Practical observations on the intermittent fever of Peru ... / [Mathie Hamilton].

Contributors

Aliquis.
Hamilton, Mathie.
University of Glasgow. Library

Publication/Creation

Glasgow, 1842.

Persistent URL

https://wellcomecollection.org/works/g459hrtd

Provider

University of Glasgow

License and attribution

This material has been provided by This material has been provided by The University of Glasgow Library. The original may be consulted at The University of Glasgow Library. where the originals may be consulted.
This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org

GLASGOW
UNIVERSITY
Medical
LIBRARY.
XXXIII. 4. 19.
NH. 12. 5

Digitized by the Internet Archive
in 2016

https://archive.org/details/b24926449

OBSERVATIONS

ON THE

HISTORY AND CURE

OF THE

ASTHMA;

IN WHICH THE PROPRIETY OF USING

THE COLD BATH IN THAT DISORDER

IS FULLY CONSIDERED.

BY MICHAEL RYAN, M. D.

AND MEMBER OF THE ROYAL ANTIQUARIAN SOCIETY

OF EDINBURGH.

LONDON:

PRINTED FOR G. G. J. AND J. ROBINSON,

PATERNOSTER-ROW.

1793.

OBSERVATIONS

ON THE

HISTORY AND CURE

OF THE

ASTHMA;

IN WHICH THE PROPRIETY OF USING

THE COLD BATH IN THAT DISORDER

IS FULLY CONSIDERED.

BY MICHAEL KIAH, M. D.

AND MEMBER OF THE ROYAL ANTIQUARIAN SOCIETY

OF EDINBURGH.

33 4 17

112 54
5 3

1793.

PREFACE.

AMONG the various chronic complaints to which the human frame is liable, very few can be conſidered of a more formidable nature than a confirmed aſthma. The idea of its being an incurable diſorder, its threatening inſtant ſuffocation at every attack, are circumſtances altogether ſo alarming to a patient, as muſt neceſſarily weaken and depreſs a mind endowed with the utmoſt fortitude and reſignation. Any remedy then that could be found capable of adminiſtering permanent relief, to a perſon in ſuch an afflicting ſituation, muſt be looked upon as of the utmoſt importance to mankind.

Unhappily, however, the efforts of phyſicians hitherto, in the aſthma, have generally failed in that reſpect. Hence it is,

that they have ſeldom in view a radical cure in their treatment of aſthma: conſcious of the inefficacy of the preſent practice for producing ſuch an effect, they content themſelves with medicines to alleviate pain, and ſeek not for a balſam to conſolidate the wound.

Very lately, indeed, a particular medicine has been highly extolled by an induſtrious and ingenious phyſician, and is ſaid by him to have repeatedly effected complete cures. How far this remedy may be entitled to ſuch high encomiums, it will probably require the teſt of future experiment to determine. Leaving this matter to be ſettled by other practitioners, it is the Author's intention to recommend, in the following Eſſay, a different mode of treating the aſthma, which facts and obſervations evince to be of very conſiderable efficacy in the cure of this diſorder.

Cold-

Cold-bathing has been mentioned as a remedy for aſthma by a few practitioners, but it never has been conſidered of ſuch utility as to bring it into any general repute. The timidity of phyſicians, or a want of confidence in ſuch a practice, has raiſed a prejudice againſt it, as may be ſeen by peruſing the late writings of ſome of the moſt eminent in the profeſſion, wherein the cold-bath is not numbered in the catalogue of remedies.

To be diſmayed, however, by ſuch a conſideration, would argue a weak and ſlaviſh attachment to the ſyſtems of men of character, and betray a dread of making any innovation dangerous to opinions eſtabliſhed by high authority. In no caſe whatſoever is ſuch ſervility more unpardonable than in the preſent, as in no diſorder is there probably greater room for improvement, from the fluctuating and unſucceſsful

ful ſtate of the practice in aſthma: an undertaking, therefore, to diſcover how far cold-bathing is adapted to its cure, does not ſeem to require an apology, but merits ſome attention from the Public.

As it is the principal object of this Eſſay, to conſider the effects of cold-bathing on aſthmatics, and by facts and cautious deductions to render the practice as univerſal as poſſible, the Author, of courſe, cannot enter into a full diſcuſſion of the hiſtory and cure of the diſorder after the manner of former writers. Several obſervations, nevertheleſs, have occurred to him on each of theſe ſubjects; and as, in his opinion, many of them have been made with accuracy, he thinks it his duty to impart them to the Public.

Kilkenny, July 1, 1792.

CONTENTS

CONTENTS.

PART I.

CHAP. I.

DIFFERENCE of Opinion between the Ancients and Moderns on the Nature of Aſthma—The Diſorder, at Times, aſſumes a continued Type, without any Obſtruction, but merely from a ſpaſmodic Affection - Page 3

CHAP. II.

The Aſthma aſcribed to various Cauſes —The Analogy of other ſpaſmodic Complaints reſorted to—The Lower Order of People and Artiſans moſt liable

liable to the Aſthma—Effects of the Aſthma miſtaken for its Cauſes Page 20

CHAP. III.

The Application of Cold the moſt frequent Cauſe of Aſthma—The Hyſteric, Flatulent, and other Species of Nervous Aſthma, proved from Facts to be the Effect of Cold—The Opinion of Hippocrates and other ancient Writers on the Cauſes of Aſthma—Dr. Millar's Explanation of the Aſthma of Infants refuted — 39

CHAP. IV.

The Aſthma not in general an incurable Diſorder, if attended to early—When it ariſes from Cold, will often readily admit of a Cure — 81

CHAP. V.

The different Remedies employed in the Cure of Aſthma—Bleeding—Bliſtering—

ing—Emetics—Iſſues—Antiſpaſmodics—Their uſe in the Aſthma—Tonics, the Neceſſity of employing them in order to obtain a radical Cure—Peruvian Bark—Flowers of Zinc—Their Mode of operation Page 87

PART II.

CHAP. VI.

Authorities in ſupport of Cold-Bathing in the Aſthma—Cælius Aurelianus, Sir John Floyer, Dr. Smollet—Obſervations on what they have advanced on this Subject—Caſes ſhewing the Efficacy of this Practice in Aſthma 131

CHAP. VII.

Defence of the Practice of Cold-Bathing in the Aſthma—The Suppreſſion of Perſpiration during the Time of Immerſion in Cold Water, productive of

no bad Conſequence in healthy Subjects—Reaſons aſſigned for this—Various Arguments adduced, tending to prove, that Cold-Bathing cannot, in general, be injurious to the Lungs of Aſthmatics — Page 169

CHAP. VIII.

The different Species of Aſthma in which the Practice of Cold-Bathing is inadmiſſible — — 199

CHAP. IX.

Directions for Aſthmatics how to make uſe of this Remedy with ſafety 221

OBSERVATIONS, &c.

CHAP. I.

EVER ſince it became faſhionable in phyſic to explain the diſorders of the human body by means of the nervous ſyſtem, phyſicians conſider themſelves as having very much improved upon the ancients both with reſpect to their hiſtory and cure.

In a particular manner, the aſthma may be ſaid to have undergone a change that reflects no inconſiderable degree of luſtre on this reformation.

That ſome advantage has reſulted to me-

dicine at large from the modern pathology, it would be unfair to deny; but it would argue an equal want of candour not to admit, that however ſpecious and ſeemingly concluſive the reaſonings of modern writers may appear, very little real or ſolid benefit have aſthmatics derived from their doctrines and opinions.

On turning over the writings of the ancients, we find that the aſthma has been pointed out as a diſtinct diſorder from other affections of the cheſt; and though ſome inaccuracy and confuſion may be detected in their deſcriptions, by thoſe who wiſh to find fault with every information coming from this ſource, and who religiouſly adhere to the definitions of modern writers, nevertheleſs an unprejudiced reader will readily diſcover thoſe ſtrong and peculiar features of the diſeaſe amply delineated in moſt of the ancient writings.

It is true that, from a very early period down to nearly the preſent time, the title of aſthma has been often indiſcriminately given to many different complaints of the lungs: but ſtill the characteriſtic marks of a ſpaſmodic affection of the lungs are preſerved in every work of eminence, and are accurately drawn by almoſt every pen.

Sir John Floyer himſelf, who had ſo much experience in this diſeaſe, and who has deſcribed its various ſymptoms with ſuch minuteneſs and preciſion, has fallen into this error, if with propriety it can be called ſuch; for he arranges, under the head of aſthma, ſeveral diſorders of the lungs that have not the ſmalleſt affinity to a ſpaſmodic, or what we in theſe days ſtrictly denominate aſthma.

In another point of view, that merits ſome attention, we find the ancients and

moderns differ very materially. In the writings of the former, we find the paroxyſm of the diſorder and all its attending ſymptoms judiciouſly drawn, its periodical return very frequently mentioned, with every other circumſtance that could be ſuppoſed to aſſiſt in elucidating its hiſtory; but with this difference, that in the intervals of the fits the breathing is alleged to be difficult and diſtreſſing: while the latter, conſidering every ſuch permanent affection of the lungs as the offspring of inflammation, obſtruction, &c. inſiſt that a complete intermiſſion between each fit, and a total freedom from diſeaſe, are neceſſary to conſtitute the eſſential and pathognomonic ſigns of this diſeaſe.

In order to decide on this point with impartiality, and to ſettle, if poſſible, this contrariety of opinion, it is neceſſary to take a

view

view of the aſthma as it occurs in different perſons in this climate.

Every practitioner who has attended to the phenomena of aſthma, muſt acknowledge the diſeaſe to be very conſtantly of a mixed and complicated nature, the ſpaſmodic affection being often combined with obſtruction from fluids accumulated in the lungs, or from ſome other very powerful cauſe. Hence it often changes from an intermitting to a continued type. This is ſuppoſed by moſt of the modern writers to take place in an advanced ſtage of the diſeaſe. They aſcribe it to tubercles, water in the cheſt, &c. brought on by repeated fits of the aſthma. But the ſame attentive obſervation ſhould inform every practitioner, that even in an early ſtage the aſthma is often of a doubtful nature, and aſſumes a continued type, at a time when there is not

a poſſibility of diſcovering any obſtruction that could give it this appearance of a conſtant and a permanent affection of the lungs.

This, however, is not the opinion generally inculcated in the writings on aſthma. If, after it has once been eſtabliſhed in the conſtitution, it ſhould happen to aſſume for any time a continued type, it is conſidered to be of a very formidable nature, and to ariſe from cauſes that are ſeldom in the power of medicine to remove. Thus Sir John Floyer ſays, "When the aſthma con-
"tinues for ſome months, it is a true pul-
"monic aſthma, and depends on ſome
"diſeaſe in the breaſt, as dropſy, tubercle,
"abſceſs, which compreſs the bronchia; and
"till that evident cauſe be removed, it is
"impoſſible to cure the aſthma fits*."

* Treatiſe on the Aſthma, p. 120.

But

But Sir John's own caſe is in direct oppoſition to this aſſertion: for he laboured under the aſthma at leaſt thirty years when he publiſhed his Treatiſe; and at that time he ſhewed no ſymptoms of obſtruction, abſceſs, or any ſuch diſorder of the lungs.

In fact, we have frequent inſtances of perſons living to an advanced age, in whom the aſthma conſtantly changes from an intermitting form to a continued one, and, after remaining in this ſtate for a conſiderable time, returns to its original ſhape without the aſſiſtance of medicine: thus Proteus-like varying its features and appearance according to the cauſes that may have been applied, to the habit of body, and other circumſtances of the patient.

In ſuch caſes it would be irrational to ſuppoſe that either tubercle or abſceſs gave origin to the difficult breathing, as theſe diſ-

orders

orders generally carry ſymptoms of mortality with them, and ſeldom fail to produce an affection of the breathing that ſcarcely ſuffers any intermiſſion.

The preſent generally received opinion on certain points in phyſiology, has probably had not a little influence on the minds of phyſicians with reſpect to the hiſtory of this diſeaſe. In conformity to the principles of this ſyſtem, they conſider it to be incompatible with the laws of the animal œconomy, that ſpaſm, properly ſo called, can ſubſiſt for any conſiderable length of time without being alternated by a ſtate of relaxation. This doctrine I ſhall not now attempt to combat; but I can venture to ſay, that I have ſeen perſons ſubject to frequent attacks of aſthma, who, in the intervals of the fits, were affected with a ſpecies of difficult breathing continuing for days, and ſometimes

times for weeks, that evidently appeared to be of a ſpaſmodic nature.

The caſe of M'Bay, to be given hereafter, is ſtrictly in point, and highly illuſtrates this ſubject: for he had recourſe to cold bathing with advantage, and perſevered in its uſe while he laboured under ſtricture at the ſternum, diſtenſion of the ſtomach, cough, uneaſineſs of breathing, with other ſymptoms clearly indicating a ſpaſmodic affection.

It is ſcarcely neceſſary to mention, that, if obſtruction of any kind had a ſhare in bringing on this diſorder, cold bathing would have been attended with very ſerious conſequences. This is not the only inſtance of the kind that I had an opportunity of ſeeing: ſeveral others equally characteriſtic have fallen under my obſervation.

In ſome of them it appeared that the application

plication of cold to the lungs in a ſlight degree, was the principal exciting cauſe of the ſymptoms, though no catarrhal affection was preſent at the time; while in others they ſeemed to be the remains of the preceding paroxyſm not thrown off completely by the conſtitution, or ſubdued by the remedies employed *.

Beſides

* Doctor Withers has, in my opinion, very properly directed his attention to thoſe caſes wherein the aſthma is complicated with ſome other complaint of the lungs. He juſtly obſerves, that, when the humoural aſthma is united to the convulſive, the patient's breathing is often difficult and diſturbed after the fit is over, and continues in that ſtate from the concluſion of one paroxyſm to the beginning of another. This he attributes to a quantity of phlegm collected in the air veſicles of the lungs, which haraſſes the patient until it is diſlodged by expectorating medicines, or ſome other cauſe.

Treatiſe on the Aſthma, p. 10.

But even in many caſes of this kind, the ſtricture at the ſternum juſt now mentioned, and which is evidently of a ſpaſmodic nature, will be often found to accompany this form of the diſeaſe, and to aggravate every prevailing ſymptom.

Beſides this appearance of the diſorder in the abſence of the fits, anomalous ſymptoms of aſthma very frequently occur without any regularly formed paroxyſm; and, as far as can be collected from their complexion and other circumſtances, they appear to be of the ſame ſpaſmodic nature with thoſe juſt now deſcribed.

An author who undertakes to publiſh the hiſtory of any diſeaſe, is highly blameable if he omit to detail at full length thoſe ſymptoms that ariſe during its progreſs, and that are found in any reſpect neceſſary for determining its juſt and preciſe character.

ſymptom. On no other ſuppoſition can we account for the oppreſſed and difficult breathing that ſometimes occurs between the fits. The catarrhal affection no doubt will often contribute to produce this effect; but it is on many occaſions altogether ſo ſlight and trivial, that it would be highly abſurd to ſuppoſe it capable of producing ſuch an affection of the breathing as we muſt often meet with in the abſence of the fits.

It is not alone ſufficient to delineate ſuch ſymptoms as preſent themſelves in the beginning of the diſeaſe: it is on many occaſions abſolutely neceſſary to attend minutely to thoſe that come on at a later period, and are found to diſturb the phenomena in ſuch a manner as to give it the appearance of a diſorder totally different to what it was at its commencement*.

Phyſicians think they have fully diſcharged their duty, if, after deſcribing the patient's ſituation previous to the fit, they bring you to his bedſide, point out with ac-

* Secundo, ea ſymptomata pro notis characteriſticis præcipue ſeligenda putavi quæ perpetuo cum morbo præſentia ſunt, et hoc quidem ſemper annitendum eſſe putavi. Cum vero plurimi morbi ſub eorum decurſu aliam atque aliam omnino formam capiant, in his ex ſerie rerum, et ſymptomatum ſibi invicem ſuccedentium, character ſæpe neceſſario petendus eſt.

Prolegomen. Synopſ. Noſol. Method. Cullen. vol. ii. p. 32.

curacy

curacy the peculiar noiſe of his breathing, the appearance of his countenance, the ſtate of his pulſe, and of every other function that happened at the time to be deranged; then inform you, that as ſoon as theſe ſymptoms diſappear, they leave the patient totally free from diſeaſe, but ſubject to attacks of a ſimilar nature at any future period.

A perſon who has had any experience in the aſthma, muſt be poſſeſſed of little or no talents for obſervation, who would conſider ſuch a hiſtory as this ſufficient for directing a phyſician to form a juſt diagnoſtic in the variety of caſes that daily occur: for though it were admitted to be the ordinary aſpect that the aſthma wears, the deviations from this appearance of the diſeaſe are altogether ſo frequent, as will neceſſarily perplex practitioners if not ſufficiently on their guard; at leaſt I have found myſelf very much em-

barraſſed

barraſſed at times, after carefully peruſing the beſt obſervations to be met with on its hiſtory.

In this ſtate of uncertainty, I have been greatly aſſiſted by attending to the following circumſtances:—If the cheſt continue engaged in the abſence of the fits without any obſtruction or collection of phlegm in the lungs, the patient complains of a ſtricture at the ſternum, ſomewhat analogous to the tightneſs that occurs in the fit, but in a ſlighter degree: his breathing, though not difficult or much oppreſſed, is by no means totally diſengaged: he has a ſenſation of ſome weight preſſing on his cheſt, that ſeems to diminiſh its cavity, and prevent the dilatation of the lungs. There is a peculiarity in the ſound of the cough and breathing, in theſe caſes, that ſhould be cloſely attended to, and they will be in general

general diſcovered, by perſons of a nice ear, to proceed from the lungs in a ſtate of ſpaſmodic conſtriction.

The ſtomach participates of the affection of the lungs, and is frequently diſturbed with flatulence and other ſymptoms expreſſive of the deranged ſtate of its functions. The pulſe, on theſe occaſions, ſhould not be paſſed by unnoticed; and it will, for the moſt part, be found either of a natural quickneſs, or ſomewhat below the ordinary ſtandard of a healthy perſon. If the latter ſhould happen to be the caſe, lowneſs of ſpirits, and other ſigns of an hypochondriacal affection, will be found its conſtant attendants.

On the whole, if a perſon (after having peruſed the hiſtory of this diſeaſe as delivered by the ancient and modern writers) compares without prejudice their obſerva-

tions with what is preſented to his view in actual practice, he will probably agree with me, that, notwithſtanding the multiplicity of caſes daily occurring, wherein the breathing is perfectly free in the intervals of the fits, inſtances of aſthmatics will be frequently met with, whoſe breathing continues affected long after the violent fits have paſſed off, and at a time when no mark or veſtige of obſtruction could be diſcovered in the lungs.

Such are the remarks that have occurred to me, on conſidering the hiſtory of this intricate and ſtubborn diſorder. I have very little doubt but that objections may be made to the hints I have ſuggeſted. However, it is ſome conſolation to me, to find that I am ſupported in my opinion by one of the brighteſt ornaments of antiquity, and at the ſame time one of the moſt accurate obſervers

of the phenomena of diſeaſes, I mean the celebrated Aretæus, who finiſhes his excellent deſcription of the aſthma in the following remarkable words: εν ὅ τησι επανεσεσι κὴν ωειῶσι ορθοϛαδην τῦ παθεῶ φερυσι ξυμβολα.

De Sign. & Cauſ. Morb. p. 40. *

CHAP.

