued, I had him removed to a houſe where I was certain every neceſſary attention would be paid him.

12th.—The plan I directed, had been properly purſued, and the lad was manifeſtly better. The cold water had been

uſed;

uſed; he had drank a bottle of wine in the night—a pint of milk porridge—and taken three drams of laudanum—his ſwallowing, at times therefore, was very free.

13th. The fits of ſpaſm, ſuch as were deſcribed on the firſt day, had returned frequently and ſeverely, but did not continue ſo long—once or twice alſo in the courſe of the day, it appeared as if he had a mild epileptic fit, joined with the tetanus, for he foamed at the mouth, and exhibited other characteriſtic appearances, although he ſcarcely ſeemed to have loſt his ſenſes. On coming out of theſe fits as well as the others, he now began to cry out for air—the windows and door were therefore opened, and he was fanned ſtrongly with a large fan; from this he derived great pleaſure, and the cool air refreſhed him ſo much, that he would inſiſt upon being got to the window after

each fit. I propoſed to him the application of the cold water at ſuch times, to which he readily conſented, and the comfort he experienced from it was ſo conſiderable, that he always cried out for it afterwards—indeed it became almoſt inconvenient to the aſſiſtants, for notwithſtanding the ſeaſon, he would remain in the tub half or three quarters of an hour at a time, five or ſix times a day, or even oftener, with his legs immerſed to the calves, and large bowls of freſh cold water continually pouring over all parts of the body. In this ſtate he was more ſoothed and quiet than in any other; his joints became more flexible and he could open his jaw wider than at any other time. Whenever he had occaſion to be removed, it was not in his power to afford himſelf the moſt trifling aſſiſtance—when he was raiſed by his head and ſhoulders, there was not the leaſt

leaſt motion in the ſpine or at the pelvis, the body was of conſequence perfectly ſtrait---raiſing him by his heels alſo, the weight of the whole body reſted upon them and his head.

14th. He continued much the ſame as yeſterday---at times the rigidity was abated ſo that the jaws could be ſeparated the third of an inch---the arms alſo could be moved three or four inches from the body, and the motion of other parts were in proportion, but when the ſpaſms came on, they were nearly as violent as ever, and three or four times he appeared to have a return of the epileptic affection---as this however was but moderate---as his ſenſes were extremely perfect---as he ſwallowed in the intervals of the ſpaſms freely, and took wine and laudanum in conſiderable quantities (about an ounce of laudanum in the day)---and as very frequent re-

courſe was had to the cold water—I entertained conſiderable expectations that all would end well. On the

15th. In the morning he appeared manifeſtly better—the return of the ſpaſms was leſs frequent, and not ſo intenſe in their attack—about noon however, the epileptic paroxyſm ſupervened, and he died ſuddenly.

The difficulty of ſwallowing in every one of theſe caſes, the diſtreſs it ſometimes occaſioned to the patient when urged ſo to do, and the utter impoſſibility of getting one drop down upon many occaſions —often induced me to think, that if within

a year

a year, or even a longer period, they had been bit by a dog or any other animal, they would univerſally have been ſuppoſed to labour under the hydrophobia —and I ſhould certainly have had the merit of curing that incurable diſorder. From theſe caſes therefore, as well as from ſome peculiar inſtances of hyſteria and epilepſia that I have witneſſed, I cannot doubt but that all thoſe caſes of hydrophobia recorded to have been cured, were not hydrophobia properly ſo called, but diſorders of the nature I have juſt mentioned.

Account of an Uncommonly large Tumour of the Scrotum.

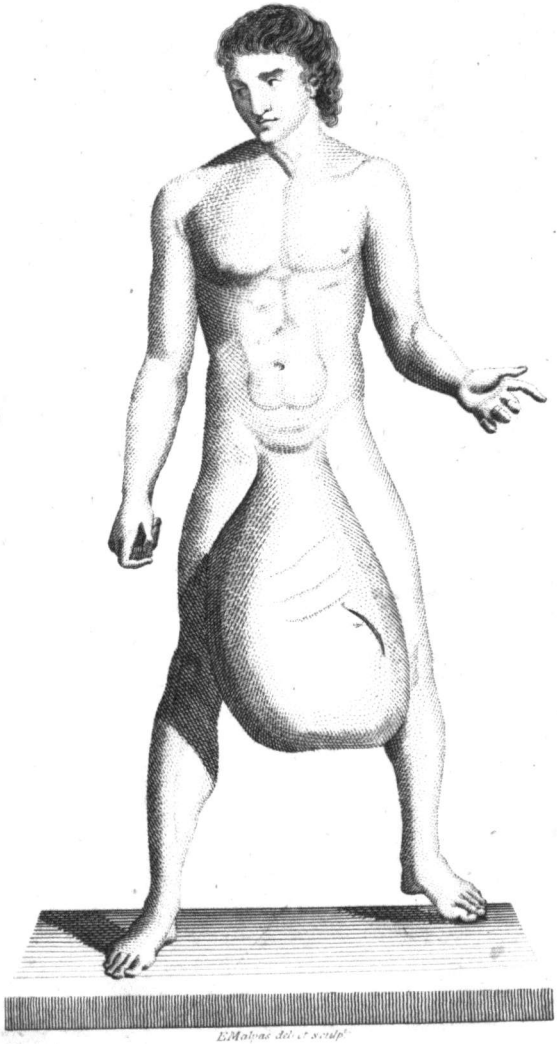
Robert Arnold, whoſe very extraordinary caſe I now relate, is thirty one years old. The account he gives of the firſt appearance of his complaint is not ſo diſtinct or ſatisfactory as I could wiſh—What I learn is, that about ſix years ago he received a conſiderable blow on the lower part of the belly and ſcrotum, and that ſoon after he perceived a ſwelling the ſize of an egg in the right ſide of the ſcrotum. For this he applied to ſeveral quacks, and truſs-makers, who frequently, he ſays, returned it into the abdomen, except a portion equal to the ſize of a walnut; and not only when he firſt

perceived it, but for ſeveral years, when it was nearly the ſize of his head, was he able to return almoſt the whole contents, but as the tumour was never perfectly reduced, he could not bear the application of the ſteel truſs, all that he did therefore was to uſe a ſuſpenſory, and this I believe was ſeldom properly applied.

The right teſticle was evidently diſeaſed, for when he laſt felt it, at the time that the tumor was half as large as his head, he could diſtinctly perceive it to be nearly the ſize of his fiſt.

The increaſe of the tumour during the firſt four years was not very conſiderable: he imagines at the end of that period it might be nearly as big as his head: ſince that time however it has increaſed in ſize very rapidly, and when I firſt ſaw him

in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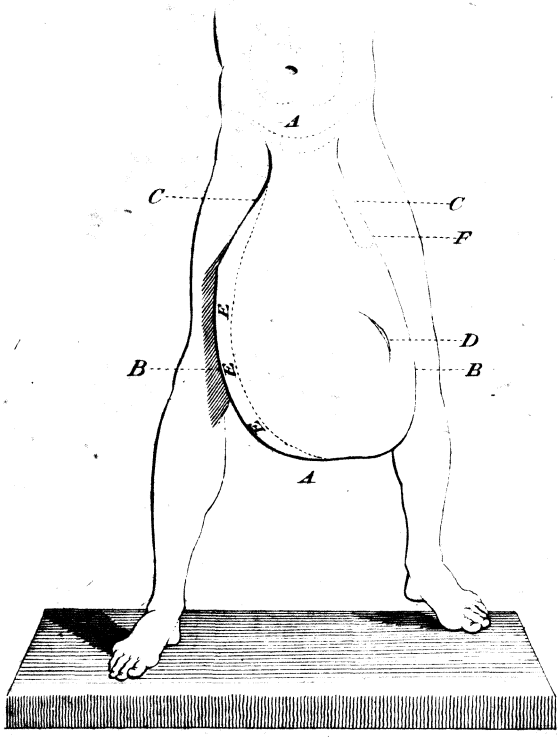

A A The length of the Scrotum from the pubis to the bottom 21 inches

B B The breadth of the tumour ..... 22 inches

The circumference at this place is ..... 43 & ½ in.

C C The circumference close to the abdomen ..... 30 inches

The measure from C to C by A is ..... 43 inches

D The opening by which the urine passes.

E E E A steatomatous mass within the dotted line.

F The part where the penis & left testis may be felt.

in March 1794, it had arrived at the aſtoniſhing magnitude repreſented in the annexed plates, in which particular attention has been paid to delineate the parts in their exact proportion.

The following are the preſent dimenſions of the Scrotum.

	Inches.
The length from the pubis to the botom - - -	21
The breadth at B. B. -	22
The largeſt circumference at B. B. - - - -	43½
The ſmalleſt circumference at C. C. - - - -	30
The ſegment, or meaſure from C. to C. by A. - -	43

I was at conſiderable pains to get the weight of this tumour, which I at length accompliſhed by means of a proper ſuſpenſory

penſory and ſteelyard, and found that it required to keep it ſuſpended one inch from the bed on which he was lying, at leaſt SIXTY POUNDS.

The tumour which in appearance is not very much unlike an inverted uterus, is pretty regular in its form: ſomewhat harder at the upper, and more elaſtic at the lower part, affording to the touch very much the ſame ſenſation with old hernia that are ſlightly ſtrictured. It may ſometimes be leſſened by preſſing a portion of its contents into the abdomen; there is an evident paſſage of air from the ſcrotum, and the ſame noiſe is heard in it which is uſual when air is confined in the inteſtines: as ſoon as the the air eſcapes into the abdomen, it appears to purſue the tract of the colon, and is preſently after evacuated.

The

The parts forming the ſcrotum, that is the ſkin, cellular membrane, and ſac, are, as may be imagined, very much thickened; as nearly as I can judge they may be an inch thick. The veſſels of the ſkin particulary the veins are of courſe very conſiderably enlarged: the principal trunk is not much leſs than my little finger. The penis has been hid theſe two years, but is diſtinctly to be felt on the upper part of the left ſide of the tumour, and near it the left teſticle of its uſual ſize. The urine is evacuated by a large ſemilunar opening on the left ſide, midway between the pubis, and its lower extremity. In making water he ſtands up and the urine is projected in a full ſtream immediately from the opening, without running down the tumour, into the pot beneath. On the right ſide is a long irregular ſteatoma amounting to

perhaps

perhaps ſix or eight pounds, which is noticed in the plate by a dotted line: this part he ſays is without feeling.

Mr. Arnold is, I imagine, about five feet five inches high, naturally fat, and was for his age particularly ſo about the belly: As ſoon, however, as the tumour began to encreaſe, he grew leſs in his belly, and is at this time ſmaller than natural, altho' the membrana adipoſa is there very much loaded with fat: it ſeems evident therefore that a large ſhare of the contents of the abdomen muſt have paſſed into the tumour.—The ſkin of the lower part of the belly and the perinœum was ſcarcely drawn at all downwards, and the naval occupied its natural place.

He riſes about the uſual time in the morning, and is able with great care and attention to get up and down ſtairs: he has not uſed any ſuſpenſory, ſo that the weight

weight of the tumour is extremely inconvenient to be borne more than two minutes at one time, and when he ſtands he is obliged on account of its ſize to keep his feet a full yard aſunder. As ſoon as he gets down ſtairs he lies upon a ſopha, and ſeldom moves from it until he returns to bed.

He has never experienced any difficulty in regard either to his ſtools or urine. His general health he informs me has been very good, and he at this time appears as hearty, as healthy, and in as good ſpirits, as any man breathing.

In April 1793, without any previous pain, inflammation or unuſual inconvenience of any kind whatever, the lower part of the ſcrotum burſt, and diſcharged in the ſpace of a few minutes, a gallon of what he expreſſes to be "a very thick, liver

liver like, half digeſted matter"---the opening became pretty conſiderable, but it healed in about ſix weeks; the diſcharge, I was informed, had no feculent or ill ſmell.

What the preciſe nature of this tumour may be, is impoſſible at preſent exactly to aſcertain:—it ſeems however ſufficiently evident, that there is a deſcent of a very large portion of the contents of the abdomen, and there can be no doubt, from the ſize of his belly formerly, that the omentum and meſentery are loaded with a conſiderable quantity of fat: theſe I imagine occupy the ſuperior part, which, as I mentioned before, is the firmer portion of the tumour: the remainder conſiſts, as I apprehend, of the diſeaſed right teſticle, which

which is moſt probably by this time much enlarged, and a conſiderable quantity of ſome fluid ſimilar perhaps to that which was ſo plentifully evacuated about a year ſince.

I am favored with the following hiſtory by Mr. Cline, the preſent reſpected lecturer on Anatomy and Surgery at St. Thomas's Hoſpital: it is the caſe of a gentleman of high literary reputation. It is dated April 2d. 1794.

"Mr. G—— was fifty-ſeven years old, of a corpulent habit, and had a tumour in the ſcrotum which extended from the left groin to his knees: it had been forming

ing more than thirty years. The inferior part of the tumour was a hydrocele, and the ſuperior a hernia. The hydrocele had been tapt three times, and at the laſt operation ſix ale quarts of fluid were diſcharged: three days after which he died.

In examining the body, the hernial ſac was found to contain nearly all the omentum and the greater part of the colon: theſe were much inflamed, adhering in many parts to each other and alſo to the hernial ſac. The ſtomach extended from the diaphragm, almoſt to the abdominal ring of the left ſide:—it appeared to have been drawn into this extraordinary ſituation by the omentum. As the tunica vaginalis had been emptied a ſhort time before his death, it only contained about a quart of fluid. The teſticle was without any diſeaſed appearance."

April 15th. 1794.

EXPLANATION.

THIS account of the weather is an abſtract of probably the moſt accurate and extenſive Journal ever publiſhed.—It was undertaken with the view of obſerving the influence of the perceptible properties of the atmoſphere on the human conſtitution, and the ſhare its changes had in the production and continuance of diſeaſes. Apprehending it might be of material aſſiſtance to others who may be deſirous of proſecuting the ſame ſubject, I willingly make it public, hoping thoſe who are in poſſeſſion of ſimilar accounts, will, for ſimilar reaſons, be induced to follow my example.

THESE Tables require very little explanation. The Columns for the Barometer, Thermometer and Hygrometer, and for the Rain and Evaporation, are ſufficiently clear. The direction of the Wind, as well as all the other circumſtances, was obſerved three times

times a day—at 8 in the morning, 3 in the afternoon, and at 10 at night:—the figures therefore ſhew the number of times the Wind was obſerved to blow in that particular direction; and all thoſe figures added together will be found to amount to three times the number of days in that month. With reſpect to the *ſtrength* of the Wind, I have followed the uſual method—1, indicates the loweſt degree of wind—4, a violent ſtorm—2, and 3, the intermediate degrees. In the column of the Weather, the degrees of *cloudineſs* are marked in a ſimilar way—1, the ſmalleſt—4, the greateſt—and 2, and 3, the intermediate degrees.

DIRECTIONS TO THE BINDER.

THE Meteorological Tables to be placed in ſucceſſion according to their dates, inſerted at the top of the firſt column in each; to face each other in pairs; and the ſuperfluous margin at the top and bottom ſhould be cut off, to avoid folding up.

1786	BAROM.	Ther. Shade.	Ther. Sun.	Hygr.	WINDS. Points.				Streng.	WEATHER.		RAIN. greateſt in 1 day.	RAIN. total in month.	EVAPORATION. greateſt in 1 day.	EVAPORATION. leaſt in 1 day.	EVAPORATION. mean daily.	EVAPORATION. total in month.	DEW. total in month.
Jan.	H. 30 73	H. 53	*	H. 89	E. 14	S.E. 6			No. 1 0	Clear 0	Cl. 1 0	*	3.059	*	*	*	*	*
	L. 28 48	L. 15		L. 40	W. 14	S.W. 35			No. 2 0	Rain 0	Cl. 2 0							
	M. 29 59	M. 39		M. 96	N. 3	N.E. 3			No. 3 0	Snow 0	Cl. 3 0							
	V. 02 25	V. 38		V. 49	S. 10	N.W 8			No. 4 0	Fog 0	Cl. 4 0							
Feb.	H. 29 98	H. 52	*	H. 85	E. 0	S.E. 0			No. 1 0	Clear 0	Cl. 1 0	*	0.760	*	*	*	*	*
	L. 29 16	L. 31		L. 51	W. 47	S.W. 22			No. 2 0	Rain 0	Cl. 2 0							
	M. 30 04	M. 39		M. 69	N. 7	N.E. 0			No. 3 0	Snow 0	Cl. 3 0							
	V. 00 82	V. 21		V. 34	S. 5	N.W. 3			No. 4 0	Fog 0	Cl. 4 0							
Mar.	H. 30 02	H. 50	*	H. 85	E. 3	S.E. 13			No. 1 0	Clear 0	Cl. 1 0	*	1.483	*	*	*	*	*
	L. 29 13	L. 29		L. 33	W. 1	S.W. 16			No. 2 0	Rain 0	Cl. 2 0							
	M. 29 03	M. 36		M. 47	N. 14	N.E. 41			No. 3 0	Snow 0	Cl. 3 0							
	V. 00 89	V. 21		V. 52	S. 0	N.W. 5			No. 4 0	Fog 0	Cl. 4 0							
Apr.	H. 30 06	H. 74	*	H. 85	E. 10	S.E. 6			No. 1 0	Clear 0	Cl. 1 0	*	1.102	*	*	*	*	*
	L. 29 05	L. 31		L. 28	W. 12	S.W. 39			No. 2 0	Rain 0	Cl. 2 0							
	M. 29 30	M. 48		M. 65	N. 7	N.E. 5			No. 3 0	Snow 0	Cl. 3 0							
	V. 01 01	V. 43		V. 57	S. 2	N.W. 9			No. 4 0	Fog 0	Cl. 4 0							
May	H. 30 30	H. 77	*	H. 72	E. 27	S.E. 1			No. 1 0	Clear 0	Cl. 1 0	*	2.161	*	*	*	*	*
	L. 29 50	L. 47		L. 14	W. 15	S.W. 32			No. 2 0	Rain 0	Cl. 2 0							
	M. 28 83	M. 56		M. 63	N. 0	N.E. 10			No. 3 0	Snow 0	Cl. 3 0							
	V. 00 80	V. 30		V. 58	S. 6	N.W. 2			No. 4 0	Fog 0	Cl. 4 0							
June	H. 30 14	H. 80	*	H. 85	E. 6	S.E. 0			No. 1 0	Clear 0	Cl. 1 0	*	1.805	*	*	*	*	*
	L. 29 30	L. 49		L. 24	W. 12	S.W. 31			No. 2 0	Rain 0	Cl. 2 0							
	M. 29 18	M. 64		M. 67	N. 0	N.E. 19			No. 3 0	Snow 0	Cl. 3 0							
	V. 00 84	V. 31		V. 61	S. 5	N.W. 17			No. 4 0	Fog 0	Cl. 4 0							
July	H. 30 04	H. 78	*	H. 70	E. 0	S.E. 0			No. 1 0	Clear 0	Cl. 1 0	*	0.618	*	*	*	*	*
	L. 29 54	L. 52		L. 10	W. 10	S.W. 71			No. 2 0	Rain 0	Cl. 2 0							
	M. 30 14	M. 60		M. 35	N. 0	N.E. 3			No. 3 0	Snow 0	Cl. 3 0							
	V. 00 50	V. 26		V. 50	S. 1	N.W. 8			No. 4 0	Fog 0	Cl. 4 0							
Aug.	H. 30 20	H. 84	*	H. 72	E. 9	S.E. 6			No. 1 0	Clear 0	Cl. 1 0	*	2.389	*	*	*	*	*
	L. 29 14	L. 50		L. 18	W. 4	S.W. 15			No. 2 0	Rain 0	Cl. 2 0							
	M. 29 58	M. 61		M. 65	N. 0	N.E. 33			No. 3 0	Snow 0	Cl. 3 0							
	V. 01 06	V. 34		V. 54	S. 2	N.W. 24			No. 4 0	Fog 0	Cl. 4 0							
Sept.	H. 30 27	H. 78	*	H. 78	E. 0	S.E. 3			No. 1 0	Clear 0	Cl. 1 0	*	2.726	*	*	*	*	*
	L. 29 20	L. 45		L. 23	W. 16	S.W. 45			No. 2 0	Rain 0	Cl. 2 0							
	M. 29 96	M. 53		M. 58	N. 0	N.E. 0			No. 3 0	Snow 0	Cl. 3 0							
	V. 01 07	V. 33		V. 45	S. 1	N.W. 25			No. 4 0	Fog 0	Cl. 4 0							
Oct.	H. 30 16	H. 58	*	H. 89	E. 1	S.E. 10			No. 1 0	Clear 0	Cl. 1 0	*	3.279	*	*	*	*	*
	L. 28 90	L. 30		L. 44	W. 13	S.W. 24			No. 2 0	Rain 0	Cl. 2 0							
	M. 29 79	M. 46		M. 71	N. 12	N.E. 05			No. 3 0	Snow 0	Cl. 3 0							
	V. 01 26	V. 28		V. 45	S. 28	N.W. 0			No. 4 0	Fog 0	Cl. 4 0							
Nov.	H. 30 40	H. 55	*	H. 90	E. 16	S.E. 0			No. 1 0	Clear 0	Cl. 1 0	*	2.948	*	*	*	*	*
	L. 28 60	L. 29		L. 59	W. 0	S.W. 8			No. 2 0	Rain 0	Cl. 2 0							
	M. 29 72	M. 38		M. 76	N. 32	N.E. 8			No. 3 0	Snow 0	Cl. 3 0							
	V. 01 80	V. 26		V. 31	S. 11	N.W. 15			No. 4 0	Fog 0	Cl. 4 0							
Dec.	H. 30 57	H. 60	*	H. 94	E. 0	S.E. 0			No. 1 0	Clear 0	Cl. 1 0	*	1.466	*	*	*	*	*
	L. 28 90	L. 30		L. 64	W. 15	S.W. 49			No. 2 0	Rain 0	Cl. 2 0							
	M. 28 44	M. 38		M. 89	N. 0	N.E. 0			No. 3 0	Snow 0	Cl. 3 0							
	V. 01 67	V. 30		V. 30	S. 29	N.W. 0			No. 4 0	Fog 0	Cl. 4 0							
The Year	H. 30 73	H. 84	*	H. 94	E. 86	S.E. 45			No. 1 0	Clear 0	Cl. 1 0	*	23.796	*	*	*	*	*
	L. 28 48	L. 15		L. 14	W. 156	S.W. 380			No. 2 0	Rain 0	Cl. 2 0							
	M. 28 63	M. 48		M. 66	N. 87	N.E. 132			No. 3 0	Snow 0	Cl. 3 0							
	V. 02 25	V. 69		V. 80	S. 100	N.W. 109			No. 4 0	Fog 0	Cl. 4 0							