* In addition to what has already been ſaid on the nature of aſthma, it may not be unintereſting to make a few obſervations more by way of illuſtration. In the generality of aſthmatic attacks, after the paroxyſm has ſubſided, the patient ſtill feels the remains of the diſorder about him; his breathing, from a ſtricture acroſs his breaſt, is rendered uneaſy, and it continues in that ſtate till the ſucceeding fit comes on, when this and every other ſymptom ariſe to the ſame pitch as in the preceding. In this manner the diſorder generally goes on for ſeveral days, and then begins to diſappear inſenſibly, leaving the patient in a ſhort time free from aſthma, or any ſort of difficult breathing. This is allowed by phyſicians to be the ordinary courſe of things in a regular attack of ſpaſmodic or convulſive aſthma; and it is worthy of notice, that, even in this ſimple and uncombined ſtate of the diſeaſe, and whether it be of a ſhort or long duration, the uneaſineſs of breathing very

CHAP. II.

EVER ſince the aſthma became an object of attention with phyſicians, they have been diligently employed at different times in inveſtigating its cauſes, and never was there a greater diverſity of opinion diſplayed

frequently keeps its ground between the fits, and is principally kept up by the tightneſs of the cheſt juſt now mentioned. Moreover, when the diſorder is protracted to any conſiderable length, without any deciſive intermiſſion, it will very often be found that the paroxyſms of aſthma will abate of their violence, and almoſt totally vaniſh, while the tightneſs acroſs the cheſt, and its concomitant ſymptoms, will ſtill continue to haraſs the patient. This in truth is ſo often the caſe, that it is not a little extraordinary, that ſyſtematic writers, in their definitions of aſthma, ſhould inculcate no other idea than that of a periodical ſpaſmodic diſeaſe, without the ſmalleſt

played on any ſubject whatſoever. One writer aſcribes the diſeaſe to a defluxion on the lungs, a ſecond to plethora, a third to an affection of the nerves, and ſo on according to the ſyſtem that happened to pre-

ſmalleſt alluſion to a permanent affection, as may be ſeen by the annexed quotations.

Difficultas ſpirandi periodicè recurrens chronica.

SAUVAGE.

Reſpiratio difficilis periodica chronica cum ſenſu anguſtiæ in faucibus.

VOGEL.

Eſt chronica periodica reſpirandi difficultas.

SAGAR.

Spirandi difficultas per intervalla ſubiens, cum anguſtiæ in pectore ſenſu, et reſpiratione cum ſibilo ſtrepitu, tuſſis ſub initio paroxyſmi difficilis, vel nulla, verſus finem libera, cum ſputo muci ſæpe copioſo.

CULLEN.

I thought it unneceſſary to inſert the definition of Linnæus among the foregoing, as he runs into the oppoſite extreme, and defines ſome incurable obſtruction of the lungs, rather than a ſpaſmodic affection of theſe organs.

vail at the time. There are others who, in order to avoid the imputation of partiality to any ſyſtem, enumerate all the cauſes that preceding writers have mentioned, arrange them under general heads, and, without any diſcrimination of their various intenſity and power, aſcribe an equal degree of them to each. By theſe means a cloud of obſcurity is thrown over the ſubject that is not eaſily diſpelled.

It cannot be denied but that there are many complaints in which a number of cauſes concur to produce the deciſive change, from a ſtate of health to that of diſeaſe: but in this multiplicity, it is ſurely the phyſician's buſineſs to point out ſuch cauſes as generally take the lead, and have the greateſt ſhare in the production of the diſeaſe; while he diſtinguiſhes them from others of leſs note, that appear but ſeldom, and ſhould

be

be conſidered as fortuitous occurrences, rather than the conſtant and invariable antecedent cauſes of the diſeaſe.

Great ſtreſs has been laid on that ſtate of the body that renders it ſuſceptible of diſeaſe. That in every diſorder there is a prediſpoſition in the habit neceſſary for aſſiſting the adventitious and exciting cauſe to produce its morbid effects, nobody will be ſo abſurd as to deny: but if a writer, in excluſion to the truly conſpicuous and efficient cauſe, exalt this prediſpoſition into a whole inſtead of making it a conſtituent part only, ſuch a theory muſt reſt on a very bad foundation. The doctrines of plethora, debility, irritability, &c. the uſual reſources of phyſicians in endeavouring to account for other ſpaſmodic diſeaſes, have been plauſibly enough transferred by analogy to the aſthma.

On ſome occaſions, there are very ſtrong reaſons for ſuppoſing that one or other of theſe deviations from a perfect ſtate of health may ſo far operate, as to ſubject a perſon more readily to attacks of aſthma than otherwiſe would have been the caſe. But if we take a view of thoſe who for the moſt part become its victims, we ſhall in general find no one particular temperament or habit of body more liable to it than another.

In this country, the lower order of people who are daily expoſed to the various viciſſitudes of the weather, who are conſtantly employed in bodily labour, and poſſeſs in conſequence thereof a rigidity of fibre and robuſt conſtitutions, are very frequently afflicted with aſthma—much more ſo indeed than perſons in the higher walks of life, whoſe frames, enervated by indolence, luxury,

luxury, and a redundance of humours, become irritable in a high degree, and are prone to various other ſpaſmodic affections. Beſides this deſcription of aſthmatics, there is a claſs of artiſans that appear to be the greateſt ſufferers by this diſeaſe, ſuch as brewers, bakers, ſoap-boilers, blackſmiths, and many others *. If theſe be facts whoſe authenticity cannot be called in queſtion, any prediſpoſition from plethora, irritability, &c. either in the body at large or in the lungs in particular, does not ſeem to contribute ſo eſſentially to the production of this diſeaſe as is generally imagined.

The ſymptoms of flatulence, indigeſtion, hypochondriaſis, &c. that ſo conſtantly accompany the aſthma, have in all probability very much miſled practitioners. Inſtead of conſidering them the natural conſequence of

* Vide Withers on the Aſthma, p. 38.

the

the diſeaſe, as they ought to do, they bring them forward as an argument in ſupport of a contrary opinion. They ſuppoſe that ſuch ſymptoms always indicate a weak, lax, and irritable fibre; and that any diſorder, as the aſthma, ariſing in ſuch a habit, and attended with complaints of this nature, muſt be the offspring of nervous debility. Hence the idea of nervous and hyſteric aſthma firſt took its riſe. This, however, is a very falſe mode of reaſoning.

Take, for example, a perſon of the moſt vigorous conſtitution, whoſe ſtomach, previous to the aſthma, would ſubdue the moſt viſcid and indigeſtible ſpecies of aliment; behold him after ſeveral attacks of his diſorder, and you will often find his appetite materially injured, the tone of his ſtomach impaired, while flatulence, diſtenſion of this organ, and various other nervous ſymptoms,

toms, as they are called, will conſtantly follow *. This is in fact ſo often the caſe with aſthmatics, that very few exceptions occur to the contrary.

To diſcover the ſource of the errors on this ſubject, we muſt go back as far as the

* Dr. Percival remarks, that phyſicians and phyſiologiſts have paid great attention to the influence that the ſtomach when diſeaſed has on the lungs, but that they have taken little notice of the converſe of this. He gives a caſe of humoural aſthma, in which the patient could take ſeveral drams of vin. ipecac. at the commencement of the diſeaſe; but as his diſorder increaſed, the irritability of his ſtomach became ſo great, that 15 drops of the ſame wine often acted as an emetic.

Percival's Eſſays, vol. ii. p. 394.

Dr. Percival is certainly juſt in his remarks on the negligence of phyſicians with reſpect to this ſubject, yet it would be an endleſs taſk to enumerate all thoſe caſes of aſthma, in which the ſtomach is deranged in conſequence of the diſordered ſtate of the lungs: for in fact very few aſthmatics can be found (let the previous ſtate of their ſtomachs be what it may) who will not in length of time ſuffer materially from flatulence, diſtenſion, and other ſymptoms of a debilitated ſtate of this organ.

time

time of Dr. Willis. Before he publiſhed his Treatiſe on the Aſthma, though medical writers deſcribed its ſymptoms with tolerable accuracy, they never conſidered it a ſpaſmodic diſeaſe, or that it could be brought on by powers applied to the nervous ſyſtem, or moving fibres.

This celebrated phyſician perceiving, after the diſorder had once taken root in the conſtitution, that it was eaſily renewed by cauſes whoſe operation could not be explained on any other principle than this, extended the idea farther, and was of opinion, that all thoſe various cauſes, ſuch as heat, paſſions of the mind, &c. that are capable of bringing on a relapſe, are equally effectual in giving riſe to the firſt attack in perſons prediſpoſed to the aſthma *.

This

* Quicquid igitur ſanguinem efferveſcit inque orgaſmum concitat, uti motus violentus corporis aut animi, frigoris

This doctrine, in its fulleſt extent, has been received into almoſt every work publiſhed on the aſthma from that period down to the preſent time, and has been adopted with the moſt implicit confidence by every practitioner: any attempt of courſe to overturn a ſyſtem ſupported by ſuch authority, may be conſidered as no ſmall degree of preſumption, and will probably meet with a very ungracious reception. Facts in themſelves abſolutely incontrovertible have been adduced by a variety of writers on this ſubject; but the concluſions that have been drawn from them, are in my opinion neither juſt nor philoſophical.

Thus it is univerſally known, that after two, three, or more fits of aſthma, the lungs

frigoris aut caloris externi exceſſus, vini potus, venus, quinimo interdum merus lecti calor, prædiſpoſitis inſultus aſthmaticos accerſit.

Willis Oper. Omnia, à Blaſio, p. 208.

become

become ſo extremely irritable, and ſo readily diſpoſed to fall into their former ſpaſmodic ſtate, that various kinds of ſtimuli, and many of them of an apparently mild and inoffenſive nature, will be productive of aſthmatic paroxyſms. But does it neceſſarily follow, that, previous to any appearance of fits, or any habit being formed in the ſyſtem, they are capable of producing ſuch violent effects in conſtitutions the moſt healthy and vigorous? I ſuppoſe it does not; and however natural the tranſition and analogy may appear, it would be as erroneous to argue from the one caſe to the other, as it would in the inſtance of an intermittent fever, to exalt to the rank of primary cauſes every irregularity or ſtimulus that is found to bring on a relapſe, after a ſtop has been put to the diſeaſe.

In illuſtration of this, it will ſuffice for the

the preſent to obſerve, that phyſicians, on finding what bad effects the change from a heavy to a light atmoſphere ſometimes produces on aſthmatics, have fallen into the error of placing a diminution in the weight of the air among the primary cauſes of the diſeaſe, though no one well authenticated inſtance of ſuch a fact can be adduced, as will be ſatisfactorily proved hereafter. Objections equally valid can be brought againſt many of the other cauſes that have been aſſigned by medical writers.

Hence we ſhould be very cautious how we take for granted the many caſes of aſthma recorded by medical authors, that are ſaid to originate in ſuch cauſes, as they will be found for the moſt part the offspring of an ill-founded though plauſible theory, and not the reſult of a minute enquiry or accurate obſervation. Moreover it is worthy

of

of notice, that the authenticity of ſeveral caſes of this kind reſts very frequently on the degree of credit that is due to the patient's narrative; and if men of ſcience and erudition be ſo liable to error on this head, we cannot be ſurpriſed at the miſtakes or miſrepreſentations of patients in general: for it muſt eſpecially depend upon the proper and judicious interrogations of the phyſician, and his capacity for diſtinguiſhing the probable from the improbable cauſes, how far he may be able to arrive at any degree of certainty.

From what has been now advanced, I would not wiſh to have it underſtood that I meant to exclude altogether the cauſes in queſtion. I can readily conceive how an acquired degree of irritability or ſenſibility, in certain habits, may ſo far predominate in the lungs, as to expoſe ſuch perſons to fits of aſthma from

from trivial cauſes, as paſſions of the mind, a light atmoſphere, &c. &c.: but ſtill I am convinced that this is not a common occurrence. The hiſtory of a patient will be related in the courſe of this work, who, after repeated nervous and hypochondriacal attacks, at length got a nervous aſthma, that returned at regular and ſtated periods. A perſon in the habit of reaſoning according to the principles of the preſent faſhionable ſyſtem, woud not heſitate a moment to pronounce the aſthma, in this caſe, to be the effects of the preceding nervous complaints, without the aſſiſtance of any adventitious power; or that ſome very trifling one had ſtirred up the diſorder, already in a latent ſtate in the conſtitution. However, there is very little doubt but that the application of cold was the ſole cauſe of the firſt attack in this patient. He was very conſtantly

 expoſed

expoſed to the night air in the moſt inclement ſeaſon of the year, previous to the appearance of the aſthma; and even after this was in a great meaſure ſubdued, expoſure to cold was the only cauſe that ſeemed to have any effect in occaſioning a relapſe.

In ſome caſes we can with tolerable certainty mark one particular ſtate of the lungs that ſeems to eſtabliſh a ſtrong prediſpoſition to the diſeaſe. This is a mal-conformation of the cheſt, apparently at times connected with an hereditary taint, but more frequently independent of it. In this ſituation the lungs being confined in too narrow a ſpace for their bulk, are eaſily ſtimulated to irregular ſpaſmodic action, by various kinds of irritation. I will relate a caſe in point. A perſon of my acquaintance, from a narrow and contracted cheſt, is ſubject to tranſitory fits of difficult breathing: fatigue, particularly

ticularly from walking too faſt, the ſulphur and ſmoke of coals, and any paſſion capable of agitating the frame, is frequently followed by a paroxyſm, which diſappears in a few minutes, and leaves him in a perfect ſtate of health. But it is a doubtful point whether, in the ſtrict propriety of medical language, this diſorder can be denominated aſthma, as it is not preceded by the ſigns peculiar to this diſeaſe, nor, in its duration or phenomena, has it the characteriſtic marks of a genuine confirmed aſthma. At moſt it is but a very ſlight ſpecies of the aſthma, though, from the very irritable ſtate of the lungs, it is evident that the prediſpoſition is as ſtrongly marked as in any caſe whatſoever. From this fact (if a ſolitary one can have any weight) it may be inferred, that the exciting cauſes of aſthma muſt be of a more powerful nature than is

commonly ſuppoſed to produce a formidable diſeaſe, let the tendency in the habit be ever ſo predominant.

Though it would look like ſcepticiſm to deny that the ſeeds of the aſthma are ſometimes tranſmitted from parents to their offspring, yet too much pains have been taken by writers to perſuade the world that this is moſt commonly the caſe. This opinion, as far as I am able to judge, was founded on the inefficacy of the remedies that were generally employed, rather than on the more faithful and unerring teſtimony of obſervation. Phyſicians ſuppoſed, as the diſorder ſeldom or never yielded to the power of medicine, that ſome hidden and unconquerable cauſe had fixed its roots deep in the conſtitution; and as an apology for the healing art, and to ſave themſelves the pains of farther inveſtigation, they have

thought

thought proper to charge this to the account of an hereditary taint. Happily however the caſe is otherwiſe. It would be nugatory to dwell on the many arguments that might be advanced to overturn this pernicious doctrine. Let it ſuffice for the preſent to ſay, that the cauſes of the diſeaſe are often ſo manifeſt, as not to elude the notice of the moſt careleſs and inattentive obſerver; that on the moſt minute enquiry it cannot be traced to any defect on the ſide of parents or their anceſtors; and that it can be very frequently ſubdued, if proper remedies be adminiſtered in due time, and with judgment.

From the foregoing ſtrictures, it is pretty clear, I ſuppoſe, that too much hurry and inattention have been ſhewn by phyſicians in their inveſtigations of the cauſes of aſthma. Taking into the account ſuch caſes as

ariſe from an hereditary taint, from malconformation, and from different accidental cauſes, as in ſmelting of lead, &c. I will ſtill venture to ſay, that in 99 caſes of 100, the application of cold to the lungs is, in this climate, the chief and principal cauſe of laying the foundation of this diſeaſe, of bringing on the attacks, and of continuing it after it has once taken place.

CHAP.

CHAP. III.

IN a climate like this, where cold and moiſture ſo conſtantly unite, it is natural to ſuppoſe, that many of the diſorders incident to it, particularly thoſe of the lungs, are in a great meaſure owing to the influence of ſuch a combination. The aſthma may with propriety be ſet down as one of the number. At leaſt the effects of cold are often obſervable, if the diſorder be carefully attended to at its commencement. For ſome days before the aſthma is completely formed, the patient frequently complains of an uneaſineſs of breathing, cough, pains in his head, and other parts of the body. Sometimes a ſtrong tendency to inflamma-

tion takes place; and in conſequence thereof a pain or ſtitch in either ſide is frequently felt, together with a ſenſation of cold in different parts, analogous to what occurs in catarrhal affections. If, together with theſe ſymptoms, a ſtricture be felt at the ſternum, an aſthmatic paroxyſm may be expected to ſupervene very ſhortly, unleſs prevented by timely applications. The appropriate remedies for ſuch threatenings of aſthma are bleeding and bliſtering, which have often, to my knowledge, warded off the impending attack.

It is neceſſary to remark in this place, that theſe precurſory ſymptoms do not take place in the exact order, degree, or number in which they are ſet down: they will frequently vary according to the difference in the intenſity of the cauſe, the previous ſtate of the patient, and many other circumſtances.

ſtances. However, in fact they are the common and uſual effects of the action of cold on the lungs, and differ in no material point from the ordinary ſymptoms of a catarrhal affection but in this, that in proportion to the degree of inflammatory tendency, and ſtate of the pulſe, the breathing is more oppreſſed than is uſually the caſe in catarrh.

On theſe occaſions an acute obſerver can often foreſee the ſtorm gathering, and guard againſt it with ſucceſs: but this is not always in his power, as in many inſtances no alarm is given, and the diſorder comes on in the moſt ſudden and unexpected manner, without any of thoſe ſymptoms that ſo conſtantly attend the operation of cold. Lying-in women, and perſons after recovery from fevers and other diſorders, by unguardedly expoſing the body to cold in a ſtate of perſpiration,

ſpiration, are, according to my obſervations, very liable to attacks in this way. In other habits the conſtitution is able to reſiſt the action of cold, though frequently renewed, for months, and ſometimes for years, till, by the frequent repetition of the ſame cauſe, the lungs become materially injured in their functions, they loſe their elaſticity and tone, and at length give way to its impulſe. An aſthma brought on in this manner is generally of a very obſtinate nature.

Thoſe who conſider the aſthma to be principally a nervous affection, and to ariſe from cauſes that operate on this ſyſtem without the concurrence of cold, do ſtill admit that the humoural aſthma, as it is called, proceeds in a great meaſure from the operation of cold on the lungs. This opinion is formed in conſequence of its being conſtantly accompanied with cough, ſpitting,

and

and other ſigns of a catarrhal complaint. Let us ſee how far this teſt may be relied upon. A phyſician muſt be poſſeſſed of very little diſcernment, who has not noticed at different times a conſiderable diſcharge of phlegm from the lungs, in every ſpecies and variety of aſthma; in the hyſteric and convulſive, as well as in the humoural and plethoric. Nay, what appears ſtill to be more worthy of remark is, that practitioners will often find the nervous and convulſive kind, with its ſtated and periodical attacks, attended by a copious expectoration of phlegm; while other ſpecies of a doubtful and irregular nature, in which a perſon could diſtinctly trace the application of cold, diſcovered no ſuch ſymptom. How then can it be alleged with any confidence, that the exiſtence of ſuch an affection as this ſhould conſtitute any

ſpecific

ſpecific difference, and be eſtabliſhed as a criterion for aſcertaining the cauſe of the diſeaſe?