1787	BAROM.	Ther. Shade.	Ther. Sun.	Hygr.	WINDS. Points.				Strength.				WEATHER.				RAIN. greatest in 1 day.	RAIN. total in month.	EVAPORATION. greatest in 1 day.	EVAPORATION. least in 1 day.	EVAPORATION. mean daily.	EVAPORATION. total in month.	DEW. total in month.
Jan.	H. 30 54 L. 29 39 M. 30 10 V. 01 15	H. 51 L. 15 M. 37 V. 36	*	H. 127 L. 75 M. 93 V. 52	E. 19 W. 28 N. 4 S. 0	S.E. 0 S.W. 27 N.E. 12 N.W. 3			No. 1 91 No. 2 2 No. 3 0 No. 4 0				Clear 28 Rain 5 Snow 4 Fog 5	Cl. 1 11 Cl. 2 4 Cl. 3 13 Cl. 4 23			*	0.676	036	000	006	0.192	000
Feb.	H. 30 24 L. 28 42 M. 29 84 V. 01 82	H. 52 L. 32 M. 43 V. 20	*	H. 120 L. 65 M. 94 V. 55	E. 4 W. 3 N. 0 S. 2	S.E. 0 S.W. 67 N.E. 8 N.W. 0			No. 1 67 No. 2 2 No. 3 19 No. 4 0				Clear 18 Rain 12 Snow 0 Fog 1	Cl. 1 7 Cl. 2 16 Cl. 3 11 Cl. 4 19			*	1.214	085	004	023	0.661	015
Mar.	H. 30 42 L. 29 06 M. 29 49 V. 01 36	H. 60 L. 32 M. 45 V. 28	*	H. 110 L. 52 M. 80 V. 58	E. 13 W. 7 N. 1 S. 1	S.E. 9 S.W. 55 N.E. 0 N.W. 7			No. 1 71 No. 2 14 No. 3 7 No. 4 1				Clear 21 Rain 13 Snow 0 Fog 0	Cl. 1 19 Cl. 2 10 Cl. 3 18 Cl. 4 12			*	2.097	104	020	054	1.754	031
Apr.	H. 30 34 L. 28 90 M. 29 75 V. 01 44	H. 64 L. 37 M. 46 V. 27	*	H. 96 L. 44 M. 69 V. 52	E. 4 W. 21 N. 5 S. 0	S.E. 3 S.W. 10 N.E. 31 N.W. 16			No. 1 39 No. 2 27 No. 3 23 No. 4 1				Clear 9 Rain 9 Snow 0 Fog 0	Cl. 1 13 Cl. 2 12 Cl. 3 21 Cl. 4 26			*	1.064	134	010	078	2.671	008
May	H. 30 15 L. 29 20 M. 29 76 V. 00 95	H. 76 L. 36 M. 53 V. 40	*	H. 95 L. 27 M. 56 V. 68	E. 23 W. 13 N. 15 S. 25	S.E. 2 S.W. 0 N.E. 7 N.W. 8			No. 1 61 No. 2 27 No. 3 4 No. 4 1				Clear 22 Rain 6 Snow 0 Fog 0	Cl. 1 22 Cl. 2 15 Cl. 3 16 Cl. 4 12			*	1.693	208	037	135	4.793	016
June	H. 30 00 L. 29 35 M. 29 66 V. 00 65	H. 79 L. 45 M. 59 V. 34	*	H. 75 L. 13 M. 42 V. 62	E. 21 W. 18 N. 1 S. 1	S.E. 7 S.W. 30 N.E. 5 N.W. 7			No. 1 72 No. 2 17 No. 3 1 No. 4 0				Clear 32 Rain 8 Snow 0 Fog 0	Cl. 1 16 Cl. 2 11 Cl. 3 12 Cl. 4 11			*	0.731	265	035	162	4.873	009
July	H. 30 25 L. 29 20 M. 29 65 V. 01 05	H. 83 L. 52 M. 61 V. 31	*	H. 97 L. 12 M. 47 V. 85	E. 6 W. 17 N. 1 S. 3	S.E. 1 S.W. 54 N.E. 3 N.W. 8			No. 1 83 No. 2 8 No. 3 2 No. 4 0				Clear 22 Rain 13 Snow 0 Fog 0	Cl. 1 23 Cl. 2 9 Cl. 3 15 Cl. 4 11			*	5.139	231	050	153	3.104	007
Aug.	H. 30 26 L. 29 10 M. 29 03 V. 01 16	H. 69 L. 50 M. 60 V. 19	*	H. 82 L. 21 M. 46 V. 61	E. 4 W. 11 N. 0 S. 11	S.E. 4 S.W. 45 N.E. 5 N.W. 13			No. 1 78 No. 2 10 No. 3 4 No. 4 1				Clear 25 Rain 12 Snow 0 Fog 0	Cl. 1 18 Cl. 2 15 Cl. 3 18 Cl. 4 5			*	1.102	235	073	135	4.855	004
Sept.	H. 30 30 L. 29 10 M. 29 79 V. 01 20	H. 69 L. 44 M. 57 V. 25	*	H. 87 L. 30 M. 53 V. 57	E. 4 W. 7 N. 0 S. 0	S.E. 0 S.W. 31 N.E. 41 N.W. 7			No. 1 74 No. 2 16 No. 3 0 No. 4 0				Clear 5 Rain 8 Snow 0 Fog 0	Cl. 1 30 Cl. 2 12 Cl. 3 22 Cl. 4 13			*	1.000	129	037	085	2.596	035
Oct.	H. 29 95 L. 29 15 M. 29 47 V. 00 80	H. 63 L. 36 M. 50 V. 27	*	H. 110 L. 37 M. 70 V. 73	E. 0 W. 19 N. 0 S. 7	S.E. 0 S.W. 58 N.E. 1 N.W. 8			No. 1 82 No. 2 9 No. 3 2 No. 4 0				Clear 11 Rain 16 Snow 0 Fog 1	Cl. 1 33 Cl. 2 11 Cl. 3 18 Cl. 4 3			*	2.774	087	001	052	1.632	018
Nov.	H. 30 20 L. 29 03 M. 29 63 V. 01 17	H. 58 L. 23 M. 40 V. 35	*	H. 95 L. 55 M. 74 V. 40	E. 10 W. 6 N. 6 S. 2	S.E. 5 S.W. 41 N.E. 11 N.W. 9			No. 1 63 No. 2 11 No. 3 10 No. 4 1				Clear 15 Rain 6 Snow 0 Fog 2	Cl. 1 31 Cl. 2 11 Cl. 3 15 Cl. 4 10			*	2.191	111	001	026	0.688	000
Dec.	H. 30 27 L. 29 10 M. 30 63 V. 01 17	H. 53 L. 29 M. 42 V. 24	*	H. 110 L. 67 M. 89 V. 43	E. 2 W. 0 N. 6 S. 9	S.E. 1 S.W. 53 N.E. 12 N.W. 10			No. 1 71 No. 2 14 No. 3 8 No. 4 0				Clear 7 Rain 11 Snow 7 Fog 0	Cl. 1 21 Cl. 2 21 Cl. 3 18 Cl. 4 8			*	3.493	036	000	008	0.290	000
The Year	H. 30 54 L. 28 42 M. 29 73 V. 02 12	H. 83 L. 15 M. 49 V. 68	*	H. 127 L. 12 M. 67 V. 115	E. 110 W. 150 N. 039 S. 061	S.E. 032 S.W. 471 N.E. 136 N.W. 096			No. 1 848 No. 2 162 No. 3 80 No. 4 5				Cle. 215 Ra. 119 Snow 11 Fog 9	Cl. 1 244 Cl. 2 147 Cl. 3 197 Cl. 4 153			*	23.174	265	000	076	28.109	143

1788	BAROM.	Ther. Shade.	Ther. Sun.	Hygr.	WINDS. Points.				WINDS. Strength.				WEATHER.				RAIN. greateſt in 1 day.	RAIN. total in month.	EVAPORATION. greateſt in 1 day.	EVAPORATION. leaſt in 1 day.	EVAPORATION. mean daily.	EVAPORATION. total in month.	DEW. total in month.
Jan.	H. 30 63	H. 50	*	H. 107	E. 0	S.E. 2	No. 1 28		Clear 22	Cl. 1 9			0.155	0.736	178	000	026	0.794	004
	L. 29 80	L. 25		L. 65	W. 17	S.W. 37	No. 2 38		Rain 7	Cl. 2 11									
	M. 29 89	M. 39		M. 86	N. 8	N.E. 15	No. 3 21		Snow 0	Cl. 3 26									
	V. 00 83	V. 25		V. 42	S. 3	N.W 11	No. 4 6		Fog 5	Cl. 4 13									
Feb.	H. 30 15	H. 52	*	H. 113	E. 6	S.E. 29	No. 1 80		Clear 4	Cl. 1 10			0.730	2.598	065	000	020	0.597	000
	L. 28 60	L. 32		L. 60	W. 0	S.W. 45	No. 2 3		Rain 8	Cl. 2 16									
	M. 29 54	M. 41		M. 93	N. 1	N.E. 3	No. 3 4		Snow 0	Cl. 3 11									
	V. 01 55	V. 20		V. 53	S. 1	N.W. 2	No. 4 0		Fog 0	Cl. 4 38									
Mar.	H. 30 03	H. 58	*	H. 109	E. 25	S.E. 0	No. 1 50		Clear 2	Cl. 1 17			0.694	1.406	138	018	046	1.432	000
	L. 29 15	L. 30		L. 38	W. 6	S.W. 27	No. 2 38		Rain 2	Cl. 2 21									
	M. 29 48	M. 41		M. 69	N. 1	N.E. 18	No. 3 5		Snow 0	Cl. 3 23									
	V. 00 88	V. 28		V. 71	S. 0	N.W. 16	No. 4 0		Fog 0	Cl. 4 28									
Apr.	H. 30 05	H. 69	*	H. 90	E. 10	S.E. 2	No. 1 57		Clear 15	Cl. 1 16			0.278	0.675	215	038	069	2.061	000
	L. 29 58	L. 33		L. 27	W. 53	S.W. 9	No. 2 15		Rain 2	Cl. 2 15									
	M. 29 63	M. 50		M. 54	N. 2	N.E. 3	No. 3 15		Snow 2	Cl. 3 20									
	V. 00 47	V. 36		V. 63	S. 1	N.W. 10	No. 4 3		Fog 0	Cl. 4 20									
May	H. 30 28	H. 83	*	H. 91	E. 17	S.E. 1	No. 1 72		Clear 25	Cl. 1 14			0.490	1.246	344	047	161	5.003	002
	L. 29 45	L. 45		L. 11	W. 16	S.W. 26	No. 2 21		Rain 4	Cl. 2 12									
	M. 29 90	M. 58		M. 39	N. 3	N.E. 21	No. 3 0		Snow 0	Cl. 3 31									
	V. 00 73	V. 38		V. 80	S. 4	N.W. 5	No. 4 0		Fog 0	Cl. 4 7									
June	H. 30 18	H. 68	H. 78	H. 85	E. 5	S.E. 0	No. 1 69		Clear 21	Cl. 1 20			1.240	3.457	318	032	162	4.863	000
	L. 29 35	L. 47		L. 9	W. 8	S.W. 26	No. 2 15		Rain 10	Cl. 2 15									
	M. 29 80	M. 61		M. 43	N. 6	N.E. 31	No. 3 6		Snow 0	Cl. 3 12									
	V. 00 83	V. 21		V. 76	S. 1	N.W. 13	No. 4 0		Fog 0	Cl. 4 12									
July	H. 30 15	H. 80	H. 96	H. 82	E. 1	S.E. 0	No. 1 75		Clear 7	Cl. 1 26			0.640	2.143	230	086	175	5.421	000
	L. 29 60	L. 52		L. 20	W. 39	S.W. 45	No. 2 14		Rain 8	Cl. 2 22									
	M. 29 78	M. 59		M. 47	N. 0	N.E. 0	No. 3 4		Snow 0	Cl. 3 16									
	V. 00 55	V. 28		V. 62	S. 1	N.W. 7	No. 4 0		Fog 0	Cl. 4 14									
Aug.	H. 30 37	H. 80	H. 101	H. 82	E. 0	S.E. 0	No. 1 76		Clear 25	Cl. 1 25			0.905	0.738	296	001	137	4.248	003
	L. 29 15	L. 51		L. 19	W. 42	S.W. 27	No. 2 16		Rain 8	Cl. 2 17									
	M. 29 74	M. 61		M. 44	N. 0	N.E. 5	No. 3 1		Snow 0	Cl. 3 9									
	V. 01 22	V. 29		V. 63	S. 2	N.W. 17	No. 4 0		Fog 0	Cl. 4 9									
Sept.	H. 30 14	H. 76	H. 97	H. 84	E. 8	S.E. 17	No. 1 70		Clear 35	Cl. 1 13			0.605	2.859	138	016	080	2.408	053
	L. 29 28	L. 47		L. 29	W. 12	S.W. 35	No. 2 7		Rain 4	Cl. 2 13									
	M. 29 87	M. 57		M. 59	N. 1	N.E. 6	No. 3 9		Snow 0	Cl. 3 18									
	V. 00 86	V. 29		V. 55	S. 2	N.W. 9	No. 4 4		Fog 2	Cl. 4 5									
Oct.	H. 30 48	H. 63	H. 74	H. 75	E. 10	S.E. 0	No. 1 62		Clear 26	Cl. 1 10			0.048	0.168	125	024	063	1.941	051
	L. 29 50	L. 30		L. 34	W. 15	S.W. 35	No. 2 16		Rain 0	Cl. 2 26									
	M. 30 08	M. 50		M. 56	N. 12	N.E. 12	No. 3 12		Snow 0	Cl. 3 21									
	V. 00 98	V. 33		V. 41	S. 3	N.W. 6	No. 4 3		Fog 2	Cl. 4 8									
Nov.	H. 30 39	H. 58	H. 78	H. 86	E. 5	S.E. 10	No. 1 70		Clear 37	Cl. 1 7			0.322	0.735	076	000	026	0.789	084
	L. 29 49	L. 25		L. 34	W. 1	S.W. 34	No. 2 14		Rain 0	Cl. 2 11									
	M. 30 15	M. 42		M. 64	N. 9	N.E. 21	No. 3 3		Snow 3	Cl. 3 10									
	V. 00 90	V. 33		V. 52	S. 2	N.W. 8	No. 4 3		Fog 3	Cl. 4 19									
Dec.	H. 30 26	H. 44	H. 44	H. 82	E. 0	S.E. 0	No. 1 49		Clear 35	Cl. 1 6			0.042	0.049	050	050	001	0.050	010
	L. 29 46	L. 11		L. 44	W. 20	S.W. 14	No. 2 27		Rain 0	Cl. 2 5									
	M. 30 14	M. 30		M. 65	N. 9	N.E. 21	No. 3 12		Snow 13	Cl. 3 18									
	V. 00 80	V. 33		V. 38	S. 1	N.W. 28	No. 4 5		Fog 3	Cl. 4 13									
The Year	H. 30 63	H. 83	H. 101	H. 113	E. 87	S.E. 61	No. 1 758		Cle. 254	Cl. 1 173			1.240	16.810	344	000	080	29.607	207
	L. 28 60	L. 11		L. 09	W. 229	S.W. 360	No. 2 224		Rain 53	Cl. 2 184									
	M. 29 83	M. 49		M. 59	N. 52	N.E. 156	No. 3 92		Snow 18	Cl. 3 215									
	V. 02 03	V. 72		V. 104	S. 21	N.W. 132	No. 4 24		Fog 15	Cl. 4 186									

1789	BAROM.	Ther. Shade.	Ther. Sun.	Hygr.	WINDS. Points.								Strength.				WEATHER.				RAIN. greatest in 1 day.	RAIN. total in month.	EVAPORATION. greatest in 1 day.	EVAPORATION. least in 1 day.	EVAPORATION. mean daily.	EVAPORATION. total in month.	DEW. total in month.
Jan.	H. 30 73 L. 28 48 M. 29 55 V. 02 25	H. 53 L. 15 M. 35 V. 38	H. 55	H. 89 L. 40 M. 72 V. 49	E. 14 W. 14 N. 3 S. 10	S.E. 6 S.W. 35 N.E. 3 N.W. 8			No. 1 55 No. 2 21 No. 3 14 No. 4 3				Clear 44 Rain 7 Snow 8 Fog 0	Cl. 1 5 Cl. 2 9 Cl. 3 5 Cl. 4 15			1.050	2.521	072	007	014	0.453	005
Feb.	H. 29 98 L. 29 16 M. 30 02 V. 00 82	H. 52 L. 31 M. 51 V. 21	H. 52	H. 85 L. 51 M. 67 V. 34	E. 0 W. 47 N. 7 S. 5	S.E. 0 S.W. 22 N.E. 0 N.W. 3			No. 1 38 No. 2 28 No. 3 15 No. 4 3				Clear 18 Rain 4 Snow 0 Fog 0	Cl. 1 12 Cl. 2 26 Cl. 3 14 Cl. 4 10			0.456	2.208	057	008	035	0.989	000
Mar.	H. 30 02 L. 29 13 M. 29 76 V. 00 89	H. 50 L. 29 M. 36 V. 21	H. 51	H. 85 L. 33 M. 59 V. 52	E. 3 W. 1 N. 14 S. 0	S.E. 13 S.W. 16 N.E. 41 N.W. 5			No. 1 75 No. 2 18 No. 3 0 No. 4 0				Clear 17 Rain 8 Snow 5 Fog 0	Cl. 1 22 Cl. 2 27 Cl. 3 12 Cl. 4 2			0.330	1.478	101	020	025	0.792	005
Apr.	H. 30 02 L. 29 05 M. 29 65 V. 00 97	H. 74 L. 31 M. 47 V. 43	H. 76	H. 85 L. 28 M. 48 V. 57	E. 10 W. 12 N. 7 S. 2	S.E. 6 S.W. 39 N.E. 5 N.W. 9			No. 1 74 No. 2 13 No. 3 3 No. 4 0				Clear 49 Rain 5 Snow 1 Fog 0	Cl. 1 7 Cl. 2 24 Cl. 3 4 Cl. 4 0			0.390	1.708	260	021	147	4.419	000
May	H. 30 30 L. 29 50 M. 29 59 V. 00 80	H. 77 L. 47 M. 57 V. 30	H. 80	H. 72 L. 14 M. 42 V. 58	E. 27 W. 15 N. 0 S. 6	S.E. 1 S.W. 32 N.E. 10 N.W. 2			No. 1 51 No. 2 38 No. 3 4 No. 4 0				Clear 20 Rain 0 Snow 0 Fog 0	Cl. 1 39 Cl. 2 24 Cl. 3 8 Cl. 4 2			0.523	1.241	180	010	115	3.571	000
June	H. 30 14 L. 29 30 M. 29 40 V. 00 84	H. 80 L. 49 M. 57 V. 31	H. 85	H. 85 L. 24 M. 47 V. 61	E. 6 W. 12 N. 0 S. 5	S.E. 0 S.W. 31 N.E. 19 N.W. 17			No. 1 39 No. 2 43 No. 3 3 No. 4 5				Clear 8 Rain 1 Snow 0 Fog 0	Cl. 1 30 Cl. 2 37 Cl. 3 14 Cl. 4 0			0.315	2.574	235	010	123	3.719	000
July	H. 30 04 L. 29 54 M. 29 55 V. 00 50	H. 78 L. 52 M. 60 V. 26	H. 86	H. 70 L. 20 M. 44 V. 50	E. 0 W. 10 N. 0 S. 1	S.E. 0 S.W. 71 N.E. 3 N.W. 8			No. 1 38 No. 2 39 No. 3 11 No. 4 5				Clear 2 Rain 8 Snow 0 Fog 0	Cl. 1 35 Cl. 2 38 Cl. 3 8 Cl. 4 2			0.465	2.563	248	037	150	4.661	000
Aug.	H. 30 20 L. 29 14 M. 29 95 V. 01 06	H. 78 L. 48 M. 64 V. 30	H. 88	H. 72 L. 18 M. 42 V. 54	E. 9 W. 4 N. 0 S. 2	S.E. 6 S.W. 15 N.E. 33 N.W. 24			No. 1 54 No. 2 31 No. 3 5 No. 4 3				Clear 10 Rain 3 Snow 0 Fog 0	Cl. 1 35 Cl. 2 39 Cl. 3 5 Cl. 4 1			0.486	1.459	245	025	169	5.252	000
Sept.	H. 30 27 L. 29 20 M. 30 88 V. 01 07	H. 78 L. 45 M. 57 V. 33	H. 86	H. 78 L. 23 M. 50 V. 55	E. 0 W. 0 N. 16 S. 1	S.E. 3 S.W. 45 N.E. 0 N.W. 25			No. 1 51 No. 2 38 No. 3 1 No. 4 0				Clear 3 Rain 9 Snow 0 Fog 0	Cl. 1 6 Cl. 2 61 Cl. 3 9 Cl. 4 2			0.496	2.367	177	032	103	3.106	059
Oct.	H. 30 16 L. 28 90 M. 29 56 V. 01 26	H. 58 L. 30 M. 47 V. 28	H. 78	H. 89 L. 44 M. 66 V. 45	E. 1 W. 13 N. 12 S. 28	S.E. 10 S.W. 24 N.E. 5 N.W. 0			No. 1 62 No. 2 24 No. 3 4 No. 4 3				Clear 52 Rain 7 Snow 0 Fog 0	Cl. 1 20 Cl. 2 3 Cl. 3 7 Cl. 4 4			0.760	4.030	190	018	082	2.567	145
Nov.	H. 30 40 L. 28 60 M. 29 74 V. 01 80	H. 55 L. 29 M. 38 V. 26	H. 55	H. 90 L. 59 M. 73 V. 31	E. 16 W. 0 N. 32 S. 11	S.E. 0 S.W. 8 N.E. 8 N.W. 15			No. 1 30 No. 2 53 No. 3 5 No. 4 2				Clear 53 Rain 8 Snow 0 Fog 0	Cl. 1 26 Cl. 2 0 Cl. 3 3 Cl. 4 0			0.583	2.705	060	002	026	0.789	035
Dec.	H. 30 57 L. 28 90 M. 29 84 V. 01 67	H. 60 L. 30 M. 42 V. 30	H. 64	H. 94 L. 64 M. 75 V. 30	E. 0 W. 15 N. 0 S. 29	S.E. 0 S.W. 49 N.E. 0 N.W. 0			No. 1 37 No. 2 49 No. 3 7 No. 4 0				Clear 33 Rain 14 Snow 0 Fog 0	Cl. 1 28 Cl. 2 11 Cl. 3 5 Cl. 4 2			0.335	0.791	085	005	037	1.163	034
The Year	H. 30 73 L. 28 48 M. 29 79 V. 02 25	H. 80 L. 15 M. 49 V. 65	H. 88	H. 94 L. 14 M. 57 V. 80	E. 86 W. 143 N. 91 S. 100	S.E. 45 S.W. 387 N.E. 127 N.W. 116			No. 1 604 No. 2 395 No. 3 72 No. 4 24				Cle. 309 Ra. 074 Snc. 014 Fog 0	Cl. 1 265 Cl. 2 299 Cl. 3 94 Cl. 4 40			1.050	25.645	260	002	085	31.481	293