In general, it is not from any difference in the cauſe, but from a difference in the diſpoſition of the bronchial glands to pour out the mucous fluid, that one aſthmatic coughs up large quantities of phlegm, while another has little or no tendency to it. Thus ſome people with ſlight catarrhs are accuſtomed to ſpit very freely; while others in the ſame ſituation, and in every degree of the diſorder, from a ſlight cold to a confirmed inflammation of the lungs, bring up little or no phlegm by coughing.

Sir John Floyer himſelf (though he aſſerts that they originally proceed from different cauſes) owns, nevertheleſs, that as to their ſymptoms and phenomena they are exactly alike; and after ſome time the fits in both

both ſpecies are brought on by the ſame means*.

The juſtly celebrated Morgagni has remarked, that many practitioners under the

* Whatſoever cauſes produce the fit of the hyſterical aſthma produce the ſame in the ſpitting aſthma, as changes of weather, heat and cold, violent motions, paſſions, wine, ſurfeits: in neither kind of aſthma can they bear the heat of the bed. Since the ſame cauſes produce the fits in both ſorts of aſthmatics, there is certainly the ſame effervescence in both which occaſions the fits, and that is plainly proved; for at the end of the hyſterical aſthma fit, the water appears feveriſh, with a thick ſediment: and I obſerve that there is the ſame interval between the hyſteric aſthma fits, as there is in the ſpitting aſthma: and there is the ſame quantity of pale water in both kinds of aſthma.

Since therefore theſe two kinds agree in the ſame ſort of conſtruction of the bronchia, in the ſame effervescence of humours occaſioned by external cauſes; all theſe two kinds differ in is the firſt occaſion that produces them, and the ſpitting attends the one and not the other; the reaſon of which I impute to inflammation of the lungs or a catarrh, and the other ariſes after hyſterical fits or a fever.

Floyer's Treatiſe on the Aſthma, p. 114, 115.

influence

influence of Willis's doctrine of aſthma, have been ſo much deceived by falſe appearances, as to treat diſorders of the lungs that evidently aroſe from obſtructions, for nervous and convulſive aſthmas. Such a caution coming from a man of Morgagni's diſtinguiſhed abilities ſhould have its due weight with phyſicians, and deter them from relying with ſo much confidence on a doctrine, that in ſeveral inſtances has been attended with conſequences of a very ſerious and alarming nature *.

Hence,

* Poſtea vero quam Williſius perſecutus eſt fuſius convulſorum nervorum effectus in diſſitis quibuſque partibus: medicorum plerique non modo cum oportuit, hanc illius ſequi doctrinam cœperunt: ſed haud raro etiam hujus facilitate et commoditate illecti, interdum quoque fallaci rerum ſpecie decepti, abuſi ſunt uſque adeo, ut cum organorum vitia non deeſſent, nihil niſi convulſiones in multis morbis, præſertim vero ad reſpirationem attinentibus, accuſaverint non ſecus ac veterum

plerique

Hence, in every recent attack of convulſive aſthma, if we cannot trace it to the effects of cold on the lungs, or to ſome defect in the formation of the cheſt, an organic obſtruction in ſome of the internal parts may be ſtrongly ſuſpected: at leaſt phyſicians are not juſtifiable in laying down any plan of cure, until every circumſtance with reſpect to this point be examined with the utmoſt deliberation.

Phyſicians can eaſily conceive how ſpaſmodic complaints of the ſtomach and bowels may be excited by cold: but if a ſimilar affection of the lungs be in queſtion, inſtead of aſcribing it to ſo obvious and natural a cauſe (as might be expected from its very conſtant and deciſive influence on theſe or-

plerique accuſabant vapores. Qui abuſus niſi caveamus quam facilis ſit non una in proximis epiſtolis docebit hiſtoria.

Morgagni de Cauſ. et Sed. Morb. p. 131, t. 1.

gans),

gans), paſſions of the mind, a change in the ſpecific gravity of the atmoſphere, &c. are had recourſe to, in order to exhibit a rationale more conſonant to a nervous and convulſive diſeaſe. In all thoſe perſons, as the common people and tradeſmen of this country already ſpoken of, and who were found to be the greateſt ſufferers by this diſeaſe, the trivial cauſes commonly aſſigned cannot, by the moſt zealous advocates for the nervous doctrine, be conſidered of ſufficient magnitude to produce effects of ſo formidable a nature as we are witneſs to every day: and unleſs a predilection for ſcepticiſm, and a deſire of explaining all ſpaſmodic diſorders by means of the nervous ſyſtem, ſhould bias the judgment, a ſatisfactory explanation of ſuch caſes of aſthma will be often diſcovered in the operation of cold on the lungs.

If,

If, after all this, it ſhould ſtill be doubted whether the cold of our climate be capable of producing the flatulent, hyſteric, or any other ſpecies of nervous aſthma, a few well authenticated facts, drawn from writings of no inconſiderable authority in medicine, will clear up this point.

Narciſſus, vir xxxviii annorum, temperamenti cholerico-ſanguinei, tribus circiter abhinc menſibus Francofurtum ad Viadrum profectus ſub itinere, febre multo vomitu ſtipata corripitur: a quâ datis a quodam medico potiunculis diaphoreticis et temperantibus liberatus, ſub diſceſſu de crebris in latere dextro puncturis conqueri cœpit. Redux et per ſex circiter dies domi commoratus, Stetinum quinque milliaribus a loco in quo degebat diſtans nave aperta proficiſci decrevit. Conſcendit quoque illam hora veſpertina ſexta, levi indutus amictu, et non ſolum ſuborta mox tempeſtate pluvioſa,

verum etiam aëre ac cœlo per totam noctem inclementi atque horrido, refrixit. Accedens Stetinum, et biduo ibidem ſub illibata ſanitate commoratus, tum de inſigni præcordiorum anxietate et omnium artuum laſſitudine conqueri cœpit. Hinc protinus domum reverſus, mox corripitur previo horrore brevi, æſtu inſigni cum ingenti anhelatione, ac ſi ſuffocari vellet aliiſque ſymptomatibus ſtipata: quæ inſequenti nocte magis invaleſcebant cum puncturis ſiniſtri lateris. Quare vena in dextro pede ſtatim inciſa, mox evanuerunt dictæ punctura: ſed cum reliqua ſymptomata non ſolum inſiſterent, verum etiam dyſuria ac flatulentia accederent, medicum abſentem accerſi curat æger, qui congruis medicaminibus noviſſimas binas adfectiones profligavit quidem, at conſtrictionem aſthmaticam debellare haud potuit.

Freder. Hoffman. Conſult. et Reſp. M. t. i p. 404.

Caſus lxxxix. De Aſthmate Spaſm. Flatulento.

On

On reading the foregoing hiſtory, it is evident (laying aſide every ſort of theory) that this flatulent ſpaſmodic kind of aſthma, as Dr. Hoffman calls it, was brought on by cold.

Narciſſus, in a few days after recovering from a fever, undertakes a journey very lightly clad, in an open veſſel, and on a wet, cold, and ſtormy night: in two days after, he is attacked with cold ſhiverings, ſucceeded by heat and violent ſuffocations threatening immediate death. When ſuch ſymptoms are accompanied with ſtitches in the ſide, and on ſuch an occaſion as this, it would be abſurd to aſcribe them to any other cauſe but cold.

Bleeding had the effect of inſtantly baniſhing the ſtitches, and the other means that were uſed ſo far ſucceeded as to remove the ſymptoms of dyſuria and flatulence: but the ſpaſmodic ſtricture at the cheſt ſtill

remained unſubdued, and never quitted him till it brought on other diſorders that in all probability terminated in his death.

In this caſe, the continuance of the ſtricture at the breaſt, after the violence of the diſorder was ſubdued by bleeding and other remedies, is a proof that the ſpaſmodic affection is often of a permanent nature in the aſthma, and makes it aſſume a continued type.

Quum aliquot abhinc annis in Carolinis degerem fontibus ; acceſſit illos vir quidam generoſus, qui in intemperantia potûs et frigori intenſo ſub quo pectus ipſi libere exponendo iter fecerat, ab aëris inclementia, aſthmaticum ſibimet contraxerat morbum.

The following reflections of Dr. Hoffman on this caſe merit particular attention :

Quemadmodum frigus omnibus nervoſis partibus infenſum eſt : ita maxime pectori deprehen-

deprehenditur inimiciſſimum. Quamplures mihi cogniti ſunt caſus ubi ex eo ſolo liberalius admiſſo tuſſes, aſthmata ſpaſmodica, et cardialgiæ atrociſſimæ propullulârunt. Hinc non rarum eſt eos qui venatoriis aut aulicis muneribus præſunt, et pectori uti mos eſt minus tecto incedunt, ejuſmodi affectibus infeſtari. Etſi noſtrum conferamus caſum, non ſane ex alia cauſa originem traxit aſthma quam ex frigore pectori admiſſo: ſiquidem æger venationibus indefeſſus vacavit, nudoque pectore ſub gelidiſſimo cœlo inceſſit. Quod cum forſan inconvenienti tractatum ſit medela: omnino in hydropem pectoris tandem degeneraverat.

Hoffman. Medic. Rat. Syſt. t. ii. p. iii. p. 353-4.

Beſides theſe teſtimonies from Dr. Hoffman in favour of the operation of cold in producing aſthma, he has another paſſage which is ſtill if poſſible more expreſſive. After enumerating the different cauſes that

lay the foundation of this diſeaſe, he concludes his ſubject in the following manner:

Si quid ex cauſis occaſionalibus eſt quod aſthma convulſivum inducere poteſt, certe eſt externum frigus, hoſtis ille nervoſo generi inimiciſſimus. Unde hyemali tempore flantibuſque ventis aquilonaribus ingraveſcit malum: et a frigido quoque potu exacerbatur. Imprimis obſervavi illos qui pectus non bene tegunt, illudque frigori maxime nocturno exponunt, ſæpius hoc malum incurriſſe.

Dr. Willis himſelf, who made ſo material a change in the pathology of aſthma, and conſidered it in every reſpect a nervous diſeaſe, gives us, notwithſtanding, a caſe of convulſive aſthma that evidently aroſe from cold.

Senex perhonorificus multis magniſque titulis inſignitus, iiſdemque omnibus major,

poſtquam

poſtquam per aliquot annos unaquaque hyeme tuſſi cum ſputo moderato et ſatis benigno obnoxius degiſſet, ſub finem noviſſimi autumni, a longo itinere domum reverſus (a frigore uti putabatur ſuſcepto) minus recte valebat. Querebatur enim de dolore in medio pectore juxta ſternum excitato, qui veſperi quamprimum lecto incaleſceret, ingraveſcens ſomnum perturbabat, et plurima nocte valde moleſtus erat, ſine quavis tamen dyſpnœa, aut aſthmatis ſigno evidenti.

Ad dolorem hunc tollendum, et purgatio et phlebotomia celebratur, pectoralia et antiſcorbutica quotidie exhibentur, loco dolenti linimenta et fotus applicantur, ſine magno tamen fructu aut levamine: nam quæ deinceps alteratio contigit, potius in deterius ceſſit: nam dolori paulo remiſſius habenti, reſpiratio difficilis et impedita ſupervenit, ita ut a primo ſomno aut appulſu ejus ſtatim aſthmaticus fieret, atque anhelus, et circa

præcordia laborans in lecto erectus ſedere cogeretur.

Porro hujuſmodi dyſpnœa et ſpirabilium agitatio convulſiva, non modo quovis veſperi redibant, ſed indies immaniores factæ longius durabant: proinde ut nocte quadam a primo ſomno evigilans aſthmatis paroxyſmo graviſſimo, qui ipſum tantum non interemit per plures horas afficeretur.

Willis, Opera Omnia à Blaſio, p. 213. De Medicam. Operatione.

On reading the preceding caſes and obſervations, no perſon, I ſuppoſe, will be ſo hardy as to deny the poſſibility of every form of aſthma from the operation of cold, independently of any other cauſe: and if a multiplicity of them were in any reſpect neceſſary for giving additional plauſibility and weight to this opinion, the records of phyſic would readily ſupply us with them.

From this ſource alſo, even at its origin,

it

it is poſſible we may be able to draw a farther corroboration of our doctrine of aſthma: for it will be found, that the theory under conſideration was embraced in the earlieſt annals of medicine, when the human mind, poſſeſſing its native independence, had no particular bias for any ſyſtem, but recorded with fidelity whatever nature preſented to its view.

If we look into the works of the venerable Father of phyſic, we ſhall find no particular ſection or chapter allotted to this diſeaſe. In the courſe of his writings, however, he takes frequent opportunities of mentioning the aſthma, and that in ſuch a manner as to leave very little doubt on the minds of his readers, that it often engaged his attention, and that he was intimately acquainted with its nature.

Theſe detached and ſcattered paſſages have called forth the exertions of different authors,

authors, particularly thoſe of Galen, who has given us a very elaborate commentary on aphor. 26, lib. 3; aphor. 46, lib. 6, and other parts.

But his intended illuſtrations on thoſe ſeemingly obſcure and mutilated paſſages, inſtead of affording us any aſſiſtance in elucidating them, and giving us a clue to the ſentiments of Hippocrates, rather, in my opinion, pervert the intention and meaning of this illuſtrious writer.

Not to dwell particularly on thoſe parts in which he has miſtaken the ſenſe of the original, it is ſufficient to obſerve, in general terms, that in no one of his remarks has he done juſtice to it: his deſcription of the aſthma does not differ in any material point from dyſpnœa, or any ſpecies of difficult breathing, and of courſe it cannot convey to us an adequate idea of a ſpaſmodic affection of the lungs.

Theſe

Theſe annotations of Galen being then inadmiſſible, it will be neceſſary to diſcover if any other hints thrown out by Hippocrates on this diſeaſe, will admit of a different explanation.

Hippocrates, enumerating the various complaints that occur at different ſtages of life, ſets down the following as diſorders to which the human frame is particularly liable, after the period in which ſpitting of blood and conſumptions of the lungs are moſt frequent.

Τοῖσι δε υπερ την ἡλικιην ταύτην ασθματα πλευριτιδες περιπνευμονιαι. Aphor. 30, lib. 3, ſect. 7.

It appears extremely probable that Hippocrates, in placing the aſthma here in contradiſtinction to pleuriſy and peripneumony, muſt have had in view the ſpaſmodic kind. We ſhall the more readily adopt this opinion, if we attend to the ſucceeding aphoriſm, where he ſays, that old men are very

ſubject to difficult breathing, coughs, and catarrhs or defluxions on the lungs.

Τοισι δε πρεσβυτησι, δυσπνοιαι, καταρροι, βηχωδεες.

Aphor. 31, ibid.

Here we are to ſuppoſe thatHippocrates, in taking notice of the greater part of the diſorders of the lungs, and in giving an appropriate term to each, had a clear and diſtinct idea of their nature and ſymptoms; and if this be the caſe, he could not poſſibly diſtinguiſh the aſthma from the reſt of the pulmonary diſorders, in any other manner than by marking with accuracy thoſe ſymptoms that are peculiar to it as a ſpaſmodic diſeaſe. That he formed ſuch an opinion of the nature of aſthma, will appear pretty clearly from a paſſage quoted by Dr. Millar, in his excellent Treatiſe on the Aſthma of Infants.

Τοισι δε παιδιοισιν, επιπιπτειν σπασμοις και ασθματα ἃ νομιζουσιν το παιδιον ποιεειν και ἱερην νουσον ειναι.

Hipp. Oper. Omn. à Fæſio, p. 281.

Hippocrates,

Hippocrates, ſpeaking of the effects of cold and moiſture on the human body, and of the diſorders which ſuch a ſtate of the atmoſphere produces, makes uſe of the foregoing obſervations.

Whether we ſuppoſe, with Galen, that Hippocrates hinted at the epilepſy by the epithet ἱερὴν, or, if we content ourſelves with an explanation that will readily occur to every intelligent reader of this paſſage, that the appearance of the diſorder was altogether ſo formidable as to induce the vulgar and uninformed ſpectators to believe that it was ſent by the gods for ſome particular purpoſe; in either ſenſe we are warranted to conclude, that the diſorders alluded to by Hippocrates, under the title of aſthmata, were of a ſpaſmodic nature. For if by this term he meant an affection of the lungs, of which there cannot be the ſmalleſt doubt, no diſorder of theſe organs except a ſpaſmodic

dic and convulſive aſthma exhibits ſuch terrifying ſymptoms as to form any grounds for a parallel with the epilepſy, or for believing that it was the effect of an immediate interpoſition of a ſupernatural power. Hence, without putting any forced conſtruction on the words of Hippocrates, it appears that the aſthma mentioned by him was of the ſpaſmodic kind, and that he conſidered cold and moiſture its principal cauſes. At leaſt it muſt be allowed that this was his opinion with regard to the diſorder in children.

We ſhall next direct our attention to another writer of antiquity, and ſee how far his ſentiments coincide with thoſe of the Father of phyſic.

Celius Aurelianus, in giving a hiſtory of the aſthma, writes like one who delivers a true and faithful account of whatever was preſented to his view in actual practice: no

weak

weak or futile theory is ſubſtituted for facts and accurate obſervation.

Gravat autem (ſays he) aſthma atque premit magis mulieribus viros, et juvenibus ſenes, atque pueros et durioribus natura corporibus teneriora, hyberno atque nocte magis quam die vel æſtate: in quibuſdam perfectis irruit paſſionibus: ſed magis ex profundo frigore ſequitur patientes ſpirationis difficultas, et frequenter natura celerior magis quam tarda.

Every phyſician converſant with the aſthma, muſt acknowledge that we have here, as far as it goes, a juſt and accurate account of its hiſtory. What in my opinion ſtamps it with no inconſiderable degree of merit, is the cauſe that is aſſigned for the production of the diſeaſe: ſed magis ex profundo frigore is the expreſs opinion of this ancient writer; and there is ſo much truth in the remark, and it is founded on ſo ſolid

and

and firm a baſis, that it deſerves to be revived in modern times, and raiſed into a ſyſtem.

Indeed, if the greater part of the earlier writers be conſulted on the aſthma, though the ſame abilities in aſcertaining its cauſe cannot be diſcovered in their works, as in thoſe of Celius Aurelianus or Hippocrates; yet the prevailing doctrines among them ſeemed to be the reſult of a careful obſervation of the ſymptoms that conſtantly took place, and led to a practice not only rational but ſucceſsful.

Thus, from the difficult breathing, cough, ſpitting, and other ſymptoms of aſthma, it appeared to them that there was a flow of humours to the lungs, which they called a defluxion, abſurdly imagining that they deſcended from the head to the cheſt, being previouſly drawn up by this organ from the lungs.

This

This explanation, however vague and ridiculous it may appear, was productive of no evil conſequence. The fact being eſtabliſhed with reſpect to the determination of morbid humours to the lungs, or to a redundancy of ſuch as were found, happily directed a practice of the moſt ſalutary tendency: vomiting, purging, and other evacuant remedies came to be employed in the incipient ſtate of the diſeaſe, and were conſtantly crowned with ſucceſs.

Even at an after period, and when the diſorder ran into a chronic ſtate, their inſtructions for aſthmatics have not been followed in vain by practitioners of experience in modern times. Thus Sir John Floyer * has

* I found I had read moſt of the modern writers, and hitherto had tried their methods, and hot pectorals and cephalics in vain. I believed by my ill ſucceſs in their way that they never underſtood this diſeaſe; and therefore turned over ſome of the old writers, Galen, Ægineta, Ætius, &c. where I found more rational no-

 tions,

has borne public teſtimony to the ſuperior efficacy of their practice, and affirms that he obtained more laſting benefit from their preſcriptions, than from any of thoſe that were publiſhed by the modern phyſicians of his time.