1790	BAROM.	Ther. Shade.	Ther. Sun.	Hygr.	WINDS. Points.						WINDS. Strength.						WEATHER.				RAIN. greateſt in 1 day.	RAIN. total in month.	EVAPORATION. greateſt in 1 day.	EVAPORATION. leaſt in 1 day.	EVAPORATION. mean daily.	EVAPORATION. total in month.	DEW. total in month.
Jan.	H. 30 45	H. 52	H. 52	H. 94	E. 0	S.E. 5					No. 1 67				Clear 40	Cl. 1 36					0.130	0.806	075	005	030	0.934	008
	L. 29 10	L. 29		L. 55	W. 9	S.W. 49					No. 2 17				Rain 2	Cl. 2 8											
	M. 30 06	M. 38		M. 73	N. 0	N.E. 16					No. 3 9				Snow 0	Cl. 3 2											
	V. 01 35	V. 23		V. 39	S. 8	N.W. 6					No. 4 0				Fog 2	Cl. 4 3											
Feb.	H. 30 61	H. 71	H. 71	H. 85	E. 0	S.E. 0					No. 1 77				Clear 51	Cl. 1 22					0.025	0.032	038	003	047	1.333	038
	L. 29 87	L. 30		L. 44	W. 11	S.W. 49					No. 2 5				Rain 2	Cl. 2 2											
	M. 30 84	M. 54		M. 63	N. 5	N.E. 0					No. 3 2				Snow 0	Cl. 3 2											
	V. 00 74	V. 41		V. 41	S. 0	N.W. 19					No. 4 0				Fog 4	Cl. 4 1											
Mar.	H. 30 60	H. 65	H. 65	H. 80	E. 2	S.E. 2					No. 1 79				Clear 58	Cl. 1 16					0.126	0.156	081	005	064	1.985	013
	L. 29 85	L. 30		L. 30	W. 7	S.W. 9					No. 2 9				Rain 4	Cl. 2 6											
	M. 29 47	M. 44		M. 54	N. 3	N.E. 45					No. 3 5				Snow 0	Cl. 3 5											
	V. 00 75	V. 35		V. 50	S. 10	N.W. 15					No. 4 0				Fog 3	Cl. 4 1											
Apr.	H. 30 30	H. 60	H. 63	H. 84	E. 3	S.E. 7					No. 1 44				Clear 62	Cl. 1 4					0.710	2.153	204	005	100	3.000	002
	L. 29 25	L. 33		L. 21	W. 0	S.W. 18					No. 2 28				Rain 15	Cl. 2 2											
	M. 29 82	M. 43		M. 47	N. 4	N.E. 50					No. 3 8				Snow 0	Cl. 3 5											
	V. 01 05	V. 27		V. 63	S. 3	N.W. 5					No. 4 10				Fog 0	Cl. 4 2											
May	H. 30 30	H. 71	H. 77	H. 78	E. 5	S.E. 8					No. 1 74				Clear 56	Cl. 1 15					0.560	1.918	225	015	126	3.922	015
	L. 29 40	L. 39		L. 18	W. 5	S.W. 27					No. 2 15				Rain 12	Cl. 2 4											
	M. 29 85	M. 55		M. 46	N. 0	N.E. 32					No. 3 4				Snow 0	Cl. 3 5											
	V. 00 90	V. 32		V. 60	S. 9	N.W. 7					No. 4 0				Fog 0	Cl. 4 1											
June	H. 30 40	H. 88	H. 96	H. 75	E. 4	S.E. 10					No. 1 73				Clear 62	Cl. 1 14					0.115	0.509	396	081	196	5.894	005
	L. 29 15	L. 44		L. 18	W. 10	S.W. 41					No. 2 16				Rain 4	Cl. 2 7											
	M. 29 99	M. 59		M. 39	N. 0	N.E. 8					No. 3 1				Snow 0	Cl. 3 3											
	V. 01 25	V. 44		V. 57	S. 2	N.W. 15					No. 4 0				Fog 0	Cl. 4 0											
July	H. 30 60	H. 69	H. 80	H. 76	E. 0	S.E. 0					No. 1 74				Clear 34	Cl. 1 34					0.668	2.296	264	039	136	4.217	004
	L. 29 40	L. 19		L. 19	W. 4	S.W. 60					No. 2 13				Rain 6	Cl. 2 13											
	M. 30 11	M. 59		M. 43	N. 5	N.E. 0					No. 3 5				Snow 0	Cl. 3 6											
	V. 01 20	V. 50		V. 57	S. 2	N.W. 22					No. 4 1				Fog 0	Cl. 4 0											
Aug.	H. 30 10	H. 78	H. 82	H. 72	E. 0	S.E. 1					No. 1 71				Clear 50	Cl. 1 14					1.295	2.671	212	036	125	3.996	006
	L. 29 15	L. 50		L. 20	W. 15	S.W. 57					No. 2 17				Rain 11	Cl. 2 14											
	M. 29 85	M. 61		M. 45	N. 3	N.E. 0					No. 3 5				Snow 0	Cl. 3 4											
	V. 00 95	V. 28		V. 52	S. 0	N.W. 17					No. 4 0				Fog 0	Cl. 4 0											
Sept.	H. 30 20	H. 71	H. 85	H. 75	E. 3	S.E. 3					No. 1 78				Clear 31	Cl. 1 40					0.160	0.497	162	050	101	3.034	000
	L. 29 45	L. 41		L. 22	W. 7	S.W. 38					No. 2 8				Rain 6	Cl. 2 9											
	M. 30 46	M. 54		M. 43	N. 6	N.E. 14					No. 3 4				Snow 0	Cl. 3 2											
	V. 00 75	V. 30		V. 53	S. 0	N.W. 19					No. 4 0				Fog 2	Cl. 4 0											
Oct.	H. 30 30	H. 71	H. 75	H. 78	E. 0	S.E. 5					No. 1 60				Clear 50	Cl. 1 5					0.325	1.266	150	008	058	1.823	000
	L. 29 52	L. 33		L. 30	W. 0	S.W. 27					No. 2 18				Rain 7	Cl. 2 18											
	M. 29 69	M. 60		M. 54	N. 2	N.E. 22					No. 3 12				Snow 0	Cl. 3 6											
	V. 00 78	V. 38		V. 48	S. 7	N.W. 30					No. 4 3				Fog 3	Cl. 4 4											
Nov.	H. 30 30	H. 72	H. 72	H. 84	E. 4	S.E. 18					No. 1 70				Clear 39	Cl. 1 12					1.242	3.194	072	008	034	1.049	000
	L. 29 27	L. 33		L. 38	W. 0	S.W. 28					No. 2 10				Rain 8	Cl. 2 24											
	M. 29 81	M. 43		M. 63	N. 5	N.E. 29					No. 3 10				Snow 0	Cl. 3 5											
	V. 01 03	V. 39		V. 46	S. 0	N.W. 6					No. 4 0				Fog 1	Cl. 4 1											
Dec.	H. 30 30	H. 52	H. 52	H. 82	E. 0	S.E. 3					No. 1 59				Clear 46	Cl. 1 8					0.823	3.223	087	006	023	0.715	035
	L. 29 10	L. 28		L. 45	W. 15	S.W. 38					No. 2 15				Rain 13	Cl. 2 15											
	M. 28 76	M. 40		M. 67	N. 4	N.E. 3					No. 3 11				Snow 3	Cl. 3 3											
	V. 01 20	V. 24		V. 37	S. 10	N.W. 20					No. 4 8				Fog 3	Cl. 4 2											
The Year	H. 30 61	H. 88	H. 96	H. 94	E. 21	S.E. 62					No. 1 826				Cle. 579	Cl. 1 220					1.295	18.721	396	003	086	31.902	126
	L. 29 10	L. 19		L. 18	W. 83	S.W. 441					No. 2 171				Rain 90	Cl. 2 122											
	M. 29 89	M. 50		M. 53	N. 37	N.E. 219					No. 3 76				Snow 3	Cl. 3 48											
	V. 01 51	V. 69		V. 76	S. 51	N.W. 181					No. 4 22				Fog 18	Cl. 4 15											

1791	BAROM.	Ther. Shade.	Ther. Sun.	Hygr.	WINDS. Points.	WINDS. Strength.	WEATHER.	RAIN. greatest in 1 day.	RAIN. total in month.	EVAPORATION. greatest in 1 day.	EVAPORATION. least in 1 day.	EVAPORATION. mean daily.	EVAPORATION. total in month.	DEW. total in month.
Jan.	H. 30 48 L. 28 50 M. 29 58 V. 01 98	H. 49 L. 31 M. 42 V. 18	H. 61	H. 88 L. 55 M. 72 V. 33	E. 0 S.E. 0 W. 10 S.W. 80 N. 0 N.E. 0 S. 0 N.W. 3	No. 1 32 No. 2 47 No. 3 11 No. 4 3	Clear 45 Cl. 1 18 Rain 13 Cl. 2 12 Snow 0 Cl. 3 1 Fog 0 Cl. 4 4	1.330	4.442	054	012	028	0.888	003
Feb.	H. 30 40 L. 29 40 M. 29 89 V. 01 00	H. 49 L. 31 M. 37 V. 18	H. 57	H. 76 L. 40 M. 65 V. 36	E. 8 S.E. 0 W. 4 S.W. 33 N. 3 N.E. 5 S. 5 N.W. 26	No. 1 45 No. 2 26 No. 3 12 No. 4 1	Clear 35 Cl. 1 17 Rain 8 Cl. 2 11 Snow 1 Cl. 3 8 Fog 0 Cl. 4 4	0.847	3.388	668	021	029	0.831	005
Mar.	H. 30 68 L. 29 00 M. 30 16 V. 01 68	H. 58 L. 28 M. 43 V. 30	H. 74	H. 72 L. 30 M. 49 V. 42	E. 2 S.E. 0 W. 1 S.W. 49 N. 0 N.E. 8 S. 0 N.W. 33	No. 1 69 No. 2 16 No. 3 8 No. 4 0	Clear 54 Cl. 1 12 Rain 0 Cl. 2 12 Snow 0 Cl. 3 12 Fog 0 Cl. 4 3	0.424	0.986	106	016	059	1.853	005
Apr.	H. 30 07 L. 29 10 M. 29 73 V. 00 97	H. 69 L. 39 M. 49 V. 30	H. 75	H. 80 L. 28 M. 59 V. 52	E. 10 S.E. 13 W. 6 S.W. 28 N. 0 N.E. 23 S. 3 N.W. 7	No. 1 45 No. 2 4 No. 3 41 No. 4 0	Clear 39 Cl. 1 15 Rain 4 Cl. 2 17 Snow 0 Cl. 3 12 Fog 2 Cl. 4 1	0.903	1.688	155	012	082	2.460	005
May	H. 30 30 L. 29 50 M. 30 09 V. 00 80	H. 65 L. 38 M. 39 V. 27	H. 78	H. 76 L. 14 M. 34 V. 62	E. 10 S.E. 0 W. 5 S.W. 38 N. 0 N.E. 26 S. 0 N.W. 14	No. 1 41 No. 2 39 No. 3 13 No. 4 0	Clear 48 Cl. 1 11 Rain 5 Cl. 2 13 Snow 0 Cl. 3 8 Fog 1 Cl. 4 7	0.540	0.493	250	038	144	4.486	000
June	H. 30 20 L. 29 50 M. 29 90 V. 00 70	H. 79 L. 40 M. 57 V. 39	H. 98	H. 64 L. 10 M. 29 V. 54	E. 1 S.E. 6 W. 5 S.W. 22 N. 6 N.E. 22 S. 6 N.W. 22	No. 1 52 No. 2 38 No. 3 0 No. 4 0	Clear 45 Cl. 1 4 Rain 4 Cl. 2 29 Snow 0 Cl. 3 8 Fog 0 Cl. 4 0	0.473	1.039	277	039	166	5.005	000
July	H. 30 22 L. 29 96 M. 29 86 V. 00 26	H. 76 L. 51 M. 58 V. 25	H. 80	H. 73 L. 22 M. 43 V. 51	E. 6 S.E. 0 W. 5 S.W. 70 N. 0 N.E. 3 S. 0 N.W. 9	No. 1 63 No. 2 27 No. 3 3 No. 4 0	Clear 38 Cl. 1 12 Rain 9 Cl. 2 16 Snow 0 Cl. 3 12 Fog 1 Cl. 4 5	0.447	2.373	268	016	137	4.274	000
Aug.	H. 30 28 L. 29 58 M. 30 02 V. 00 70	H. 75 L. 52 M. 62 V. 23	H. 98	H. 80 L. 18 M. 43 V. 62	E. 14 S.E. 0 W. 0 S.W. 49 N. 0 N.E. 19 S. 5 N.W. 6	No. 1 35 No. 2 47 No. 3 11 No. 4 0	Clear 54 Cl. 1 8 Rain 4 Cl. 2 13 Snow 0 Cl. 3 8 Fog 0 Cl. 4 6	0.205	1.040	234	028	159	4.951	000
Sept.	H. 30 30 L. 29 50 M. 30 06 V. 00 80	H. 82 L. 48 M. 57 V. 34	H. 95	H. 78 L. 28 M. 48 V. 50	E. 6 S.E. 3 W. 2 S.W. 21 N. 9 N.E. 31 S. 0 N.W. 18	No. 1 59 No. 2 27 No. 3 4 No. 4 0	Clear 46 Cl. 1 15 Rain 2 Cl. 2 13 Snow 0 Cl. 3 9 Fog 5 Cl. 4 0	0.312	0.419	235	015	131	3.956	064
Oct.	H. 30 40 L. 29 15 M. 29 65 V. 01 25	H. 62 L. 32 M. 48 V. 30	H. 83	H. 71 L. 30 M. 45 V. 41	E. 7 S.E. 8 W. 0 S.W. 61 N. 0 N.E. 3 S. 3 N.W. 11	No. 1 36 No. 2 49 No. 3 8 No. 4 0	Clear 35 Cl. 1 14 Rain 9 Cl. 2 19 Snow 0 Cl. 3 8 Fog 1 Cl. 4 7	0.732	2.327	136	010	046	1.446	024
Nov.	H. 30 30 L. 28 65 M. 29 63 V. 01 65	H. 53 L. 33 M. 43 V. 20	H. 54	H. 86 L. 30 M. 62 V. 56	E. 7 S.E. 21 W. 0 S.W. 51 N. 5 N.E. 6 S. 0 N.W. 0	No. 1 47 No. 2 25 No. 3 18 No. 4 0	Clear 54 Cl. 1 5 Rain 21 Cl. 2 1 Snow 0 Cl. 3 3 Fog 1 Cl. 4 5	0.860	3.600	097	012	041	1.245	010
Dec.	H. 30 20 L. 29 05 M. 29 29 V. 01 15	H. 49 L. 20 M. 36 V. 29	H. 52	H. 80 L. 40 M. 56 V. 40	E. 2 S.E. 6 W. 4 S.W. 52 N. 4 N.E. 1 S. 2 N.W. 22	No. 1 40 No. 2 32 No. 3 10 No. 4 11	Clear 59 Cl. 1 0 Rain 10 Cl. 2 5 Snow 0 Cl. 3 15 Fog 0 Cl. 4 4	0.522	1.695	053	007	016	0.510	000
The Year	H. 30 68 L. 28 50 M. 29 82 V. 02 18	H. 82 L. 20 M. 47 V. 62	H. 98	H. 88 L. 10 M. 50 V. 78	E. 73 S.E. 57 W. 42 S.W. 554 N. 27 N.E. 147 S. 24 N.W. 171	No. 1 564 No. 2 377 No. 3 139 No. 4 15	Cle. 552 Cl. 1 131 Ra. 89 Cl. 2 161 Snow 1 Cl. 3 104 Fog 11 Cl. 4 46	1.330	23.490	277	007	086	32.905	116

1792	BAROM.	Ther. Shade.	Ther. Sun.	Hygr.	WINDS. Points.						Strength.				WEATHER.				RAIN. greateſt in 1 day.	RAIN. total in month.	EVAPORATION. greateſt in 1 day.	EVAPORATION. leaſt in 1 day.	EVAPORATION. mean daily.	EVAPORATION. total in month.	DEW. total in month.
Jan.	H. 30 40	H. 47	H. 50	H. 80	E. 3	S.E. 9			No. 1 51				Clear 27	Cl. 1 10					0.315	2.069	072	040	019	0.604	005
	L. 28 92	L. 18		L. 50	W. 4	S.W. 23			No. 2 40				Rain 11	Cl. 2 20											
	M. 29 39	M. 38		M. 68	N. 0	N.E. 6			No. 3 2				Snow 3	Cl. 3 12											
	V. 01 48	V. 29		V. 30	S. 0	N.W. 48			No. 4 0				Fog 1	Cl. 4 9											
Feb.	H. 30 22	H. 52	H. 60	H. 76	E. 13	S.E. 6			No. 1 54				Clear 57	Cl. 1 2					0.690	2.360	080	032	039	1.149	000
	L. 29 40	L. 25		L. 50	W. 13	S.W. 17			No. 2 20				Rain 8	Cl. 2 8											
	M. 29 93	M. 38		M. 61	N. 3	N.E. 10			No. 3 13				Snow 5	Cl. 3 1											
	V. 00 82	V. 27		V. 26	S. 2	N.W. 23			No. 4 0				Fog 6	Cl. 4 0											
Mar.	H. 30 20	H. 64	H. 72	H. 76	E. 0	S.E. 28			No. 1 40				Clear 68	Cl. 1 3					0.402	2.391	105	027	039	1.224	000
	L. 29 25	L. 40		L. 67	W. 0	S.W. 41			No. 2 20				Rain 5	Cl. 2 17											
	M. 29 42	M. 42		M. 68	N. 0	N.E. 10			No. 3 33				Snow 0	Cl. 3 0											
	V. 00 95	V. 24		V. 09	S. 0	N.W. 14			No. 4 0				Fog 0	Cl. 4 0											
Apr.	H. 30 25	H. 68	H. 78	H. 79	E. 0	S.E. 20			No. 1 10				Clear 51	Cl. 1 8					0.830	3.566	308	035	098	2.967	000
	L. 29 40	L. 40		L. 30	W. 3	S.W. 28			No. 2 54				Rain 8	Cl. 2 14											
	M. 29 74	M. 51		M. 55	N. 0	N.E. 25			No. 3 26				Snow 0	Cl. 3 9											
	V. 00 85	V. 28		V. 49	S. 5	N.W. 09			No. 4 0				Fog 0	Cl. 4 0											
May	H. 30 45	H. 69	H. 78	H. 72	E. 2	S.E. 3			No. 1 2				Clear 51	Cl. 1 11					0.222	1.358	179	052	090	2.796	000
	L. 29 55	L. 44		L. 12	W. 2	S.W. 55			No. 2 82				Rain 4	Cl. 2 19											
	M. 29 80	M. 51		M. 36	N. 12	N.E. 6			No. 3 8				Snow 0	Cl. 3 8											
	V. 00 90	V. 25		V. 60	S. 0	N.W. 13			No. 4 1				Fog 0	Cl. 4 0											
June	H. 30 25	H. 79	H. 88	H. 74	E. 4	S.E. 16			No. 1 64				Clear 35	Cl. 1 12					0.366	2.147	270	038	102	3.087	000
	L. 29 55	L. 48		L. 16	W. 0	S.W. 38			No. 2 18				Rain 8	Cl. 2 21											
	M. 30 00	M. 54		M. 39	N. 6	N.E. 13			No. 3 6				Snow 0	Cl. 3 10											
	V. 00 70	V. 31		V. 58	S. 3	N.W. 10			No. 4 2				Fog 0	Cl. 4 4											
July	H. 30 15	H. 70	H. 84	H. 72	E. 1	S.E. 2			No. 1 49				Clear 32	Cl. 1 12					1.010	5.195	270	022	088	2.739	031
	L. 29 49	L. 52		L. 28	W. 2	S.W. 56			No. 2 42				Rain 10	Cl. 2 21											
	M. 28 70	M. 59		M. 43	N. 1	N.E. 13			No. 3 2				Snow 0	Cl. 3 15											
	V. 00 66	V. 18		V. 44	S. 1	N.W. 17			No. 4 0				Fog 0	Cl. 4 3											
Aug.	H. 30 30	H. 81	H. 92	H. 60	E. 3	S.E. 3			No. 1 27				Clear 50	Cl. 1 8					1.760	3.940	296	038	178	5.531	000
	L. 29 55	L. 54		L. 18	W. 4	S.W. 48			No. 2 55				Rain 8	Cl. 2 18											
	M. 29 15	M. 63		M. 37	N. 1	N.E. 20			No. 3 7				Snow 0	Cl. 3 6											
	V. 00 75	V. 27		V. 42	S. 8	N.W. 6			No. 4 4				Fog 1	Cl. 4 2											
Sept.	H. 30 30	H. 68	H. 70	H. 50	E. 0	S.E. 8			No. 1 28				Clear 40	Cl. 1 8					0.575	2.053	143	014	060	1.829	000
	L. 29 00	L. 35		L. 40	W. 0	S.W. 67			No. 2 48				Rain 10	Cl. 2 22											
	M. 29 85	M. 54		M. 40	N. 0	N.E. 3			No. 3 10				Snow 0	Cl. 3 6											
	V. 01 30	V. 33		V. 10	S. 2	N.W. 10			No. 4 4				Fog 2	Cl. 4 2											
Oct.	H. 30 48	H. 58	H. 65	H. 50	E. 0	S.E. 9			No. 1 16				Clear 23	Cl. 1 20					0.350	2.761	064	008	034	1.164	017
	L. 29 24	L. 38		L. 40	W. 4	S.W. 38			No. 2 68				Rain 11	Cl. 2 19											
	M. 29 85	M. 49		M. 40	N. 1	N.E. 30			No. 3 8				Snow 0	Cl. 3 14											
	V. 01 24	V. 20		V. 10	S. 1	N.W. 10			No. 4 1				Fog 1	Cl. 4 5											
Nov.	H. 30 40	H. 56	H. 56	H. 48	E. 1	S.E. 18			No. 1 29				Clear 40	Cl. 1 16					0.231	0.637	074	010	036	1.108	008
	L. 29 40	L. 34		L. 40	W. 7	S.W. 47			No. 2 55				Rain 4	Cl. 2 20											
	M. 29 96	M. 45		M. 40	N. 3	N.E. 13			No. 3 4				Snow 0	Cl. 3 6											
	V. 01 00	V. 22		V. 08	S. 1	N.W. 0			No. 4 2				Fog 1	Cl. 4 3											
Dec.	H. 30 22	H. 58	H. 58	H. 40	E. 0	S.E. 9			No. 1 12				Clear 20	Cl. 1 19					0.585	2.197	049	005	018	0.570	000
	L. 29 05	L. 30		L. 38	W. 7	S.W. 42			No. 2 58				Rain 8	Cl. 2 29											
	M. 29 65	M. 40		M. 39	N. 1	N.E. 9			No. 3 18				Snow 0	Cl. 3 11											
	V. 01 17	V. 28		V. 02	S. 0	N.W. 25			No. 4 5				Fog 1	Cl. 4 5											
The Year	H. 30 48	H. 81	H. 92	H. 80	E. 27	S.E. 131			No. 1 382				Cle. 494	Cl. 1 129					1.760	30.674	308	005	666	24.768	061
	L. 28 92	L. 18		L. 12	W. 46	S.W. 500			No. 2 560				Rain 95	Cl. 2 228											
	M. 28 78	M. 48		M. 46	N. 28	N.E. 158			No. 3 137				Snow 08	Cl. 3 98											
	V. 01 56	V. 63		V. 68	S. 23	N.W. 185			No. 4 19				Fog 13	Cl. 4 33											