Having laid before my readers this account of the doctrines of the ancients with reſpect to the aſthma, I ſhall take the liberty of making a few remarks on ſome paſſages in Dr. Millar's treatiſe on the ſame ſubject, already mentioned, as they appear to be a ſtrong corroborating evidence in ſupport of the theory under conſideration, though brought forward by this ingenious writer for a very different purpoſe.

He ſets out with a deſcription of the ſoil, extent and ſituation of the different coun-

tions, and was directed by them to the uſe of that medicine which does very much relieve and prevent my fits, of which I will hereafter give an account.

Treatiſe on the Aſthma, p. 15.

tries

tries wherein the aſthma was found to be moſt prevalent, recounts the diſeaſes that rage at particular ſeaſons, gives a minute account of the ſtate of the weather which he thinks produced them, and concludes his obſervations in the following ſummary manner :

" Such was the ſtate of the weather, " which at this time introduced the aſthma, " and ſuch were the concomitant diſeaſes: " and as there was little variation in ſuc- " ceeding years, it is ſufficient to obſerve in " general, that from a meteorological re- " giſter, very accurately kept by an ingeni- " ous clergyman, for almoſt fourteen years, " compared with a journal of diſeaſes during " that period, it appears that the aſthma " was more or leſs frequent according to the " ſtate of the weather; that it prevailed moſt " in ſpring and autumn, and eſpecially in " moiſt ſeaſons accompanied with eaſt and

" north-eaſterly winds; when the weather
" was variable; when the mercury in the
" barometer was fluctuating, but generally
" low; and when ſudden changes from
" froſt to thaw were very frequent."

Millar's Obſervations on the Aſthma and Hooping-Cough, p. 13.

A perſon diveſted of every ſort of pre-poſſeſſion in favour of any particular theory, on peruſing the preceding obſervations relative to the aſthma, could not, in my opinion, heſitate a moment in forming a deciſion as to its cauſe. But let us ſee the ſuperſtructure that Dr. Millar has raiſed on this foundation.

" From the hiſtory which has already
" been given of the aſthma, it appears that
" it is chiefly incident to children, eſpecially
" ſuch as have been lately weaned; and that
" it has been moſt prevalent in ſpring and
" autumn, moiſt ſeaſons, changeable wea-
" ther,

" ther, and when the mercury ſtood low in
" the barometer.

" However unſatisfactory the conjectures
" may be which have been formed con-
" cerning the influence of a light atmo-
" ſphere in producing diſeaſes, yet the
" fact ſtands confirmed by the concurring
" teſtimony of phyſicians in all countries,
" and in all ages. An extraordinary
" inſtance of the lungs being affected by
" ſuch a conſtitution of the air, is related
" by Dr. Mead in his Treatiſe concerning
" the Influence of the Sun and Moon upon
" the Human Body. And if we have not
" been groſsly deceived by the relations of
" travellers, the ſudden change from a
" denſe to a light atmoſphere, in aſcending
" high mountains, renders reſpiration very
" difficult."—Ibid. p. 67.

" When moiſture is joined to ſuch a ſtate
" of the air, it becomes ſtill more injurious ;

" the ſuperfluous ſerum, which ought to be " thrown out by expiration, is accumu- " lated; the fibres become turgid and œde- " matous; and the organs of reſpiration " are weakened."—Ibid. p. 69.

Thoſe who labour under no defect of the lungs, for the moſt part bear with impunity very conſiderable changes in the ſpecific gravity of the atmoſphere: even many perſons have reſided for ſeveral weeks on very high mountains, without finding their reſpiration affected, as was the caſe with Meſſrs. Bouger and La Condamine, on Pinchinea * in America. Others affirm that they experienced no difficulty of breathing on the Pike of Teneriffe.

The diſorders that are generally ſaid to attack thoſe who viſit ſuch mountains, are hæmorrhages from different parts of the

* Zimmerman's Experience in Phyſic, vol. ii. p. 111.

body,

body, as from the lungs, noſtrils, eyes, &c. They are accounted for in this manner:— The impediment that is given to the propulſion of the blood through the vaſcular ſyſtem, being in part removed by the diminiſhed preſſure on the tops of mountains, the fluids are propelled with greater force by the vis a tergo; hence the ſmall veſſels becoming more and more diſtended, a rupture of ſuch of them as are leaſt capable of reſiſtance takes place *. This ſeems ſatisfactory enough; though there are ſome who contend that the cauſe of ſuch diſcharges of blood is to be ſought for in ſome accident, and not in any diminution of the weight of the atmoſphere.

However philoſophers may diſagree about this point, they all allow that there is not one well authenticated inſtance of a con-

* Vide Percival's Eſſay, vol. ii.

firmed aſthma in conſequence of the change of air from the loweſt to the higheſt ſituations, by the aſcent of mountains, or by the flights to the upper regions, as in the late practice of aeroſtation. Hence it is but reaſonable that we ſhould reject the explanation given by Dr. Millar, as it is ſcarcely poſſible that the ſlight variation of the atmoſphere mentioned by him (though aſſiſted by moiſture) could produce ſuch violent effects as an aſthma, ſo general at times among children as to amount nearly to an epidemic diſtemper.

It being found by experience, that many aſthmatics, on their removal from a thick and heavy to a light air, were immediately attacked with their diſorder *, phyſicians have

* I have found London air and that of Holland agree beſt with me; and by going into a ſharp air, I have immediately fallen into a ſhortneſs of breath, particularly in my going from London to Epſom; but upon my

have hence rather precipitately concluded, that ſuch a cauſe was ſufficient of itſelf to give origin to the aſthma. But many different cauſes (as we already remarked) will affect the aſthmatic after the diſeaſe has taken root, that would not produce any morbid ſymptom, had they been applied before the lungs were injured by its frequent attacks: ſo a light atmoſphere, by not giving the ordinary degree of diſtenſion to the lungs, may diſagree with an aſthmatic, or occaſion a relapſe, though it could not poſſibly produce any effect on the ſame perſon before the aſthma appeared.

If we attend to the fact ſtated by Dr.

my return next day to London, I was very well. I have had ſevere fits in London; none in Holland, but a little heavineſs, which the Jeſuits Powder put off immediately. Eating a ſupper or any thing in an afternoon occaſions my fits: but in the beginning of my fits ſupper agreed well with me.

Floyer's Treatiſe on the Aſthma, p. 21.

Millar,

Millar, that the ſpecies of aſthma which he treats of prevailed moſt in wet and moiſt ſeaſons accompanied with eaſt and north-eaſterly winds, there ſurely can be no difficulty in forming a tolerably juſt idea of its cauſe, except we wiſh to ſubſtitute ſophiſtry for reaſoning, and ſubtlety for common ſenſe.

Such weather as this is well known to be injurious to the lungs, and is conſtantly found to be productive of catarrhs, pleuriſies, and other diſorders of this ſort: and Dr. Millar himſelf remarked, that, in October 1755, inflammations of the bowels, and the iliac paſſion, were very prevalent at the ſame time with the aſthma *.

This ſhews to a demonſtration, that we are not to refer the cauſe of this ſpecies of aſthma to any change produced in the

* Obſervations on the Aſthma, p. 11.

weight

weight of the air: for it would be highly abſurd to aſcribe inflammation of the bowels, or the iliac paſſion, to a diminution in the weight of the air; and the argument will hold equally good with reſpect to the aſthma that happened to rage at the ſame time.

When the cauſes of aſthma underwent an inveſtigation, many facts and obſervations were adduced, which tended to prove, in a ſatisfactory manner, that the application of cold to the lungs was by far the moſt frequent cauſe of this diſorder. If this be the caſe, does not the moſt ſtriking analogy authorize us to aſſert, that the aſthma which raged during the prevalence of eaſt and north-eaſterly winds originated in the ſame ſource?

To obviate the force of theſe arguments, it may perhaps be alleged, that the diſorder in queſtion is not an affection of the lungs, and does not differ materially from

the

the ſuffocatio ſtridula, or croup, of the ingenious Dr. Home. However, in forty inſtances at leaſt of the croup that I have ſeen, both in this country and in Scotland, the ſymptoms had little or no ſimilarity to thoſe of the aſthma of infants deſcribed by Dr. Millar.

In the former, as ſoon as the perſon is attacked, the peculiar ſound that is heard on inſpiration immediately attracts the attention, and points it out as an affection of the upper part of the windpipe. It never has conſiderable remiſſions; nor, as far as I can learn, does it ever run into a chronic ſtate *.

In the latter, the caſe is totally different according to Dr. Millar. Remiſſions are frequently perceptible, and it conſtantly

* Vide Home on the Croup. Michaelis de Angina Polypoſa. Memoires de la Société R. de Medecin pour l'Année 1782-3, p. 82-3.

changes

changes to a chronic diſeaſe; nor do diſſections exhibit the ſame appearances after death. If, notwithſtanding theſe arguments, it ſtill be denied that they are different diſeaſes, this at leaſt muſt be granted, that Dr. Millar's account of the croup differs very widely from thoſe of the moſt judicious authors on the ſubject: ſo much ſo indeed, that there is a ſtrong foundation for a charge of inaccuracy and inattention againſt him: but very few will be diſpoſed to find him guilty of it, who properly conſider the many juſt and faithful obſervations he has left us on this diſeaſe. It was principally on account of the great merit of his work, that I thought it neceſſary to give the foregoing extracts, with remarks upon them, in order to ſhew how one of the moſt intelligent writers on the aſthma may be miſled by a fond attachment to a favourite theory.

I have been thus inſenſibly drawn on to

conſider

conſider at greater length than I originally intended, the cauſes that give riſe to the aſthma. From the profeſſed deſign of this work, I ſhould have confined myſelf to a few curſory obſervations only; but the very intereſting nature of the enquiry urged me, when once engaged, to extend my ſubject, and offer to the public ſuch reflections as an attentive conſideration of the ſymptoms and phænomena of this obſtinate malady had ſuggeſted.

But after all this, it may be aſked, how far this theory (admitting it in general well founded) will improve the practice in aſthma? Does it recommend any new method of cure? How, or in what manner, is it ſuperior to the doctrines hitherto advanced by medical writers?

If the application of cold to the lungs be in moſt caſes the principal cauſe of aſthma, the impreſſion that ſuch a doctrine muſt

make

make on the minds of practitioners will be attended with one very important advantage. It will baniſh from their thoughts the idea of its being an hereditary and incurable diſorder, and lead them to conſider that it is in moſt caſes accidental, and that of courſe it will admit of a cure in many inſtances by proper remedies.

Thus, from the effects that cold uſually produces on the human body, evacuations of one kind or other become in moſt caſes neceſſary, in the firſt onſet of the aſthma; and as the diſorder is afterwards continued by the power of habit, ſuch means as are found uſeful in interrupting this, and preventing it from becoming a fixed and permanent affection, ſhould chiefly occupy the attention of the phyſician. If no other purpoſe was anſwered by this view of the aſthma, than the conſideration of its being brought on accidentally by expoſure to cold,

in conſtitutions apparently the moſt healthy and vigorous, it may be productive of ſome advantage.

Except thoſe who have ſome particular remedy or method of cure to recommend, and who (it may naturally be expected) dwell with peculiar pleaſure in praiſe of their own offspring, which they have foſtered and brought to maturity with much aſſiduity and care, very few beſides think a radical cure of a confirmed aſthma within the reach of the healing art. Such ſentiments as theſe, when promulgated by phyſicians of weight and authority in medicine (as is daily the caſe), muſt be attended with the worſt of conſequences; they encourage the old and experienced to content himſelf with treading in the paths of his predeceſſors, and deter the young and timid practitioner from venturing to explore any new or untravelled road.

CHAP.

CHAP. IV.

OF THE PROGNOSTICS IN ASTHMA.

WHEN ſpaſmodic diſeaſes, by frequent repetition, have once taken deep root in the conſtitution, phyſicians at all times have given a very unfavourable prognoſis of them. On the aſthma their prognoſtics have been no leſs gloomy and inauſpicious.

The lungs of the human body, when labouring under ſpaſmodic aſthma, are ſo liable to be affected by a variety of cauſes capable of renewing the diſeaſe, that it is not to be wondered at, if phyſicians

ſhould be very cautious in pronouncing a favourable termination in any caſe.

The opinions entertained of the cauſes of the diſeaſe have probably, in a great meaſure, influenced their deciſions. If the aſthma be a diſorder which is in general tranſmitted from parents to their offspring by an hereditary taint, or if it originate in an idioſyncraſy, as it is called, or a peculiar ſtate of the fibres ſtamped on the frame by the hand of Nature; then a phyſician is juſtifiable in proclaiming the diſorder incurable, and in with-holding that conſolation from the afflicted, which neither his own character, the nature of the complaint, nor any expectations he can have from the common remedies, will allow him to give. But if, on the other hand, the majority of caſes that daily occur in practice be the effects of cold, and cannot be traced to any conſtitutional infirmity, ſome

ray

ray may be emitted from this light to diſſipate the miſt thrown over the ſubject, in conſequence of the errors committed with reſpect to the efficient cauſe of the diſeaſe.

That there is in reality no foundation, from its nature, for paſſing ſo awful a ſentence as is cuſtomary with phyſicians, appears from the many facts and obſervations brought forward to prove it in the greater number of inſtances to be an accidental diſorder; and until the method of cure be conducted according to theſe principles, no reliance, in my opinion, can be placed on the prognoſtics that may be made on the aſthma.

If a perſon, ſhortly after expoſing his body to cold, be attacked with aſthma, his diſorder will frequently admit of a complete cure, on condition that his lungs have not been previouſly injured by catarrhal or pleuritic complaints; that no obſtructions

exiſt in the viſcera; and that proper remedies be timely and judiciouſly employed. Several inſtances of this ſort have occurred to me without any relapſe taking place. The more gradual the aſthma is in its approaches, the more obſtinate it generally turns out. Coming on in this inſidious manner, the patient is totally off his guard: he neglects every ſort of aſſiſtance till a fit comes on, when perhaps the diſorder had been undermining the lungs for ſeveral weeks before. On ſuch occaſions, if the gathering ſtorm be foreſeen, it is often in the phyſician's power to take ſuch ſteps as may effectually prevent any untoward conſequence.

It appears to me, that the obſtinacy of the aſthma ſhould be often charged to the negligence of practitioners in the early ſtage of it. A nice and ſcrupulous attention to this period of the diſeaſe, will often guard againſt

againſt the formation of obſtructions, and the habitual repetition of the fits, which ever after render it ſo ſuperior to every medical exertion.

It has been remarked by almoſt every writer on the aſthma, that tubercles are moſt commonly formed ſome time before its fatal termination, and that they in a great meaſure contribute to ſuch an event. When water in the cheſt, tubercles, and other obſtructions come on in conſequence of the frequent repetition of the fits, it muſt be owned that very few, if any inſtances, are to be met with on record, of a perſon recovering in ſuch a ſituation.

But if it appear on accurate examination that none of theſe diſorders exiſt, though the aſthma has continued without any diminution in its violence for a great length of time, and has rather increaſed as to the number of its fits, the patient ſtill ſhould not

be given up as irrecoverable. No remedy that affords the ſmalleſt proſpect of relief ſhould be left untried: the cauſe of humanity, the honour of the profeſſion, demand our moſt ſtrenuous endeavours; and there is not a doubt but that they will often triumph over the diſeaſe in the moſt alarming and unpromiſing caſes.

CHAP. V.

OBSERVATIONS ON THE DIFFERENT REMEDIES THAT HAVE BEEN EMPLOYED IN THE CURE OF ASTHMA.

THE remedies that have been generally made uſe of in this diſeaſe are of great variety, ſuch as bleeding, bliſtering, iſſues, expectorants, antiſpaſmodic tonics, &c. A minute detail of each would lead to a long and tedious diſcuſſion, not by any means calculated for an Eſſay of this kind. Some obſervations however appear neceſſary; and theſe are offered to the public with the greateſt diffidence, from the ſtate of uncertainty in which the practice of aſthma is involved.

On the firſt attack of the aſthma, blood-

letting is often looked upon to be a very uſeful remedy; and it really is ſo, when the patient's fulneſs of habit, the ſtrength and quickneſs of his pulſe, with other circumſtances, point out the neceſſity of ſuch an evacuation. But in many inſtances of the firſt onſet of aſthma, blood-letting cannot with any propriety be attempted; for the diſorder ſometimes attacks feeble and exhauſted conſtitutions, which may be materially injured by any loſs of blood whatſoever.

One great advantage, if not the principal one, ſuppoſed by phyſicians to be obtained by bleeding in the aſthma, is the temporary ſuſpenſion of the difficult breathing that generally ſucceeds its uſe. If no other purpoſe was anſwered by it than this, it would be of very little moment, as a renewal of the paroxyſms moſt commonly ſucceeds this tranſitory interval of eaſe.

In order to form a juſt idea of the utility of bleeding in aſthma, we muſt look back to the cauſes that firſt gave riſe to the diſeaſe. From this retroſpect it will appear, that the application of cold to the lungs is the moſt frequent exciting cauſe; and that, in conſequence thereof, very ſtrong ſymptoms of an inflammatory diſpoſition muſt often accompany the firſt ſtage of aſthma.

Hence it is that, in many caſes, a phyſician muſt neceſſarily preſcribe veneſection in order to preſerve the life of his patient, and not confine his views merely to the removal of a plethoric ſtate, or to the abatement of ſpaſm by the relaxing power of blood-letting. On other occaſions too, though no danger to the patient's life ſhould follow the omiſſion of this practice, it will be highly proper to have ſome blood drawn in order to obviate obſtructions, and bring about a ſtate of intermiſſion, ſo neceſſary

for

for the operation of ſuch remedies as are capable of putting a complete ſtop to the further progreſs of the diſeaſe.

Bliſtering, from its well known power of exciting a copious diſcharge of ſerous fluid, ſeems eminently well calculated for removing ſome of the moſt diſtreſſing ſymptoms of aſthma. However, ſome practitioners of character have ventured to aſſert, that in the ſpaſmodic aſthma bliſters are productive of little or no advantage. This is maintained on a principle that the diſorder is ſeated in the nervous ſyſtem; and never was there a more ſtriking inſtance of the baneful influence of theory unſupported by facts. Caſes no doubt will occur, in which bliſters will often fail in producing thoſe ſalutary effects that were expected: but the ſignal ſucceſs daily attending their uſe, proclaim them on many occaſions a

ſpeedy

ſpeedy and powerful auxiliary in the cure of this diſorder.

Whenever the fits are renewed by the power of habit, bliſters will ſeldom avail any thing in overcoming this tendency in the ſyſtem. It is in the beginning of the diſorder, or when a fit is brought on by the application of cold at any period, that benefit is to be obtained by them.

I always make it a rule to apply a bliſter in the firſt paroxyſm of aſthma, be the cauſe of the diſorder what it may; and as no injury can attend it, but very often the beſt effects may be produced, the propriety of the meaſure is evident.

Bliſters appear to be well adapted to that ſpecies of aſthma where an accumulation of blood in the lungs is found to contribute in ſome meaſure to the fit, and where, of courſe, a plentiful evacuation near the diſeaſed part would be a probable means of

removing

removing it. In every primary aſthmatic complaint, whether the patient be of a full habit or otherwiſe, if, in the beginning of the diſeaſe, the intermiſſions be not complete, or if the breathing be any way uneaſy between the fits, bliſters are not only admiſſible, but ſhould on no account whatſoever be omitted.