1793	BAROM.	Ther. Shade.	Ther. Sun.	Hygr.	WINDS. Points.				WINDS. Strength.		WEATHER.			RAIN. greatest in 1 day.	RAIN. total in month.	EVAPORATION. greatest in 1 day.	EVAPORATION. least in 1 day.	EVAPORATION. mean daily.	EVAPORATION. total in month.	DEW. total in month.
Jan.	H. 30 50	H. 48	H. 52	H. 98	E. 0	S.E. 9			No. 1 6		Clear 33	Cl. 1 12		2.320	2.864	052	008	012	0.381	000
	L. 29 00	L. 24		L. 30	W. 3	S.W. 46			No. 2 87		Rain 7	Cl. 2 20								
	M. 28 99	M. 37		M. 49	N. 3	N.E. 17			No. 3 0		Snow 0	Cl. 3 11								
	V. 01 50	V. 24		V. 68	S. 2	N.W. 13			No. 4 0		Fog 3	Cl. 4 7								
Feb.	H. 30 15	H. 48	H. 58	H. 78	E. 0	S.E. 3			No. 1 10		Clear 37	Cl. 1 4		0.640	1.255	050	005	025	0.708	000
	L. 29 20	L. 28		L. 50	W. 18	S.W. 44			No. 2 66		Rain 5	Cl. 2 25								
	M. 29 68	M. 40		M. 66	N. 1	N.E. 2			No. 3 5		Snow 0	Cl. 3 7								
	V. 00 95	V. 20		V. 28	S. 2	N.W. 14			No. 4 3		Fog 0	Cl. 4 6								
Mar.	H. 30 25	H. 60	H. 65	H. 80	E. 6	S.E. 1			No. 1 34		Clear 41	Cl. 1 6		0.380	2.041	058	005	025	0.794	000
	L. 29 00	L. 32		L. 40	W. 10	S.W. 49			No. 2 33		Rain 5	Cl. 2 21								
	M. 29 77	M. 41		M. 65	N. 0	N.E. 27			No. 3 21		Snow 0	Cl. 3 14								
	V. 01 25	V. 28		V. 40	S. 0	N.W. 0			No. 4 5		Fog 0	Cl. 4 6								
Apr.	H. 30 20	H. 56	H. 75	H. 78	E. 6	S.E. 13			No. 1 0		Clear 51	Cl. 1 7		1.135	2.917	102	012	058	1.746	000
	L. 29 45	L. 31		L. 15	W. 5	S.W. 10			No. 2 86		Rain 4	Cl. 2 18								
	M. 29 92	M. 41		M. 51	N. 3	N.E. 21			No. 3 4		Snow 1	Cl. 3 5								
	V. 00 75	V. 25		V. 63	S. 1	N.W. 31			No. 4 0		Fog 0	Cl. 4 4								
May	H. 30 40	H. 64	H. 78	H. 70	E. 6	S.E. 11			No. 1 1		Clear 51	Cl. 1 5		0.136	0.635	148	063	085	2.641	000
	L. 29 30	L. 40		L. 15	W. 3	S.W. 13			No. 2 89		Rain 2	Cl. 2 24								
	M. 29 93	M. 48		M. 44	N. 7	N.E. 10			No. 3 3		Snow 0	Cl. 3 9								
	V. 01 10	V. 24		V. 55	S. 0	N.W. 42			No. 4 0		Fog 0	Cl. 4 2								
June	H. 30 10	H. 74	H. 85	H. 60	E. 2	S.E. 9			No. 1 5		Clear 36	Cl. 1 8		0.720	1.206	230	055	113	3.418	000
	L. 29 70	L. 46		L. 15	W. 0	S.W. 43			No. 2 83		Rain 2	Cl. 2 34								
	M. 29 92	M. 56		M. 31	N. 3	N.E. 6			No. 3 2		Snow 0	Cl. 3 8								
	V. 00 40	V. 28		V. 45	S. 1	N.W. 26			No. 4 0		Fog 0	Cl. 4 2								
July	H. 30 25	H. 88	H. 110	H. 80	E. 5	S.E. 3			No. 1 15		Clear 61	Cl. 1 8		1.200	2.246	375	010	165	5.131	000
	L. 29 80	L. 50		L. 05	W. 2	S.W. 50			No. 2 78		Rain 4	Cl. 2 5								
	M. 29 99	M. 64		M. 39	N. 1	N.E. 22			No. 3 0		Snow 0	Cl. 3 11								
	V. 00 45	V. 38		V. 75	S. 0	N.W. 10			No. 4 0		Fog 0	Cl. 4 0								
Aug.	H. 30 30	H. 80	H. 98	H. 70	E. 4	S.E. 20			No. 1 16		Clear 58	Cl. 1 5		0.665	1.430	300	087	136	4.231	008
	L. 29 45	L. 50		L. 20	W. 8	S.W. 41			No. 2 67		Rain 4	Cl. 2 14								
	M. 29 92	M. 60		M. 45	N. 1	N.E. 2			No. 3 10		Snow 0	Cl. 3 8								
	V. 00 85	V. 30		V. 30	S. 1	N.W. 16			No. 4 0		Fog 0	Cl. 4 4								
Sept.	H. 30 30	H. 68	H. 74	H. 75	E. 0	S.E. 0			No. 1 46		Clear 27	Cl. 1 19		0.660	2.902	175	015	076	2.290	035
	L. 29 35	L. 43		L. 38	W. 6	S.W. 43			No. 2 42		Rain 14	Cl. 2 20								
	M. 29 94	M. 53		M. 49	N. 1	N.E. 17			No. 3 2		Snow 0	Cl. 3 4								
	V. 00 95	V. 25		V. 37	S. 4	N.W. 19			No. 4 0		Fog 4	Cl. 4 2								
Oct.	H. 30 55	H. 68	H. 83	H. 80	E. 0	S.E. 9			No. 1 17		Clear 47	Cl. 1 3		1.150	1.504	084	020	052	1.629	036
	L. 29 15	L. 33		L. 50	W. 10	S.W. 59			No. 2 71		Rain 6	Cl. 2 14								
	M. 29 95	M. 51		M. 61	N. 0	N.E. 3			No. 3 5		Snow 0	Cl. 3 13								
	V. 01 40	V. 35		V. 30	S. 0	N.W. 12			No. 4 0		Fog 4	Cl. 4 6								
Nov.	H. 30 34	H. 57	H. 59	H. 90	E. 6	S.E. 32			No. 1 0		Clear 41	Cl. 1 6		0.410	2.139	063	010	019	0.591	044
	L. 29 00	L. 28		L. 50	W. 4	S.W. 18			No. 2 87		Rain 7	Cl. 2 14								
	M. 29 61	M. 45		M. 45	N. 8	N.E. 10			No. 3 3		Snow 0	Cl. 3 12								
	V. 01 34	V. 29		V. 40	S. 2	N.W. 10			No. 4 0		Fog 1	Cl. 4 9								
Dec.	H. 30 34	H. 56	H. 56	H. 90	E. 0	S.E. 9			No. 1 0		Clear 13	Cl. 1 8		0.390	2.402	030	005	008	0.265	000
	L. 28 45	L. 28		L. 55	W. 2	S.W. 46			No. 2 86		Rain 17	Cl. 2 28								
	M. 29 70	M. 42		M. 75	N. 0	N.E. 30			No. 3 7		Snow 0	Cl. 3 9								
	V. 01 89	V. 28		V. 35	S. 0	N.W. 6			No. 4 0		Fog 8	Cl. 4 10								
The Year	H. 30 55	H. 88	H. 110	H. 98	E. 35	S.E. 119			No. 1 150		Cle. 496	Cl. 1 91		2.320	23.541	375	005	064	23.825	123
	L. 28 45	L. 24		L. 05	W. 71	S.W. 462			No. 2 875		Ra. 77	Cl. 2 241								
	M. 30 61	M. 48		M. 51	N. 28	N.E. 167			No. 3 62		Snow 1	Cl. 3 111								
	V. 02 10	V. 64		V. 93	S. 13	N.W. 200			No. 4 8		Fog 20	Cl. 4 58								