It ſhould be a principal object with practitioners, as we noticed before, to bring about if poſſible complete intermiſſions early in the diſorder. Sometimes there will be no need of this indication, as the intermiſſions are often well marked from the beginning; but in the greater number of caſes there is an abſolute neceſſity for it. It is deemed a matter of no conſequence to what part of the thorax the bliſter ſhould be applied; nor is it, I believe, for the removal of the ſymptoms of difficult breathing or tendency to inflammation. But

when

when the aſthmatic fit paſſes off, any difficulty or uneaſineſs of breathing that remains, is in a great meaſure ſupported by the ſtricture at the ſternum. To this part, of courſe, it is evident that the bliſter ſhould be applied, and a diſcharge kept up by iſſue ointment, or elſe a repetition of the bliſter made uſe of, until the deſired effect be produced.

I do not reſt the ſuperior utility of this practice on the reaſoning advanced in ſupport of it: facts, which always plead ſo forcibly when well authenticated, can be readily called to my aſſiſtance. Thus, in two inſtances, I had an opportunity of ſeeing a bliſter at the extremity of the ſternum productive of ſingular ſucceſs, both in removing the ſtricture at this part, and in abating the whole of the ſymptoms, after little or no benefit was obtained by its application between the ſhoulders. By purſuing the

plan

plan now laid down, we ſhall have it in our power to remove any ſymptoms of inflammation that may ſubſiſt, and ſhall ſeldom want of courſe a ſeaſonable opportunity of adminiſtering the neceſſary remedies for putting a final ſtop to the diſeaſe.

Dr. Millar has made an obſervation on the aſthma, that, in my opinion, is very well founded. He ſays, that in the irregular return of its paroxyſms, in its remiſſions, and in the affection of the breathing, it bears a ſtriking analogy to the chin-cough. This diſorder, though evidently of a ſpaſmodic nature, often requires bleeding, bliſtering, and emetics, before we can venture upon a radical cure. During its firſt ſtage, it ſo nearly reſembles a common catarrh, that the one may be readily miſtaken for the other: nay, inſtances do very frequently occur, in which the diſeaſe never

puts

puts on the characteriſtic form of a ſpaſmodic diſeaſe.

This matter is well illuſtrated, by attending to a fact that muſt be well known to practitioners. If a number of children in a family be expoſed to the contagion of chincough, and in conſequence thereof happen to be attacked with ſymptoms of catarrh, it is often found, that while one or two of them diſcover no further ſymptoms of chincough, all the reſt, in a fortnight or three weeks after the firſt appearance, will labour under the convulſive cough and hoop. Moreover, after the paroxyſms are formed, the intervals between are often marked by cough, difficult breathing, and other ſymptoms of an inflammatory affection; ſo much ſo as to render it at times a difficult matter to affix a proper appellation to the diſeaſe. Hence we muſt frequently have recourſe to bleeding, bliſtering, and other evacuants,

in

in order to remove any inflammatory diſpoſition that may exiſt, and put the diſorder in a proper train for the adminiſtration of tonic and other remedies. Motives of a ſimilar nature ſhould often influence our conduct in directing the method of cure in aſthma; for though in many inſtances it early aſſumes the form of a genuine periodical ſpaſmodic diſeaſe, yet, like the chin-cough, it will be conſtantly found in the beginning of a doubtful nature, and, after the fits have come on, to be accompanied with ſtrong marks of an inflammatory tendency.

While it is in this ſtate of a mixed and complicated diſeaſe, little hopes can be entertained of a cure; but if bliſtering, with other evacuations, ſo far ſucceed as to render the breathing free and unembarraſſed in the intervals of the fits, and exhibit the aſthma ſtripped of every ſort of diſguiſe, then

then, there will be room to hope for a favourable termination.

Emetics.—Very frequently in the aſthma the lungs are oppreſſed with a large collection of phlegm, from which it is found neceſſary to free the patient by medicines entitled expectorants. Accordingly phyſicians, to fulfil this intention, have generally preſcribed tart. emetic, ſquills, gum ammoniac, and others of this tribe. From the teſtimony of different writers, it would be ſcepticiſm to deny that theſe medicines have been of ſervice in the aſthma. But, on the other hand, it is to be feared that the conſtant uſe of ſuch drugs may prove injurious to aſthmatics; for they not only increaſe the force of the circulation, and thereby overheat the body, but in a remarkable degree impair the functions of the ſtomach by the conſtant nauſea they

induce, if given in quantity ſufficient for producing any conſiderable effects as expectorants.

Hence, when we wiſh to promote expectoration, an emetic judiciouſly adminiſtered at proper intervals, will certainly prove the moſt ſafe, ſpeedy, and effectual remedy.

Even in thoſe caſes of aſthma where no neceſſity occurs of employing expectorants, vomiting, it is ſaid, may be reſorted to with advantage, for the purpoſe of preventing the recurrence of the aſthmatic fits. This was the practice of Dr. Akenſide: and, on his recommendation, I employed it in three or four caſes with the ſame intention that he did, and always found myſelf diſappointed in my expectations.

Beſides its efficacy as an expectorant, and its effects in removing any catarrhal affection that may be combined with the aſthma,

vomiting

vomiting will be found highly uſeful in relieving the patient of flatulence, diſtenſion of the ſtomach, and other ſymptoms of indigeſtion.

In preſcribing for aſthmatics, it may with juſtice be obſerved, that the more cloſely we adhere to ſimplicity, the better chance we ſtand of aſſiſting them. How is it poſſible that the feeble and diſtended ſtomach of an aſthmatic can bear with impunity ſuch a compound as the following: Suppoſe ſquills, gum ammoniac, ſagapenum, emetic tartar, paregoric elixir, and vitriolic æther, made into a mixture ſecundum artem, and a delicate aſthmatic ordered to take it repeatedly, what ought we naturally to expect to be the reſult? That whatever vigour the ſtomach poſſeſſed before, will now be deſtroyed by ſo many medicines of ſuch various and contradictory operation. It is ſurely more than raſhneſs to overload a

feeble and enervated ſtomach with ſuch a nauſeating farrago: yet we find practitioners preſcribe ſimilar potions in the aſthma, and eagerly contend for their efficacy.

If it be conſidered for a moment with what difficulty their ſtomachs digeſt the lighteſt kind of aliment that can be given to them, we ſhould, I am perſuaded, be very cautious in adminiſtering ſuch compounds; for though one or two patients may be able to withſtand their operation, or ſhould even receive ſome benefit by them, ſtill an indiſcriminate uſe of ſuch heterogeneous mixtures muſt prove in many caſes very prejudicial.

I would not by any means inſinuate that the uſe of medicines, even a variety of them, is to be excluded from the cure of aſthma, as they are ſometimes abſolutely neceſſary: but I maintain, that if ſimplicity

of preſcription be commendable in any diſorder, it muſt be ſo in this, where the ſtomach at times is ſo deranged in its functions, as to partake at length in a great meaſure of the primary ſpaſmodic complaint of the lungs.

Iſſues have been often employed in the cure of aſthma, and I think with much propriety. The idea of a convulſive and ſpaſmodic diſeaſe ſhould not deter practitioners from their uſe, when certain indications point out a probability of ſucceſs from their application.

There are two varieties of the diſeaſe that ſeem particularly to demand their aſſiſtance.

The firſt and moſt ſtriking one is, when the diſorder occurs in perſons of full and plethoric habits. The next is, when the patient, with or without any ſigns of general fulneſs, together with the aſthma

labours under a catarrhal affection. In either caſe the utility of a drain is evident, in order to take off the tendency of the fluids from the internal, and give them a direction to the external parts. If, however, the diſorder ſhould ſtill gain ground, and the body appear to have ſuffered any conſiderable loſs by ſuch, it may not be prudent in ſuch caſes to keep up a conſtant diſcharge, as it might be a means of promoting a proceſs already too far advanced. Iſſues ſhould be immediately inſerted between the ſcapulæ, or in each arm, whenever any ſymptoms of conſumption of the lungs take place: even before they come on, if any apprehenſion exiſts of ſuch an event, no remedy promiſes to be more uſeful than iſſues.

After this account of the evacuations neceſſary to be employed in the aſthma, we are next to conſider what medicines we are

poſſeſſed

poſſeſſed of capable of alleviating or ſuſpending the fits.

For this purpoſe, various remedies have been recommended by different writers, and much contrariety of opinion has prevailed on the ſubject. According to Dr. Willis, the fœtid gums and volatile ſalts have ſometimes produced the happieſt effects: while Sir John Floyer *, from long experience in his own perſon and that of others, reprobates their uſe; and aſſerts, that by their heating quality they increaſe the ſuffocation during the fit, and aggravate every prevailing ſymptom. The writers of modern times do not appear more diſpoſed to coincide.

On this ſubject I cannot venture to give ſo deciſive and ſatisfactory an opinion as I could wiſh, not having had experience ſuf-

* Floyer on the Aſthma, p. 112.

ficient to authorize me to do ſo; for when medicines of this kind were indicated, I ſeldom had an opportunity of giving them, and in other caſes I had recourſe to thoſe of a more unequivocal and powerful operation.

However, from what I have ſeen, I do not think them entitled to the high encomiums of the one, nor that they deſerve the ſevere and undiſtinguiſhing cenſure of the other.

When in the beginning of aſthma the fits recur at very ſhort intervals, after evacuations being premiſed, and that ſymptoms are ſtill preſent which forbid the uſe of opium (as muſt ſometimes be the caſe), will a phyſician look on with indifference, and behold the diſorder advance with rapid ſtrides, without taking ſuch ſteps as may oppoſe its progreſs? No. I dare ſay that every phyſician of judgment, in ſuch a ſituation,

ation, would preſcribe muſk, æther, and aſafœtida itſelf in large doſes, in order to lengthen the intervals of the fits, and give himſelf an opportunity of throwing in the bark and other tonics with freedom.

In the hands of Dr. Millar, aſafœtida, when given in large doſes, proved a very powerful remedy in the aſthma of infants; and it is highly probable that, on many occaſions, with proper management, it may be adminiſtered in the aſthma of adults with advantage. It was cuſtomary with him to join a portion of neutral ſalt with the aſafœtida in a ſtate of ſolution, for the purpoſe I ſuppoſe of procuring a moiſt ſkin, having found by experience that it was often ſucceeded by a complete remiſſion of all the ſymptoms.

As cold is ſo frequently the exciting cauſe of aſthma, we are warranted from analogy to ſay, that ſpiritus Mindereri, and other

medicines

medicines capable of procuring a gentle moiſture at the ſurface, may with propriety be given in the early ſtage of the aſthma; and that of courſe the practice of Dr. Millar may be ſometimes transferred to grown up perſons, and imitated with ſucceſs *. Of this, however, I have had no experience.

Among the various medicines of this claſs, opium unqueſtionably, with certain reſtrictions, holds the firſt rank. Ever ſince its introduction into the cure of aſthma, ſome of the moſt celebrated writers on the diſeaſe have conſidered it peculiarly well adapted to the removal of the ſpaſmodic fits. Willis, Floyer, and others have

* In one caſe of the hyſteric aſthma of Sir John Floyer, I have ſeen aſafœtida produce more good effect than any other medicine of analogous power. When other antiſpaſmodics failed in procuring relief, a large doſe of this operated with ſingular efficacy in abating the ſpaſms of the lungs.

given

given it with freedom, and it has frequently anſwered their moſt ſanguine expectations. Willis in particular ſeems to have made ſome juſt obſervations on its uſe; for though he ſpeaks in high terms of its efficacy, yet he qualifies them in ſuch a manner as to guard againſt its raſh or indiſcriminate application.

Quod ſi hoc modo ſpiritus debacchantes ſedari nequeunt (alluding to the other means that he uſed), ad narcotica (ſays he) perveniatur, ut quibuſdam profligatis cæteri in ordinem redeant: enimvero, niſi obſtat pulmonum infarctus, cum inſigni præcordiorum oppreſſione, opiata nonnunquam inſigniter proſunt. In horrendis morbi hujus paroxyſmis, cum alia medicamina minus effeciſſent, ſæpe bono cum fructu diacodium, imo laudanum tartariſatum, exhibui.

Verum hæc non ſine magna cautione propinantur, quia cum reſpirationem, quæ

jam

jam jam difficilis et præpedita eſt, amplius et nimis impediunt, non raro in vitæ diſcrimen adducunt.

Willis, Oper. Omn. à Blaſio, p. 121, De Medic. Operatione.

A phyſician ſhould be very cautious how he adminiſters opiates to a patient in the firſt paroxyſm of aſthma: he can ſeldom be a competent judge of its nature till the fit wears off, and an opportunity offers of examining its appearance during the intermiſſions. This admonition is the more neceſſary, as the diſorder, in its incipient ſtate, is ſo frequently accompanied with a flow of humours to the internal parts, and evident ſymptoms of an inflammatory tendency.

But as ſoon as theſe obſtacles are removed, no time ſhould be loſt in deliberation; a large doſe of the medicine is to be given without delay, in order to put a ſtop to the fits, and thereby counteract that diſpoſition

poſition in the ſyſtem to renew any irregular motions that have once taken place.

If any inſtruction coming from this pen can have weight with practitioners, I would beg leave todirect their attention in the moſt particular manner to the early ſtage of aſthma; for I can ſafely aver, from experience, that a bold and liberal adminiſtration of opium at this early period (when circumſtances render it admiſſible) will often put the diſorder in ſuch a train, that no extraordinary degree of medical talents or ſkill will be requiſite for finiſhing the cure.

In one caſe of ſymptomatic aſthma from retrocedent gout, it proved a ſpeedy and effectual remedy; and in three or four inſtances of a primary diſeaſe, the tendency in the habit to repeat the fits was ſo far ſubdued, that no difficulty was found in obtaining a complete and laſting cure.

The opium poſſeſſes the power of ſhortening

ening or removing the fits altogether; yet a good deal of addreſs is neceſſary for ſelecting thoſe caſes to which it ſhould be confined, and for adjuſting the mode and time of giving it. If the diſorder has ſubſiſted for any length of time, and that the fits return every night, or at ſhort intervals, in conſequence of the aſcendancy of habit, opium, according to my obſervations, will ſeldom anſwer our purpoſe. In ſome inſtances I have rather found it prejudicial, by rendering the ſucceeding fits more violent, and of longer duration than the preceding. It would ſeem as if the effects of opium in theſe caſes were too tranſitory to produce any permanent alteration in the ſtate of the fibre, and that the habit was too firmly rooted to give way to an operation ſo fugacious as this.

Hence there is an abſolute neceſſity, on ſuch occaſions, of having recourſe to medi-

cines

cines whoſe effects are more durable; and the time ſhould not be trifled away in giving opium, or any other remedy of a ſimilar nature.

It is in the early ſtage of the diſeaſe, or even in an advanced period thereof, if the fit be brought on by accidental cauſes, that we are to place any reliance upon opium; and in order that its full force and efficacy ſhould be diſplayed, a large doſe of the medicine muſt be given immediately before the acceſſion of a fit; or, if this cannot be accompliſhed, as ſoon as any threatenings of it are perceptible. By this management we ſhall often ſucceed in poſtponing the fit, and in laying the foundation of another piece of neceſſary practice, the uſe of tonic remedies.

It appears by the records of phyſic, that thoſe medicines which now-a-days are denominated tonic, were at all times pre-

ſcribed

ſcribed for aſthmatics under one form or other. The bitter acid, ſo much celebrated by Sir John Floyer, and which he borrowed from the ancients, was unqueſtionably of this nature. Modern practitioners however are very limited in their choice of remedies belonging to this claſs: their practice is chiefly confined to Peruvian bark, and a few others of conſiderable powers. Even theſe are ſeldom extenſively employed in the cure of aſthma. Sir John Floyer, who probably firſt introduced the bark, at leaſt who firſt brought it into any general repute, reſtrained its uſe to the hyſteric and other forms of nervous aſthma, in which the fits return at certain ſtated periods. But terms of ſuch vague and doubtful ſignification ſcarcely deſerve to be mentioned in theſe days; and ſtill it is ſurpriſing to find phyſicians adopt them, and direct their practice accordingly.

In

In the firſt ſtage of aſthma, no ſpitting in general takes place till the patient has had repeated attacks of his diſorder; ſo that, from its commencement to the time that this ſymptom ſupervenes, every aſthmatic complaint, let the habit of body be what it may, ſhould be denominated nervous, according to the uſual definitions. But as ſoon as any copious expectoration comes on, this circumſtance alone is ſuppoſed to change its nature, and to conſtitute a different ſpecies.

It is true, indeed, that the recurrence of the fit at a certain hour gives it the appearance of a genuine nervous affection: nevertheleſs it ſhould be conſidered, that this tendency in the diſorder to return periodically, is to be found in every variety and form of aſthma, in the ſpitting kind as well as in that which is accompanied with no ſuch ſymptom.

In Sir John Floyer it aſſumed this type at an advanced period of life, though he was firſt attacked with his aſthma in conſequence of a cold that he got when very young. In fact, it is the caſe with many aſthmatics from the effects of habit on the ſyſtem; and I have often known the diſorder ſhortly after its commencement appear in a periodical ſhape, when it could be evidently traced to the operation of cold.

Many different ſymptoms accompany the aſthma during its courſe, that may in ſome meaſure change its type, though it would be abſurd to eſtabliſh a diſtinct ſpecies on the baſis of every inſtance of this ſort. Should this principle be admitted, there would be no end to the multiplication of ſpecies. The genuine aſthma is, for the moſt part, the ſame in all, but differently modified according to various circumſtances and cauſes.

One aſthmatic diſcharges a conſiderable quantity

quantity of phlegm by coughing, and this is called the humoural or ſpitting aſthma; another is troubled with flatulence, and his is termed the flatulent or hyſteric aſthma; a third perſon's goes under the appellation of plethoric, if he be of a full habit; and ſo on without end.

Hence it is evident that theſe diſtinctions, inſtead of leading to any uſeful or important diſcrimination in practice (as might naturally be expected), have been converted to a very bad purpoſe, by excluding bark from every ſpecies of aſthma that could not be conſidered ſtrictly nervous.

The principal ſymptoms that contra-indicate the uſe of bark in the early ſtage of aſthma, and to which phyſicians ſhould particularly direct their attention, are, inflammation or tendency to it, a full habit of body, and catarrhal affections. All theſe very frequently take place at the ſame time;

and whether they occur conjointly or ſeparately, it would be more than raſhneſs to adminiſter the bark during their exiſtence. But as ſoon as theſe obſtacles are removed by general and topical evacuations, and that no difficulty of breathing remains after the fit has paſſed off, there are very few caſes that will not admit of the bark, particularly if the repetition of the fits be owing to the dominion of the power of habit over the ſyſtem.

The effects of the power of habit in renewing the diſeaſe after the primary cauſes have ceaſed to exiſt, have been already ſpoken of; and in this place it may not be unintereſting to recall the attention to it. Whoever has watched the progreſs of the aſthma with aſſiduity, muſt have remarked that the power of habit operates with the ſame intenſity in this as in other ſpaſmodic diſeaſes; that, if once allowed to take root

and

and extend its influence, all the force of the beſt directed practice will not be able to overcome the oppoſition to be met with. This is fully proved by the concurring teſtimony of practitioners. Hence it is obvious how neceſſary it becomes to watch with anxious care the beginning of the diſorder, and oppoſe with vigour and diſpatch a ſtate ſo dangerous in its tendency, ſo irreſiſtible when once confirmed, as to bid defiance to the united endeavours of experience and judgment.