1794	BAROM.	Ther. Shade.	Ther. Sun.	Hygr.	WINDS. Points.				WINDS. Strength.		WEATHER.		RAIN. greateſt in 1 day.	RAIN. total in month.	EVAPORATION. greateſt in 1 day.	EVAPORATION. leaſt in 1 day.	EVAPORATION. mean daily.	DEW. total in month.	DEW. total in month.
Jan.	H. 30 50	H. 50	H. 50	H. 95	E. 7	S.E. 3			No. 1 0		Clear 34	Cl. 1 2	425	855	055	010	006	199	000
	L. 28 40	L. 20		L. 60	W. 2	S.W. 41			No. 2 86		Rain 2	Cl. 2 13							
	M. 30 09	M. 34		M. 72	N. 2	N.E. 20			No. 3 4		Snow 3	Cl. 3 21							
	V. 02 10	V. 30		V. 35	S. 0	N.W. 18			No. 4 3		Fog 7	Cl. 4 11							
Feb.	H. 30 30	H. 62	H. 64	H. 90	E. 0	S.E. 3			No. 1 9		Clear 41	Cl. 1 0	285	804	135	025	038	1.073	000
	L. 29 40	L. 34		L. 45	W. 0	S.W. 68			No. 2 52		Rain 6	Cl. 2 15							
	M. 28 62	M. 47		M. 71	N. 2	N.E. 0			No. 3 23		Snow 0	Cl. 3 20							
	V. 00 90	V. 28		V. 45	S. 4	N.W. 7			No. 4 0		Fog 0	Cl. 4 2							
Mar.	H. 30 50	H. 70	H. 85	H. 90	E. 0	S.E. 6			No. 1 4		Clear 45	Cl. 1 0	620	1.787	145	005	046	1.453	003
	L. 29 40	L. 40		L. 40	W. 2	S.W. 58			No. 2 76		Rain 18	Cl. 2 8							
	M. 29 92	M. 46		M. 69	N. 0	N.E. 24			No. 3 11		Snow 0	Cl. 3 8							
	V. 01 10	V. 30		V. 50	S. 3	N.W. 0			No. 4 2		Fog 7	Cl. 4 7							
Apr.	H. 30 40	H. 78	H. 85	H. 92	E. 4	S.E. 12			No. 1 47		Clear 52	Cl. 1 0	270	1.528	170	040	094	2.827	000
	L. 29 05	L. 42		L. 15	W. 1	S.W. 44			No. 2 26		Rain 13	Cl. 2 9							
	M. 30 07	M. 51		M. 56	N. 5	N.E. 5			No. 3 16		Snow 0	Cl. 3 13							
	V. 01 35	V. 36		V. 77	S. 6	N.W. 13			No. 4 1		Fog 0	Cl. 4 3							
May	H. 30 60	H. 68	H. 74	H. 75	E. 3	S.E. 5			No. 1 9		Clear 46	Cl. 1 0	1.300	2.635	205	020	107	3.340	017
	L. 29 40	L. 40		L. 20	W. 1	S.W. 29			No. 2 67		Rain 10	Cl. 2 16							
	M. 29 92	M. 52		M. 41	N. 4	N.E. 18			No. 3 17		Snow 0	Cl. 3 15							
	V. 01 20	V. 28		V. 55	S. 0	N.W. 33			No. 4 0		Fog 0	Cl. 4 6							
June	H. 30 30	H. 80	H. 90	H. 68	E. 15	S.E. 3			No. 1 12		Clear 58	Cl. 1 1	250	507	270	040	180	5.400	000
	L. 29 65	L. 45		L. 15	W. 9	S.W. 4			No. 2 69		Rain 1	Cl. 2 16							
	M. 30 00	M. 58		M. 46	N. 0	N.E. 25			No. 3 9		Snow 0	Cl. 3 8							
	V. 00 65	V. 35		V. 53	S. 3	N.W. 31			No. 4 0		Fog 0	Cl. 4 6							
July	H. 30 35	H. 79	H. 92	H. 50	E. 7	S.E. 0			No. 1 43		Clear 49	Cl. 1 4	200	815	286	110	219	6.809	000
	L. 29 15	L. 58		L. 15	W. 12	S.W. 51			No. 2 49		Rain 2	Cl. 2 26							
	M. 29 90	M. 66		M. 34	N. 0	N.E. 16			No. 3 1		Snow 0	Cl. 3 6							
	V. 01 20	V. 21		V. 35	S. 2	N.W. 5			No. 4 0		Fog 0	Cl. 4 6							
Aug.	H. 30 30	H. 76	H. 92	H. 55	E. 0	S.E. 3			No. 1 44		Clear 44	Cl. 1 3	260	1.331	220	030	141	4.376	000
	L. 29 55	L. 50		L. 15	W. 5	S.W. 34			No. 2 44		Rain 5	Cl. 2 15							
	M. 30 97	M. 61		M. 48	N. 1	N.E. 20			No. 3 5		Snow 0	Cl. 3 15							
	V. 00 75	V. 26		V. 40	S. 0	N.W. 30			No. 4 0		Fog 0	Cl. 4 11							
Sept.	H. 30 30	H. 66	H. 72	H. 70	E. 0	S.E. 12			No. 1 18		Clear 36	Cl. 1 4	2.391	4.433	095	015	056	1.705	000
	L. 29 40	L. 36		L. 40	W. 5	S.W. 22			No. 2 61		Rain 12	Cl. 2 19							
	M. 29 82	M. 55		M. 61	N. 0	N.E. 27			No. 3 11		Snow 0	Cl. 3 9							
	V. 00 90	V. 30		V. 30	S. 0	N.W. 24			No. 4 0		Fog 0	Cl. 4 10							
Oct.	H. 30 30	H. 68	H. 72	H. 70	E. 1	S.E. 2			No. 1 17		Clear 45	Cl. 1 0	750	4.968	090	010	039	1.228	018
	L. 29 15	L. 36		L. 40	W. 3	S.W. 57			No. 2 70		Rain 22	Cl. 2 11							
	M. 29 76	M. 52		M. 54	N. 0	N.E. 3			No. 3 5		Snow 0	Cl. 3 11							
	V. 01 15	V. 32		V. 30	S. 4	N.W. 23			No. 4 1		Fog 0	Cl. 4 4							
Nov.	H. 30 10	H. 60	H. 60	H. 80	E. 0	S.E. 23			No. 1 13		Clear 31	Cl. 1 0	680	4.525	040	010	016	506	010
	L. 29 10	L. 30		L. 40	W. 0	S.W. 45			No. 2 64		Rain 17	Cl. 2 23							
	M. 29 84	M. 55		M. 59	N. 0	N.E. 13			No. 3 12		Snow 0	Cl. 3 11							
	V. 01 00	V. 30		V. 40	S. 3	N.W. 6			No. 4 1		Fog 2	Cl. 4 6							
Dec.	H. 30 40	H. 60	H. 60	H. 75	E. 7	S.E. 6			No. 1 22		Clear 40	Cl. 1 1	535	1.260	060	010	007	237	038
	L. 29 65	L. 20		L. 50	W. 2	S.W. 21			No. 2 64		Rain 4	Cl. 2 9							
	M. 29 89	M. 38		M. 57	N. 0	N.E. 24			No. 3 4		Snow 5	Cl. 3 15							
	V. 00 75	V. 40		V. 25	S. 17	N.W. 16			No. 4 3		Fog 9	Cl. 4 10							
The Year	H. 30 60	H. 80	H. 92	H. 95	E. 44	S.E. 78			No. 1 238		Cle. 521	Cl. 1 15	2.391	25.448	286	010	079	29.153	086
	L. 28 40	L. 20		L. 15	W. 42	S.W. 474			No. 2 728		Ra. 112	Cl. 2 180							
	M. 29 90	M. 51		M. 55	N. 14	N.E. 195			No. 3 118		Snow 8	Cl. 3 152							
	V. 02 20	V. 60		V. 80	S. 42	N.W. 206			No. 4 11		Fog 25	Cl. 4 82							

A Comparative View of the Quantity of Rain *and* Evaporation *in every Month for Nine Years*—1786—1794.

	1786.	1787.		1788.		1789.		1790.		1791.		1792.		1793.		1794.	
	Rain.	Rain.	Evap.	Rain.	Evap.	Rain.	Evap.	Rain.	Evap.	Rain.	Evap.	Rain.	Evap.	Rain.	Evap.	Rain.	Evap.
Jan.	3.059	0.676	0.192	0.736	0.794	2.521	0.403	0.806	0.934	4.442	0.888	2.069	0.604	2.864	0.381	0.855	0.199
Feb.	0.760	1.214	0.661	2.598	0.597	2.208	0.989	0.232	1.333	3.388	0.831	2.360	1.149	1.255	0.708	0.804	1.073
Mar.	1.483	2.097	1.754	1.406	1.432	1.478	0.792	0.156	1.985	0.986	1.853	2.391	1.224	2.041	0.794	1.787	1.453
April	1.102	1.064	2.671	0.675	2.061	1.241	3.571	2.153	3.000	1.688	2.460	3.566	2.967	2.917	1.746	1.528	2.827
May	2.161	1.693	4.793	1.246	5.003	1.708	4.419	1.918	3.922	0.493	4.486	1.358	2.796	0.635	2.641	2.635	3.340
June	1.805	0.731	4.873	3.457	4.863	2.574	3.719	0.509	5.894	1.039	5.005	2.147	3.087	1.206	3.418	0.507	5.400
July	0.618	5.139	3.104	2.143	5.421	2.563	4.661	2.296	4.217	2.373	4.274	5.195	2.739	2.246	5.131	0.815	6.809
Aug.	2.389	1.102	4.855	2.738	4.248	1.459	5.252	2.671	3.996	1.040	4.951	3.940	5.531	1.430	4.231	1.331	4.376
Sept.	2.726	1.000	2.596	2.859	2.408	2.367	3.106	0.497	3.034	0.419	3.956	2.053	1.829	2.902	2.290	4.433	1.705
Oct.	3.279	2.774	1.632	0.168	1.941	4.030	2.567	1.266	1.823	2.327	1.446	2.761	1.164	1.504	1.629	4.968	1.228
Nov.	2.948	2.191	0.688	0.735	0.789	2.705	0.789	3.194	1.049	3.600	1.245	0.637	1.108	2.139	0.591	4.525	0.506
Dec.	1.466	3.493	0.290	0.049	0.050	0.791	1.163	3.223	0.715	1.695	0.510	2.197	0.570	2.402	0.265	1.260	0.237
Total	23.796	23.174	28.109	18.810	29.607	25.645	31.481	18.721	31.902	23.490	31.905	30.674	24.768	23.541	23.825	25.448	29.153

The Mean of Nine Years, is—of RAIN, 23.699—of EVAPORATION, 25.638.

The Higheſt, Loweſt, and Mean Height, and the Greateſt Variation of the Barometer, Thermometer, *and* Hygrometer, *for Nine Years*—1786—1794.

	Barom.	Therm.	Hygrom.
Higheſt	30.73	88	127
Loweſt	28.40	11	5
Mean	29.66	48	56
Variation	02.33	77	122

The Mean Number of Obſervations of the Direction of the Winds *for Nine Years, have been in the following Proportion:*

E. 63	S. E. . . . 70
W. . . . 107	S. W. . . 448
N. 43	N. E. . . 159
S. 48	N. W. . . 155

The Mean Number of Obſervations of the Appearances of the Sky, *for Nine Years, have been in the following Proportion:*

Clear . . . 380	Cloudy 1 140
Rain 78	Cloudy 2 173
Snow 7	Cloudy 3 113
Foggy . . . 12	Cloudy 4 68