That the bark may break in upon this habit, and put a ſtop to its further operation, we have reaſon to believe, both from the cure of other ſpaſmodic diſeaſes, and from experience in the aſthma itſelf. Our ſucceſs, it is true, in the latter has not generally anſwered our expectations; and this ſhould probably be attributed in ſome meaſure to a negligence on our part to that pe-

riod of the diſeaſe wherein tonic remedies can act with efficacy.

The cure of aſthma, by means of the bark, ſhould be conducted in the ſame manner as in the caſe of intermittent fevers. The doſes of the medicine ſhould be very large, and ought to be given within a few hours of the acceſſion of the paroxyſm, if we can foreſee the time when the attack is to come on.

With reſpect to the adminiſtration of bark in the humoural aſthma, as it is called, it is to be obſerved, that when the ſpitting is the conſequence of a recent cold, it is very rarely admiſſible: the tendency to inflammation, and ſuch like complaints of the cheſt that generally accompany this affection, proclaim the bark an expedient of a very precarious nature. But as ſoon as the diſorder of the lungs is ſubdued, though the ſpitting ſhould ſtill continue, both reaſon

and

and experience fully juſtify a trial of this truly celebrated medicine.

Caſes however will often be met with, in which ſome ſtuffing of the cheſt takes place from cold in the intervals of the fits, with ſcarcely any increaſe of the preceding difficult breathing, if any had ſubſiſted, or any ſymptom of inflammation; and yet it would be injudicious and improper to adminiſter the bark during its prevalence.

Calcined zinc, commonly known by the name of flowers of zinc, next demands our attention. To the induſtry and abilities of Dr. Withers we are indebted for this diſcovery. From his experiments, it appears that he employed the flowers of zinc in almoſt every form of aſthma, and with aſtoniſhing ſucceſs. Since his publication in 1786, I have not heard of any further teſtimony in its favour: for I do not know any practitioner that has followed his very

laudable example, in inſtituting a regular ſet of experiments for this purpoſe.

In ſeveral inſtances it has been adminiſtered, to my knowledge, in pretty large doſes, and with evident advantage; while in other trials its efficacy could not be diſcerned, though given agreeably to the inſtructions delivered by Dr. Withers himſelf.

Without any intention to deduct from the authenticity of thoſe caſes recorded by Dr. Withers, it is to be hoped that practitioners of abilities, who have frequent opportunities, will imitate his conduct, in order to appreciate the virtues of this medicine, and aſcertain how far it may be relied upon in the multifarious caſes of this obſtinate diſorder that daily preſent themſelves in practice.

Like the bark, it will probably be found moſt effectual when given in the intervals of the paroxyſms, in as large a doſe as the

ſtomach

ſtomach is able to bear; and when no obſtruction, difficult breathing, or inflammation, exiſts to counteract its operation. Yet Dr. Withers aſſerts that, together with its tonic, it poſſeſſes an antiſpaſmodic power; and ſays, that he found it beneficial in removing the difficulty of breathing, as well as in preventing the return of the fits. Something ſimilar to this has been remarked of the Peruvian bark. A caſe is related by Sir John Floyer, of a Lady* afflicted with the aſthma, who, on taking a dram of bark, found her breathing immediately relieved; and, by perſevering in its uſe, ſhe got rid of her diſorder for a conſiderable length of time.

Theſe facts plead very forcibly in favour of a free and undaunted application of ſuch medicines in caſes of an apparently equivo-

* Floyer on the Aſthma, p. 20.

cal

cal nature: they in particular ſhew us that we are not to be deterred from preſcribing them on certain occaſions, though the breathing ſhould not be perfectly free in the remiſſions.

When water in the cheſt, tubercles, and other organic affections are complicated with the aſthma, it is evident that neither theſe nor any other kind of tonic can be given with ſafety or advantage.

Such are the obſervations that have occurred to me on the different remedies uſually employed by phyſicians in the cure of aſthma. Other means beſides, ſuch as mercury, mineral waters, &c. have been recommended by particular writers; but I purpoſely omit their diſcuſſion in this place, not having it in my power to advance any thing from experience concerning them that would prove uſeful or ſatisfactory. For inſtruction on theſe ſubjects, I muſt refer my readers to

thoſe authors who have had proper opportunities of being well informed of their efficacy and powers. I alſo avoid entering into any conſideration of the regimen and diet fit for aſthmatics, as this ſubject is treated with great judgment by Sir John Floyer, Dr. Withers, and other ingenious phyſicians.

On a retroſpective view of the various remedies treated of in the foregoing pages, a queſtion very naturally preſents itſelf—Is the cure of a confirmed aſthma to be expected from a judicious management of them? If we be governed in our deciſions on this point by the experiments of Sir John Floyer, we ſhould anſwer without heſitation, that a complete cure cannot be effected by them, or in conjunction with the other auxiliaries in common uſe.

Sir John Floyer's Treatiſe on the Aſthma (as far as I can learn) has been erected not

only as a ſtandard for the practice, but for the doctrine of prognoſtics alſo.

The reſpectability of his medical character, his minute and very accurate deſcription of the diſeaſe, his courſe of experiments inſtituted on his own perſon, carry a degree of plauſibility with them that is not a little impoſing. Neither his candour or fidelity in relating the effects of the numberleſs remedies he tried, can be called in queſtion; yet it muſt be acknowledged that the reſult of his experiments has infuſed ſuch a large portion of ſcepticiſm and incredulity into the minds of phyſicians, as muſt have repreſſed their ardour for improvement, and lulled them into an acquieſcence in the futility of almoſt every kind of medicine in the aſthma.

It would be as unphiloſophical to deduce any concluſion from Sir John's experiments, derogatory to the power of medi-

cine,

cine, as it would from ſimilar trials made on a perſon labouring under the epilepſy for the ſame number of years that he laboured under the aſthma.

According to Sir John's own account of himſelf, he was attacked with the aſthma when he firſt went to ſchool, which muſt have been at a very early period of life; and by the time that he arrived at an age fit for making experiments, his diſorder was ſo firmly fixed in the conſtitution, that it was no longer in the power of medicine or regimen to remove it.

When a diſorder, particularly a ſpaſmodic one, has ſubſiſted for a number of years, it is not reaſonable to expect that the action of medicine will produce any ſignal or extraordinary benefit: to an early period, if at all, we muſt look for ſatisfactory and ſtriking proofs of their efficacy; and if the medicines we are poſſeſſed of be tried by this teſt,

teſt, their effects will not be found ſo deſpicable as ſeveral have imagined. On many occaſions, when properly managed, they will put a ſtop to the progreſs of the diſeaſe; and if the occaſional cauſes be afterwards avoided, a radical cure may often with certainty be obtained. This event, however, will not take place as often as could be wiſhed, in ſuch a variable climate as this, without further aſſiſtance. We ſhall frequently meet with diſappointment in our expectations of the moſt powerful medicines, though given in circumſtances highly favourable to their operation; and ſhould we even ſucceed in ſubduing the diſeaſe for a time, yet all the circumſpection in our power will not in general be able to guard againſt a relapſe.

To make up for this deficiency, and, on the whole, to eſtabliſh the cure of this diſeaſe on a firm baſis, cold-bathing muſt be

called

called to our aſſiſtance. In truth, its efficacy has appeared to me ſo ſtriking in many caſes, both in removing the fits and in preventing a relapſe, that, if the inſtructions contained in the ſucceeding part of this work be properly attended to, I do not heſitate to declare, that very few ſpaſmodic diſorders, of ſuch magnitude as the aſthma, will be found ſo completely within the reach of our art.

PART

1817

CHAP. VI.

OF COLD-BATHING.

OF all the remedies that phyſicians are acquainted with, there is probably not one held in more univerſal eſteem for the cure of many diſeaſes than cold-bathing. In the long catalogue of chronic complaints, particularly in the nervous and ſpaſmodic, experience has ſtamped a value on it ſuperior to that of any medicine yet diſcovered. In the aſthma, however, this practice has been rarely recommended, as will fully appear from what is to be met with on the ſubject in the writings of phyſicians.

We find but one of all the ancient

writers who recommends cold-bathing in the aſthma.

Cælius Aurelianus ſays, that reſiding at the ſea-coaſt, and bathing in the water, are highly uſeful to aſthmatics; though he produces no inſtance of its ſucceſs to ſupport his aſſertion.

The next authority that we have is Sir John Floyer, who gives ſome proofs of its utility, in his Treatiſe on Cold-Bathing.

"I have (ſays he) diſcourſed with an "aſthmatic perſon, who has had an habitual "aſthma for many years, and ſhe informed "me, that ſhe went into St. Winifred's Well "a Holywell, and that her aſthmatic dry "cough went off for ſome time, but at laſt "returned again."

Treatiſe on Cold-Bathing, p. 121.

"I have had ſeveral accounts of people "being much relieved, and ſome perfectly "cured by the uſe of cold immerſion, in "aſthmas,

" aſthmas, and other difficulties of breathing,
" eſpecially if the infirmity is taken in the
" beginning, and not confirmed by time:
" yet an old gentleman, of ſixty years,
" lately told me that, having had a convul-
" ſive aſthma for at leaſt ſeven years, he was
" ſo cured by three times bathing, that he
" had not the leaſt fit for three months after;
" and believes that, had he lived tempe-
" rate, and continued bathing ſometimes, it
" would not have returned."

Ibid. p. 314.

Dr. Millar, in enumerating the different authorities in ſupport of cold-bathing, tranſcribes a paſſage from Dr. Baynard's Eſſay on this ſubject: but as this quotation agrees word for word with the preceding one from Sir John Floyer, I think it unneceſſary to inſert it here.

I have not the work of Dr. Baynard at preſent in my poſſeſſion, but I imagine that

he took this paſſage from Sir John's work, and that Dr. Millar was miſtaken in ſuppoſing that it originated with Dr. Baynard himſelf.

If this be not the caſe, I cannot account for ſo extraordinary an inſtance of two writers exactly correſponding in their ideas and language on ſuch a ſubject as this.

The only writer that remains to be conſidered is Dr. Smollet, who gives a circumſtantial account of the effects of cold-bathing on his own perſon.

"In conſequence of a cold caught in a "few days after my arrival in France, I was "ſeized with a violent cough, attended with "a fever and ſtitches in my breaſt, which "tormented me all night long without "ceaſing. At the ſame time I had a great "diſcharge by expectoration, and ſuch a "dejection of ſpirits as I never felt before. "In this ſituation, I took a ſtep which may

"appear

" appear to have been deſperate. I knew
" there was no impoſthume in my lungs,
" and I ſuppoſed the ſtitches were ſpaſmo-
" dical. I was ſenſible that all my com-
" plaints were originally derived from re-
" laxation. I therefore hired a chaiſe, and
" going to the beach, about a league from
" the town, plunged into the ſea without
" heſitation. By this deſperate remedy I
" got a freſh cold in my head: but my
" ſtitches and fever vaniſhed the very firſt
" day, and, by a daily repetition of the bath,
" I have diminiſhed my cough, ſtrengthened
" my body, and recovered my ſpirits."

Smollet's Travels, vol. i. p. 22.

Dr. Smollet alſo mentions, in another part of his work, that he had two returns of his diſorder, and that at each time he ſubdued it by ſea-bathing.

His agitatus furiis, æger ad mare provolat: in fluctus ſe præcipitem dat: periculum

factum ſpem non fefellit: decies iteratum felix fauſtumque evaſit. Elater novus fibris conciliatur—febricula fugatur—aëris dyſpnœa ſolvitur.

Ibid. p. 179.

Deſperatis denique rebus iterum ad mare veluti ad anceps remedium recurritur. Balneum hoc ſemper benignum. Dolor ſtatim avolat. Tertio die febris retroceſſit. Immerſio quotidiana antemeridiana ad vices quinquaginta repetita ſymptomata graviora ſubjugavit.

Ibid. p. 180.

Theſe then are the principal, if not the only facts that the records of phyſic afford in favour of cold-bathing in aſthma; and, before we proceed any farther, a few obſervations on each ſhall particularly engage our attention.

From what is to be found in the writings of Cælius Aurelianus relative to this practice, very few, I ſuppoſe, would be fond of adopting

adopting it. The bare ipſe dixit of an author, let his reputation be what it may, will ſeldom induce practitioners to preſcribe any remedy of a precarious nature; they muſt have ſomething beſides conjecture to recommend it to their notice.

No ſuch charge, however, can be brought againſt Sir John Floyer, as he appeals to the teſt of experiment for what he has advanced, and gives a ſatisfactory account of the effects of the water on ſome aſthmatic patients.

But, did Sir John, in conſequence of the information he had on the ſubject, conſider cold-bathing a remedy well adapted to the cure of aſthma?

He laboured under the aſthma, according to his own acknowledgement, for the greater part of his life, without obſtructions in his lungs, or any other diſorder in which cold-bathing would be prejudicial; and ſtill

we

we do not find that he had courage enough to make uſe of this remedy.

Moreover, he does not inform us, in any part of his Treatiſe on Cold-Bathing, that he tried it on his patients, or even recommended it to them; and when he comes to give his own opinion, he delivers it in ſuch an equivocal manner, as to leave very little doubt on the minds of his readers, that he placed no great confidence in it, and that he was not well qualified to decide on its virtues.

"I cannot believe (ſays he) that cold-
"bathing can help any defluxions, ſuch as
"the aſthma, without water drinking, and
"in a recent diſeaſe."

Treatiſe on Cold-Bathing, p. 20.

That the internal uſe of cold water ſhould aſſiſt its external application in the aſthma, is an aſſertion of ſo extraordinary a nature, that very few will be diſpoſed to attend to it;

it; and I am convinced that, if Sir John Floyer had experience for his guide in this matter, he never would have been led into this miſtake, nor have broached ſo erroneous a doctrine.

The caſe of an aſthmatic patient will be related hereafter, who, during a courſe of ſea-bathing, drank at leaſt a bottle of wine every day, and ſometimes exceeded this quantity without any injury. In fact, I never gave any particular directions on this head, except in the preſent caſe, and wine was found abſolutely neceſſary from the low and debilitated ſtate of the patient: all the reſt were allowed to drink whatever agreed beſt with them, and the cure went on as well as if the moſt ſcrupulous attention had been paid to this point. There is one circumſtance that ſeems to have led Sir John into this miſtake. He in general found that water agreed better with his aſthmatic

patients

we do not find that he had courage enough to make uſe of this remedy.

Moreover, he does not inform us, in any part of his Treatiſe on Cold-Bathing, that he tried it on his patients, or even recommended it to them; and when he comes to give his own opinion, he delivers it in ſuch an equivocal manner, as to leave very little doubt on the minds of his readers, that he placed no great confidence in it, and that he was not well qualified to decide on its virtues.

"I cannot believe (ſays he) that cold-
"bathing can help any defluxions, ſuch as
"the aſthma, without water drinking, and
"in a recent diſeaſe."

Treatiſe on Cold-Bathing, p. 20.

That the internal uſe of cold water ſhould aſſiſt its external application in the aſthma, is an aſſertion of ſo extraordinary a nature, that very few will be diſpoſed to attend to it;

it; and I am convinced that, if Sir John Floyer had experience for his guide in this matter, he never would have been led into this miſtake, nor have broached ſo erroneous a doctrine.

The caſe of an aſthmatic patient will be related hereafter, who, during a courſe of ſea-bathing, drank at leaſt a bottle of wine every day, and ſometimes exceeded this quantity without any injury. In fact, I never gave any particular directions on this head, except in the preſent caſe, and wine was found abſolutely neceſſary from the low and debilitated ſtate of the patient: all the reſt were allowed to drink whatever agreed beſt with them, and the cure went on as well as if the moſt ſcrupulous attention had been paid to this point. There is one circumſtance that ſeems to have led Sir John into this miſtake. He in general found that water agreed better with his aſthmatic

patients

patients than any other liquid; and, from this principle, he was probably led to believe that cold-bathing would prove injurious, unleſs the patients reſtrained themſelves to the drinking of water during the cure.

The only remaining fact to be conſidered is that related by Dr. Smollet, concerning his own perſon.

In his caſe, cold-bathing was attended with the moſt extraordinary ſucceſs, notwithſtanding there were many circumſtances which ſeemed to point it out as a deſperate expedient. He ſays, that he was induced to try it, from an idea he had of his diſorder originating in relaxation.

It may look like preſumption in me to differ in opinion with a man of no inconſiderable knowledge in medicine about the cauſe of his diſorder, and one who, it is to be ſuppoſed, was well acquainted with the

cauſes that contributed to his valetudinary ſtate; but whatever had been his previous conſtitutional infirmity, the aſthmatical attack in queſtion was evidently the effect of cold, had no connexion with relaxation or debility, and of courſe did not warrant ſo raſh and immediate a uſe of cold-bathing.

The ſuddenneſs of the attack, attended with fever, ſtitches, and expectoration, proclaim a ſtrong tendency to inflammation in his diſorder, and ſhould have deterred him from trying ſo hazardous an experiment until the violence of the ſymptoms had in a great meaſure abated. By his own confeſſion he got a freſh cold in his head, which he probably would have eſcaped, had he waited for a few days till the feveriſh ſtate of his diſorder paſſed off; and it is aſtoniſhing to find that nothing more ſerious befel him in ſuch a ſituation. But he was not to be diſmayed: he perſevered in his reſolution,

lution, and had unheard-of ſucceſs. A ſecond and a third time he had recourſe to this remedy, and with no leſs impunity than at firſt.

Phyſicians, however, ſhould be very cautious how they conſider the fortunate iſſue of this caſe, an example worthy of imitation.

In every recent attack from cold, or indeed from any other cauſe, it would be highly imprudent to precipitate a perſon into a cold bath, without farther ceremony, though no inflammatory ſymptoms were preſent at the time. But how much more raſh and unguarded muſt it be, to direct cold-bathing for an aſthmatic labouring under fever, ſtitches, and difficult breathing, which indicate at leaſt a ſtrong tendency to inflammation in the lungs!

To illuſtrate this, I will give a caſe.

There was a gentleman under my care very

very lately, who, from cold-bathing, was fortunate enough to get rid of his aſthmatic fits, in a great meaſure, after every other method had failed: but by unguardedly expoſing himſelf to cold air, he unluckily got a relapſe. Not dreading, however, any bad conſequence from a remedy that had hitherto ſerved him ſo eſſentially, he continued to bathe every day, until an affection of the lungs, bordering on a peripneumony, obliged him to deſiſt.

This ſhews us very clearly what riſque a perſon in Dr. Smollet's ſituation muſt run from cold-bathing, and accordingly we do not find that his ſucceſs has excited any ardent deſire in the breaſts of other practitioners to follow his example: indeed there is ſo much of the marvellous in his caſe, that one may naturally ſuppoſe it would rather ſuppreſs than promote ſuch a diſpoſition in people of prudence and reflexion.

On

On the whole, it is evident that the facts and obſervations to be found in medical authors relative to cold-bathing in the aſthma, are few, unſatisfactory, and deficient. That they have had no weight with practitioners, is fully evinced by the medical writings of modern times.

In all the late publications on the aſthma, cold-bathing is not even mentioned as a remedy, except in one work *, and that too in a tranſient manner: no new facts are brought forward, to give additional credit and ſtability to this practice: the author implicitly relies on the authority of Dr. Millar, and he (as we have already ſeen) reſorts to the doubtful evidence of Sir John Floyer and Dr. Smollet, without any experience of his own to corroborate the teſtimony of either.

The practice of phyſicians, according to

* Withers on the Aſthma, p. 114.

my

my information, is perfectly conformable to their writings. If bleeding, bliſtering, and the reſt of the common and well-known remedies happen not to ſucceed, they give up the ill-fated victim to patience and an incurable diſorder.

It is not to be wondered at, that the caſes related by Dr. Millar ſhould have been paſſed by unnoticed by phyſicians. A few ſolitary facts, though unexceptionable as to their authenticity, when founded on experiments of an apparently dangerous nature, and delivered without any attempt to form a ſyſtem of principles, will ſeldom flaſh conviction on the minds of people that are accuſtomed to hear facts publiſhed with confidence by one phyſician to-day, and contradicted by another with the ſame certainty the next.

Theſe, with other conſiderations, have induced me to inſtitute the following expe-

riments, in order to decide on the propriety of cold-bathing in the aſthma; and, I ſuppoſe, the very lame and imperfect account of it to be found in the works of phyſicians, will fully juſtify the undertaking. To guard againſt any objection that may be made to the facts I want to eſtabliſh, I took down a particular ſtate of each caſe at the time the patient was committed to my care, and obtained a preciſe and ſatisfactory account of the operation of the water, either during the progreſs of the cure, or, if this could not be had, immediately after it was fully completed.

In ſhort, from the ſituation of the different patients before recourſe was had to cold-bathing, from the inefficacy of the other remedies employed, and from the manner in which the experiments were conducted, I expect it will appear that no fallacy can be diſcovered in the inferences drawn from them,

them, nor any room left for cavil or contradiction on this ſubject. In many caſes beſides the following, I have known cold-bathing prove highly ſalutary: but as I was not exact in committing to paper the hiſtory and cure of ſuch patients, I cannot think of offering any fact from memory alone, but ſhall confine myſelf to a more faithful and authentic record.

CASE I.

The firſt inſtance of the good effects of cold-bathing in aſthma that happened to come within my knowledge, was that of a woman, about twenty-five years of age, who had borne ſeveral children. From her firſt pregnancy onwards, ſhe was ſubject to ſpaſmodic complaints of the ſtomach and bowels, both during the periods of geſtation, and the intervals thereof; without the ſmalleſt

tendency, however, to any diſorder of the lungs. But on expoſing herſelf to cold ſhortly after a lying-in, ſhe began to feel an uneaſineſs in her breathing, attended with a ſhort teaſing cough, which, in a few days, terminated in a confirmed ſpaſmodic aſthma. In no caſe whatſoever were the pathognomonic ſymptoms of idiopathic aſthma better marked than in the preſent: the fits returned moſt commonly late in the evenings, preceded by flatulence, continued through the night, and ended towards morning with a free and plentiful expectoration. In fact, all thoſe ſymptoms were preſent that uſually characteriſe the moſt violent and alarming ſtate of this diſeaſe.

Bliſters, aſafœtida, camphor, and the reſt of the uſual remedies in thoſe caſes were tried; but all to no purpoſe, for the fits ſtill returned every night with very little abatement of their violence. At length recourſe

courſe was had to cold-bathing, and the ſucceſs that attended its uſe far exceeded any expectations that were formed of it. In leſs than a week from the firſt immerſion, the patient found herſelf very ſenſibly relieved; and by continuing the practice for the ſpace of ſix weeks, ſhe obtained a complete and laſting recovery.

If a ſingle fact can authoriſe a particular mode of treatment in any diſeaſe, we are certainly warranted in recommending the cold bath in aſthma from the precedent before us, eſpecially as the utmoſt precaution was taken to guard againſt any deception about it. I was altogether ſo exact, that I even intermitted the bath for a few days, after ſome change for the better had taken place, in order to ſatisfy myſelf of its efficacy: but the patient began to relapſe ſo ſuddenly into her former ſituation, that

an immediate repetition of the bath was found abſolutely neceſſary.

Hence we ſee that very little room is left for ſuppoſing that nature was in any degree entitled to the merit of this recovery; and this will be the more readily acceded to, if people conſider how feeble and deficient her endeavours muſt be, when engaged in combat with ſuch a formidable adverſary as the aſthma.

River water was the bath made uſe of on this occaſion, from its vicinity to the patient's habitation, and as a preparatory ſtep to bathing in the ſea; but as the former anſwered every purpoſe that could be expected, the latter was neglected, and the cure went on equally well without its aſſiſtance. This, however, is the only inſtance in which I have ſeen a cure obtained without ſea-bathing; its powerful ſtimulus being

in

in moſt caſes neceſſary for reſtoring to the lungs their loſt elaſticity and tone.

CASE II.

RICHARD DUNPHY, of whom ſome account is to be given in this place, was about the age of forty when firſt attacked with the aſthma. During the winter ſeaſon, in particular, he was ſubject to frequent fits of his diſorder; and, in the intervals of them, was affected with more or leſs of difficult breathing. He laboured under his diſorder twelve months and more, when he firſt applied to me in April 1785. Several remedies were tried, ſuch as antiſpaſmodics, bliſters, expectorants and others, with little or no alleviation of the ſymptoms: indeed the diſorder ſeemed to gain ground, notwithſtanding the repeated uſe of them for the ſpace of ſeven weeks.

Finding very little probability of gaining any advantage by the medicines of the Materia Medica, I thought myſelf bound to recommend a trial of the cold bath, from the glaring proofs of its efficacy in the caſe juſt now related; nor had I any cauſe to repent of my raſhneſs, as the patient ſoon experienced the happineſs of getting rid of a diſorder which muſt have inevitably terminated in his death. By his own account, it appears that he had not bathed above ſix days, when he found a very ſenſible change for the better; and by continuing the practice once a day for ſeven weeks only, the aſthmatic fits were totally removed.

On this occaſion ſea-bathing was made uſe of, and nothing was done previous to the courſe, except the taking of a mild purgative: the precautions to be mentioned hereafter were not attended to in this, or in the caſe immediately following: both

patients

patients were conſtantly employed in bodily labour; and on this account they probably did not ſtand much in need of a preparation for ſea-bathing, by having firſt bathed in water of a warmer temperature.

CASE III.

RICHARD HOLLAND, ætat. 48, was ſubject to a cough at different times, for ſeveral years, but was at laſt ſuddenly ſeized with a fit of the aſthma at night, that obliged him to ſit up in bed till morning. From that time till he applied to me in April 1787, which was about two years, he was very few nights in the winter ſeaſon free from an attack. In the ſummer ſeaſon alſo, the fits very conſtantly returned. At all times his breathing was rather difficult, attended with a ſtricture at the cheſt, which ſeemed to impede the expanſion of the lungs.

lungs. His cough, though generally hard through the day, was ſoft in the morning, and generally afforded relief. Being apprehenſive of tubercles having formed in his lungs, from the long continuance of the cough previous to the aſthma, I had ſome doubts about the propriety of cold-bathing: but on finding his pulſe very regular between the fits, I concluded that they had not yet taken place, as a quickneſs of pulſe is generally the conſequence of ſuch an internal irritation: I then, without waiting to ſee the effects of medicine, adviſed him, as ſoon as the ſeaſon ſhould advance, to make a trial of cold-bathing; and in order to induce him to it, I told him that there were little or no hopes of a cure from any other ſource. In defiance of the general outcry of his friends againſt the danger of the remedy, he followed my advice, and, to my aſtoniſhment, returned from bathing

in three weeks time, perfectly free from aſthma, or difficulty of breathing of any kind.

CASE IV.

WILLIAM DONOVAN, of this city, carpenter, ætat. 46, laboured under the aſthma for ſeventeen weeks, when he came to me in September 1789. He informed me that, for a month before the aſthma appeared, he was troubled with a cough. The aſthmatic fits generally came on at night, though at times he would have two or three attacks during the day. His breathing between the fits was ſeldom or never free, particularly if he made any exertion that hurried him, as in walking ſmartly, or in attempting to aſcend any eminence. During the above length of time that he was afflicted with the aſthma, he was never able to work

one

one day at his trade. Being of opinion that medicine would avail him very little in his ſituation, I recommended a trial of ſea-bathing. For the firſt week the water had no effect in diminiſhing the violence or duration of his fits, though in other reſpects, as in mending his appetite and ſpirits, he experienced ſome benefit. About the tenth day his breathing began to grow better; and by continuing to bathe every day for three weeks only, he got completely rid of his aſthma. At the preſent time, he is as well able to work at his trade as ever.

CASE V.

MICHAEL M'BAY, ætat. 22, by expoſure to cold, got a ſevere cough that held him for three months, and then terminated in a tightneſs of the cheſt, lowneſs of ſpirits, diſtenſion of the ſtomach, and flatulence. He

was

was not many days troubled with theſe ſymptoms, when he was ſuddenly ſeized with a difficulty of breathing, that ſeemed to threaten immediate ſuffocation. About twelve o'clock every day he had an aſthmatic paroxyſm of this kind for upwards of three weeks: but by degrees they began to diſappear; and when he came to me in June 1789, his chief complaints were, diſtenſion of the ſtomach from wind, low ſpirits, and ſtricture acroſs the lower part of his cheſt. He told me that he had applied to different practitioners, without receiving any benefit from their preſcriptions. Judging that the uſual remedies, in ſuch caſes, had been adminiſtered, I applied a bliſter to the lower part of the cheſt, and directed him, as ſoon as the part ſhould heal, to plunge himſelf in a river every morning, it being at that time the only bath that could be conveniently procured. He followed

my

my advice, and came every day to inform me what effect the water had on him.

It is curious enough to find that, during the time of immerſion, the ſtricture at his cheſt, and any uneaſineſs he had in his breathing, vaniſhed inſtantaneouſly, and did not return for a conſiderable time after he came out of the water. To make uſe of his own phraſe, he felt his cheſt grow wider; and this effect was produced on the firſt, as well as on every other ſubſequent bathing. Finding, however, after the expiration of eight or ten days, that he did not mend according to my expectations, I thought that ſea-bathing might produce that permanency of effect which was experienced in the former caſes. But in this I was diſappointed. After bathing in the ſea for three weeks, he had ſtill ſome remains of the weight and ſtricture of his cheſt; but his lowneſs of ſpirits, diſtenſion of the ſtomach, and other

nervous

nervous and hypochondriacal ſymptoms were completely removed.

Though a radical cure was not obtained by the bath in the preſent caſe, it nevertheleſs operated in ſuch a manner as to ſtrike the mind with a full conviction of its efficacy in ſuppreſſing the ſpaſmodic affections of aſthma; and it is more than probable, from the great benefit this patient received, that had he perſiſted in bathing for ſome time longer, a complete cure would have been the conſequence.

CASE VI.

Mr. H. ætat. 30, of a melancholic temperament, and ſubject at times to vomitings, lowneſs of ſpirits, giddineſs, and other ſymptoms of hypochondriaſis; at length was ſuddenly ſeized with a ſlight fit of the aſthma, about twelve o'clock at night.

About

About the ſame hour every night for the ſpace of three weeks he had an attack, and every ſucceeding one was more violent than the former.

Dr. Thomas Butler, a phyſician of eminence in this place, and I, were called to his aſſiſtance.

On examination, we found that his diſorder had already made a conſiderable breach in his conſtitution: his pulſe was ſmall, ſlow, and extremely feeble; he was much reduced in fleſh; his hands trembled; his limbs tottered under him; and he ſeemed ſcarcely able to walk acroſs the floor. Beſides this general ſtate of debility, he complained of a ſtricture and weight of his cheſt in the intervals of the fits, that took place on the fifth or ſixth day of his diſorder.

To remove the ſtricture, and prevent the return of the paroxyſm at night, a bliſter was applied to his cheſt; and a draught, with

with paregoric elixir, and ſome drops of the theb. tinct. to render its operation the more effectual, was preſcribed, with directions to have it adminiſtered about a quarter of an hour before the uſual time of the coming on of the fit.

The report next morning was as follows:

24*th*. Had a violent fit at the uſual hour, and ſeems quite low and exhauſted this morning, notwithſtanding his bliſter roſe well, and he took the draught as directed.

On this Dr. Butler propoſed the uſe of the Peruvian bark, in as large doſes as the ſtomach could bear; and from the periodical nature of the complaint, and the enervated ſtate of the patient, it ſeemed to be particularly well adapted to his ſituation, and to promiſe more ſucceſs than any other medicine whatſoever. It was combined with valerian, in the following form:

M ℞. Cort.

℞. Cort. Peruv. Rub. pulv. ℥j.
Rad. Valer. Sylv. pulv. ℥iij.
Syrup. Zingib. q. ſ. ut fiat Electar.—cujus ſumat æger cochleare parvulum 2da quaque hora.

25*th.* He is conſiderably better this day, though the medicines diſagree with his ſtomach. He had but a ſlight fit this morning at four o'clock, that diſappeared in a few minutes. The electuary was continued in the ſame form and quantity.

26*th.* He is not ſo well this morning as yeſterday: had a fit, about four o'clock, that held him three quarters of an hour.

27*th.* The paroxyſm came on about three o'clock, and continued an hour. The electuary ſtill produces ſickneſs of ſtomach, and other diſtreſſing ſymptoms.

To obviate theſe complaints, and to throw in a greater quantity of the bark if poſſible, it was given to him in the form of pills, with an aromatic; and as the flowers of zinc,

zinc, it was ſuppoſed, might aſſiſt its operation, they were ſubſtituted in room of the valerian, and joined to the bark.

28*th.* The fit returned at two o'clock, and continued about an hour and a half, of the ſame violence as the night before.

29*th.* He had a return of the aſthmatic fit laſt night, that continued above an hour.

30*th.* He had a violent attack, which laſted between two and three hours, though he increaſed the doſe of his pills, ſo as to have taken on the 28th and 29th an ounce of bark, and twelve grains of the flowers of zinc each day.

From the foregoing reports, we ſee that the Peruvian bark, on the firſt days of its adminiſtration, conſiderably checked the progreſs of the aſthma; but that, as ſoon as the ſyſtem became habituated to it, its efficacy began to diminiſh every day, till at

length it produced no good effect whatſoever.

It appears extremely probable, indeed, that if the bark could have been given in ſufficient quantity on the firſt onſet, a complete ſtop would have been put to the fits: this, however, was rendered impracticable, by the delicate ſtate of the patient's ſtomach; and all our hopes of a cure from this ſource were fruſtrated. The addition of the flowers of zinc did not render it more effectual.

It is worthy of notice, that, at the time the bark ſeemed to operate moſt advantageouſly in combating the diſeaſe, it had little or no effect in reſtoring the patient to his former ſtate of vivacity and vigour; he ſtill remained depreſſed in his ſpirits, feeble in his limbs, and in every reſpect as enervated as before he began to make uſe of it.

This diſappointment from medicines of

the moſt promiſing nature, fully juſtified a trial of ſome very active and powerful remedy. Accordingly, from my experience of its efficacy in the preceding caſes, I ſuggeſted to Dr. Butler the uſe of ſea-bathing, as the only expedient now left that afforded any flattering expectations. To this he readily aſſented, and informed me, that an aſthmatic, by his advice, had recourſe to it very lately with extraordinary ſucceſs. To prepare our patient for bathing in the ſea, an artificial ſalt bath was immediately got ready; and, on the firſt immerſion, he had no return of the paroxyſm that night, though he awoke at the hour it uſually came on. In this manner he paſſed five or ſix nights free from any threatening of an attack; but on going into the bath one morning, he unfortunately got cold, and, in conſequence thereof, he had a ſlight fit that night.

As he got directions to repair to the ſea

after a few dips in the artificial bath, it happened unluckily that he went there at the time he got this relapſe from cold: for, during the firſt week of bathing, inſtead of any amendment taking place, we find him grow worſe and worſe every day.

At the end of this period, however, he began to improve; and, in the ſhort ſpace of a fortnight, he completely recovered his appetite, his ſtrength, and his ſpirits.

Beſides this re-eſtabliſhment of his general ſtate of health, he had ſcarcely any remains of the aſthma; not more, in fact, than what ſhewed that the tendency in the ſyſtem to renew the fits was not entirely eradicated. For the laſt week he was quite free from aſthma, except once or twice that he had ſome uneaſineſs in his breathing, that vaniſhed in a few minutes.

Deluded by theſe appearances of a complete recovery, and ſeized with a ſtrange

and

and unaccountable inſenſibility of the precarious ſituation in which he ſtill remained, he relinquiſhed the water, in direct oppoſition to the advice of his phyſicians, and the eager and preſſing ſolicitations of his friends. During ſix weeks from the time that he left off bathing in the ſea, he remained without any perceptible alteration for the worſe; but by frequent attacks of cold, his diſorder returned to its ancient form.

In the preceding caſes, it has been my chief aim to relate, in a plain and perſpicuous manner, the hiſtory of the diſeaſe in each of my patients, and the effects of cold-bathing on them, without any wiſh or deſire to exaggerate its virtues. Let others decide how far they may ſerve as examples worthy of imitation. Though conſcious of not having been deceived by falſe appearances in the obſervations I made, and

that I have not been duped by any partiality to the practice in queſtion, I ſtill think it neceſſary, from the difficulty that attends the aſcertaining of facts, to ſtrive to eſtabliſh the ſafety of cold-bathing in aſthma, by arguments drawn from a different ſource to that of the experiments above mentioned, and to anſwer every objection that can poſſibly be made againſt it.

Thus both facts and reaſoning will unite in confirmation of this practice, and will exhibit a body of evidence in its favour, as ſtrong and convincing as is generally met with on a ſubject of this nature.

CHAP.

CHAP. VII.

COUGHS, catarrhs, and other diſorders of the lungs, are very common in the winter ſeaſon, in all cold climates. Such complaints are, with ſome reaſon, ſuppoſed to originate in ſuppreſſed perſpiration, or in a change of the circulation of the fluids from the external to the internal parts, in conſequence of the operation of cold. On either ſuppoſition, cold-bathing muſt be looked upon as a very extraordinary mode of cure for any pulmonary affection. And as it appears from daily obſervation, that the application of cold is the moſt frequent cauſe of aſthma, cold-bathing muſt be as prejudicial in this, as in any other complaint of the lungs whatſoever.

It happens to be the caſe with aſthmatics in general, as it is with perſons who have other complaints of the lungs, that the winter ſeaſon is, for the moſt part, injurious to them: hence it follows, that cold-bathing, whoſe operation is ſimilar to that of cold air, muſt be a precarious remedy in the aſthma. Theſe are the principal arguments that, in my opinion, can be advanced againſt cold-bathing in the aſthma; and in all probability they have had very conſiderable weight with phyſicians: but how far they were authorized to reject this practice on ſuch grounds, will be ſeen by the following enquiry.

On examining a number of perſons with various complaints, and of different ages and conſtitutions, who have bathed for a ſeaſon in the ſea, it will in general be found, that few of them have been attacked with coughs or catarrhs. This may afford ſome room

for

for ſpeculation to a perſon who would conſider that, perhaps, the major part of them repaired to the water without conſulting any phyſician on the propriety of ſuch an undertaking. It muſt, indeed, appear ſurpriſing how ſuch a number of valetudinarians eſcape with impunity, when we conſider the danger that is ſuppoſed to ariſe from the ſuppreſſion of perſpiration.

However, not only the vigorous and healthy, but alſo the feeble and enervated, ſeldom experience any complaint of the lungs from the operation of this element. Even people of the latter deſcription are often obliged to withdraw themſelves from bathing, in order to avoid many diſagreeable and diſtreſſing complaints, among which a cough or catarrh is very rarely diſcovered. What concluſion are we to draw from ſuch premiſes? The moſt obvious and natural one is, that though the perſpiration be ſuppreſſed,

preſſed, and the fluids be driven from the external to the internal parts during the time of immerſion, they are in general reſtored to their former ſituation ſhortly after the operation of the water is over. If this inference be not admitted, at leaſt it is natural to ſuppoſe that, in the cuſtomary way of cold-bathing, the action of the perſpirable matter on the lungs is not of a very formidable nature.

From the well-known aſtringent effects of cold water on the ſurface of the body, it is reaſonable to believe that a temporary check is put to the perſpiration in every inſtance of cold-bathing: but how or in what degree it is productive of diſeaſe, is probably a matter of difficult inveſtigation.

Without being under the neceſſity of indulging the imagination in any fanciful theory, we can prove, from incontrovertible facts, that a very great latitude may be allowed

allowed in cold-bathing, without any danger from the retention of the perſpirable matter.

Fiſhermen often remain up to the middle in water, for the greater part of a day, without receiving any injury. Perſons who are employed as aſſiſtants at bathing places, have the greateſt part of their bodies under water for ſeveral hours every day during the ſeaſon, without finding any inconvenience from it by cough, catarrh, or any ſuch diſorder.

If we were to reaſon *a priori* on an experiment of this kind, without waiting for the event, we would readily agree about the conſequence: we would not heſitate to declare, that ſome alarming diſaſter muſt attend the experiment; that a ſtubborn cough which may end in a conſumption, an inſuperable inflammation of the lungs, or ſome

other

other very formidable diſtemper, muſt neceſſarily ariſe from ſuppreſſed perſpiration.

Such are the dangers which the fancy, heated with theory, will portend on ſuch an occaſion. But how weak its fears, and how groundleſs its apprehenſions, when a perſon, after reſiding for ſix or ſeven hours in the water, diſcovers not the ſlighteſt tendency to diſeaſe! This fact (which will be ſatisfactorily explained hereafter by ſome obſervations of Dr. Gardiner) is adduced for the purpoſe of baniſhing from the minds of people their fears with reſpect to the influence of cold-bathing on the perſpiration.

But arguments may, perhaps, be advanced againſt this doctrine, and with the effect of overthrowing it. Thus it may be ſaid, that thoſe who are ſo much accuſtomed to the water as the fiſhermen, &c. juſt mentioned, cannot poſſibly experience its ordinary effects:

fects: that the power of habit in reſiſting the cauſe of diſeaſe, is not more evidently diſplayed on this occaſion than on many others which daily preſent themſelves; and that, of courſe, the examples brought forward in ſupport of cold-bathing, cannot amount to any clear or ſatisfactory proof.

As a farther confirmation of this reaſoning, it may be alleged that, in many inſtances, eſpecially on the firſt onſet of bathing, a diarrhœa occurs, which muſt originate in the action of the perſpirable matter on the inteſtinal canal.

The power that the human body poſſeſſes of reſiſting the operation of cold, is allowed by all philoſophers to be very conſiderable, however they wiſh to account for it; and when to this is ſuperadded the power of habit, it muſt be very great indeed. But, that in conſequence thereof it ſhould be capable of preventing the effects of ſuppreſſed

perſpiration

perſpiration on the body, is a conjecture ſupported by very little probability.

In the firſt place, it is evident that the water, during every month of the ſummer, is ſo many degrees below the ordinary temperature or ſtandard heat of the human body, that ſuch a conſtriction is induced on the exhalent veſſels, as effectually prevents the eſcape of that inviſible halitus that conſtitutes the matter of perſpiration. Hence, conſidering the quantity of perſpirable matter that is accumulated in the body during a perſon's reſidence for ſeveral hours in the water, it is improbable to ſuppoſe, that the natural reſiſting power of the conſtitution, the power of habit, or the co-operation of both, can guard againſt a catarrhal affection, if, in any inſtance, it aroſe from ſuppreſſed perſpiration.

When a perſon makes uſe of the water medicinally, and remains in it but a few

ſeconds,

ſeconds, ſuch a briſk vibration of the fibres, and ſuch a univerſal glow of heat in general ſucceed, that any danger which might be apprehended from ſuppreſſed perſpiration will be effectually obviated by ſuch vigorous exertions of the ſyſtem: but if the body be immerſed in cold water for five or ſix hours, no ſuch effort can take place as may be ſuppoſed to counteract, in any habit, the agency of the perſpirable matter on the lungs.

As to the other argument, I think its fallacy may be eaſily expoſed. Many inſtances of the moſt violent ſtate of coſtiveneſs have occurred, wherein all the uſual remedies were judiciouſly employed without the ſmalleſt advantage, when the daſhing of a few bowls of water on the abdomen, or lower extremities, had the happy effect of procuring an inſtantaneous evacuation. Here it would be extremely unphiloſophical to ſuppoſe, that the feeble action of the per-

ſpirable matter on the bowels removed the conſtipation, when it can be more rationally explained on the principle, that the water, by its ſhock or ſtimulus, brought on an extraordinary degree of action in the bowels, by which they got rid of their contents.

If the diarrhœa of cold-bathing had its origin in obſtructed perſpiration, how comes it to paſs that the lungs are not affected by the ſame cauſe and at the ſame time with the bowels?

The internal ſurface of the lungs ſeems as liable to be acted upon by the perſpirable matter as that of the inteſtinal tube: How are we then to account for the abſence of catarrh when a diarrhœa occurs? A little attention to the difference of ſtructure in theſe organs will clear up this point. Thus aloes and colocynthida rubbed on the integuments, will often bring a diarrhœa, from the ſympathy that ſubſiſts between the external

and

and internal parts. In like manner cold water, by its ſtimulus to the abdomen, will ſometimes act as powerfully as a briſk purgative: but the lungs, not being of a muſcular ſtructure, are not ſo ſuſceptible of impreſſion from the temporary action of ſtimuli externally applied, and, of courſe, will not be ſo readily affected by cold-bathing as the bowels.

It is poſſible that the diarrhœa of cold-bathing may ſometimes ariſe from a redundancy of bile in the bowels; and this may be attributed to the effect of the water in determining the perſpirable matter to the liver: but the explanation will be more ſatisfactory, by ſuppoſing that the ſtimulus of the water is communicated to the veſſels that pour out the bile, and thus occaſions a plentiful flow of it into the bowels.

To illuſtrate and confirm the preceding doctrine, I will preſent my readers with

ſome obſervations in point, from Dr. Gardiner's excellent Treatiſe on the Animal Œconomy. They will alſo be found to contain a very juſt and ſatisfactory rationale of the modus operandi of cold in the production of catarrh.

Dr. Gardiner, not conſidering obſtructed perſpiration the cauſe of catarrh, makes uſe of the following reflections:

" An invariable effect of cold during its " application, is a diminution of perſpira- " tion, from the conſtringing action of cold " on the veſſels of the ſkin. But this uſu- " ally happens without any injury to the " body: for the perſon no ſooner moves " himſelf into a warmer air, than his per- " ſpiration is again increaſed, in proportion " to the degree of heat applied. But with " regard to the quantity of perſpiration or " degree of cold that may be endured with " impunity, cuſtom allows of a conſiderable

" latitude. Shepherds, on the mountainous
" parts of this country, bear the cold of
" winter ſurpriſingly: and I have known
" the guides where ſea-bathing is uſed, have
" the greateſt part of their bodies immerſed
" five or ſix hours every day for ſeveral
" months together in water above forty
" degrees colder than the temperature of
" their bodies. For unleſs the cold is ſo in-
" tenſe, or continued ſo long as to affect the
" energy of the nerves, it produces no bad
" conſequences. I mean not to ſay, that
" long obſtructed perſpiration is not hurt-
" ful to the conſtitution; for certainly it is
" often a principal agent in the production
" of ſcurvy, dropſy, and other diſorders:
" but that a temporary obſtruction of per-
" ſpiration on catching cold, or at the com-
" mencement of a catarrh, ſhould be the
" cauſe of the diſeaſe, I have never yet been
" able to comprehend. The ſpaſm on the

" extreme veſſels of the ſkin, with ſome-
" times a ſlight degree of vigour about the
" beginning of the diſorder, returning at
" uncertain periods, and commonly of ſhort
" duration, can have very little influence.
" For although a free perſpiration contri-
" butes in general to the relief of parts
" affected, as ſhall afterwards be more par-
" ticularly noticed, yet profuſe ſweats are
" not uncommon during the continuance of
" the diſeaſe, without any alleviation of
" the ſymptoms, when the cauſe of it has
" operated ſtrongly on the ſyſtem."

After quoting the ſtatical experiments of Dr. James Keil, which prove that a conſiderable increaſe or diminution of perſpiration may take place in twenty-four hours, without any apparent injury to health, or the ſmalleſt tendency to catarrh; he reaſons in the following manner:

" The ſympathy between the nerves of

" the

" the ſkin, from the application of a certain
" degree of cold, and thoſe of the internal
" membrane of the bronchii, is ſo remark-
" able, that many delicate perſons are im-
" mediately ſeized with a cough, when part
" of their body, and eſpecially their feet,
" have been expoſed to a ſevere cold, inde-
" pendent of the application of cold air to
" the lungs. And if, the inſtant a perſon
" perceives it to have this effect, he moves
" into a warmer ſituation, ſo as to become
" comfortably warm, the cough ſoon leaves
" him. But if he ſhall remain, or be un-
" avoidably expoſed to the cold for ſome
" time, the cough may continue for a ſhorter
" or longer period, and be attended with all
" the effects of ſlight or ſevere catarrh, ac-
" cording to the time he was ſo expoſed."

Gardiner's Obſervations on the Animal Œconomy, p. 245-46.

From the foregoing obſervations, I expect

it will appear, that we need not in general be very much alarmed about the effects of obſtructed perſpiration in the ordinary way of cold-bathing: it will now be neceſſary to take a more particular view of it with reſpect to its operation on aſthmatics.

In the greater part of the diſorders of the lungs, as in ulcers, tubercles, recent coughs and catarrhs, &c. more or leſs of inflammation is commonly found to accompany them. So ſuſceptible of the action of cold are the lungs rendered in conſequence thereof, that cold-bathing cannot poſſibly be ventured upon without the moſt imminent danger: let us therefore adopt what theory we will, whether that of ſuppreſſed perſpiration with writers in general, or that of nervous ſympathy with Dr. Gardiner, an increaſe of the preceding inflammation, and of courſe an aggravation of all the ſymptoms, muſt neceſſarily follow. Without due

attention

attention to the nature of aſthma, we are apt to conclude, that conſequences equally alarming will attend the uſe of cold-bathing in this diſorder alſo. But a little reflection will baniſh ſuch an ill-founded conjecture.

In the firſt attack of the aſthma, we often diſcover ſymptoms of inflammation, or we find the diſorder of ſuch a mixed and complicated nature, that the exact line of diſtinction between a ſpaſmodic and an inflammatory affection of the lungs cannot be eaſily drawn. This ſtage, however, paſſes off in ſome time, and the diſorder aſſumes the form of a genuine unmixed ſpaſmodic complaint. When this period once arrives, and if the diſeaſe be kept up by the power of habit, as is moſt commonly the caſe, we ſhould endeavour with all our might to counteract it; and, for this purpoſe, no danger can in general attend the uſe of cold-bathing. Every ſymptom of inflammation, or tendency to it, has now diſappeared; and in

theſe caſes we have, for the moſt part, an oppoſite ſtate to that of inflammation to deal with. In this ſtage and form of the diſeaſe, perhaps, the greateſt danger to be apprehended from cold-bathing is ſome inconſiderable catarrhal affection, or, at worſt, a return of the aſthmatic fits. It is even highly probable, that ſuch conſequences are never experienced from the operation of the water itſelf.

We know to a certainty, that ſpaſms in the ſtomach and bowels returning periodically, and continuing for a length of time from a morbid ſtate of irritability, have been very frequently removed by ſea-bathing. Obſtinate vomiting, which often depends on ſimilar cauſes, has been radically cured by the partial application of cold water to the region of the ſtomach, after every other powerful remedy was tried in vain. In caſes of violent hyſteria, cold water, applied to the ſame part, has had an immediate

immediate powerful effect in removing that ſuffocating diſtention attendant on the hyſteric paroxyſm *. Here we have convincing proofs that cold water may be applied to the ſtomach during the exiſtence of ſpaſms therein with ſafety and advantage; and as this is the caſe, it is to be preſumed that cold-bathing may be uſed in ſpaſmodic aſthma, without any danger from ſuppreſſed perſpiration, or any other mode of action whatſoever.

But ſome objections may, perhaps, be raiſed againſt this concluſion with reſpect to the aſthma.

It may be alleged, that the functions of the lungs are altogether ſo different from thoſe of the ſtomach, that it is improper to reaſon by analogy from the one part to the other: that the lungs, from their ſituation and many other cauſes, are ſo readily acted upon in a

* Vide London Medical Journal, vol. vii. p. 123.

diſeaſed

diſeaſed ſtate by cold, that the external application of cold water may injure them when attacked with ſpaſms, though it ſhould relieve the ſtomach when labouring under the ſame diſorder.

But though we ſhould admit this reaſoning to be in a great meaſure well founded, the conſequence ſtill does not follow that immerſion in cold water is prejudicial; for it will immediately appear that cold-bathing may be uſeful to aſthmatics, though they ſhould be materially injured by the partial application of cold.

Coughs, catarrhs, &c. are, for the moſt part, found to ariſe from the partial application of cold. Such complaints, no doubt, are ſometimes brought on by cold applied in a general way: but while we look upon this operation of cold in affecting the lungs as an occurrence by no means frequent, we muſt conſider its common mode of action

in

in moſt caſes to be in a partial way. Thus we find the lungs of ſome delicate perſons are readily affected by cold applied to the feet; nay, by ſuch a moderate degree of it, that had it been applied to the whole ſurface equally by immerſion, or in any other manner, no morbid alteration would in all probability have taken place in any particular part. Moreover, it appears that the firſt threatenings of catarrhs, inflammations, and other diſorders of the lungs, are often occaſioned by the partial application of cold air to the lungs when the body is overheated, and are found to ariſe in a mild ſeaſon, if the air be directed to the lungs in a ſtream or current, as by ſitting at a window, or expoſing the body in any ſituation by which a ſimilar effect may be produced. It ſhould alſo be obſerved, that in theſe caſes the diſorder is generally ſlight at the firſt onſet, till, by unguardedly expoſing the body

again

again and again to the air, the affection ariſes to ſuch a pitch as to be attended with danger.

This ſubject is well illuſtrated by the following paſſage from the ingenious author already mentioned:

" Although an accidental expoſure to an " intenſe cold for any conſiderable time is " ſoon followed by a catarrh, catarrhal or " inflammatory fever; yet the effect of ſuch " changes in the weather as are related in " p. 168, are commonly ſlow, and do not " affect the health in any remarkable " manner for ſome time, becauſe it is not " the cold of a few hours which affect " people in general. It uſually requires " the operation of ſome days before ſuch " changes can be brought on the ſyſtem as " are mentioned in p. 146-7, by which the " Doctor means a catarrh, when got to a " conſiderable height." He proceeds and ſays—

ſays—" On ſuch occaſions its operation is
" continued, as it were, by prizes or ſucceſ-
" ſive additions. It is not the cold of one
" day, but of ſeveral, that is capable of pro-
" ducing ſuch conſiderable effects on the
" arterial ſyſtem and mucous gland: theſe
" at firſt are of a ſlight nature, but gradually
" increaſe according to the circumſtances of
" expoſure to the weather, and conſtitution
" of the perſon, until a præternatural ſen-
" ſibility and irritability of the ſyſtem,
" which always accompany and keep pace
" with the morbid effects of cold, ariſe to
" ſuch a degree as, in conjunction with
" the ſtimulus of a collection of phlegm in
" the ſtomach and bowels, from a diſeaſed
" ſecretion of it in the viſcera, an acceſſion
" of the fever is brought on."

From the foregoing enquiry it appears, that when the cold of our atmoſphere is productive of catarrhal affections in healthy people,

people, it commonly operates in a partial manner, and, except it be very intenſe, requires ſome days (at leaſt it requires to be reiterated at different times) before it is capable of bringing on any conſiderable morbid affection. Let us now endeavour to find how aſthmatics are affected in ſimilar circumſtances.

From the violence offered to the lungs in every fit of the aſthma, from the origin of the diſorder and other cauſes, it is no way ſurpriſing that ſuch a degree of ſenſibility is induced, as to render theſe organs very ſuſceptible of the action of cold. Accordingly we find no deſcription of people more ſubject to ſlight coughs and catarrhs, than thoſe who are afflicted with the aſthma. Nevertheleſs, every day's experience demonſtrates that ſuch attacks do not often terminate in catarrhal fevers, pleuriſies, or any diſorder accompanied with ſymptoms of much inflam-

mation.

mation. If this obſervation be well founded, it muſt be granted on all ſides, that aſthmatics cæteris paribus are not more liable to inflammatory affections of the lungs than perſons who enjoy good health, and are poſſeſſed of robuſt conſtitutions. It has been commonly remarked by medical writers, that thoſe who labour under ſpaſmodic complaints, are ſeldom attacked with inflammatory diſorders. Exceptions to this general rule, no doubt, will ſometimes occur; but the prædiſpoſition, ſo neceſſary for conſtituting what is called by phyſicians the phlogiſtic diatheſis, being abſent in theſe caſes, the occaſional cauſe muſt operate with more than ordinary intenſity and power, to be capable of producing an inflammatory diſorder.

This circumſtance alone ſhould, in my opinion, be conſidered a ſtrong argument in favour of cold-bathing in aſthma; for if, in general, people of ſound lungs, and good

conſtitutions, are injured as materially by the application of cold air as aſthmatics, how is it poſſible that immerſion for a few ſeconds in cold water, that acts equally on every part of the ſurface at the ſame time, can be attended with any dangerous or alarming conſequence in the aſthma?

But though it ſhould be granted that the lungs of aſthmatics are more liable to inflammatory affections from cold air than people in health, does it follow of courſe that cold-bathing is prejudicial in the aſthma? I apprehend it does not. There are many perſons altogether ſo delicate as to get coughs and colds at almoſt every blaſt of ſharp air, who find not the ſmalleſt inconvenience from bathing in cold water: for, inſtead of proving hurtful, it is in many caſes the beſt and only remedy for guarding the body againſt this effect of the air. This appears in a great meaſure to be the caſe with aſthmatics;

matics; and it would be as injudicious to reaſon from the effects of air to that of water in the one caſe as in the other. Many cauſes in the different ſcenes and occupations of life, which cannot poſſibly have any influence when cold-bathing is employed, muſt often co-operate with cold air in injuring the lungs of aſthmatics. Thus, the viciſſitudes of the ſeaſons, the unguarded expoſure to cold and rainy weather, the removing from a warm temperature immediately into a cold one, with various other accidental cauſes, muſt frequently prove very conſiderable auxiliaries to the action of cold air. Compare an aſthmatic circumſtanced in this manner, to his ſituation when, in a mild ſeaſon, he is plunged into the cold-bath; and can there, with the leaſt propriety, be any analogy eſtabliſhed between them? Can there exiſt in nature any two cauſes that appear to differ more widely in their

manner of acting on the human body? The difference of denſity in the two fluids—the re-action that takes place after the one, and not after the other—the vaſt length of time a perſon may be expoſed to the air in compariſon to that of the water, muſt totally change any ſimilarity of action that could be ſuppoſed to ſubſiſt between them. Moreover, it ſhould be taken into conſideration, that cold air, when productive of diſeaſe, is very frequently applied in a partial manner; while, in bathing, the cold water is applied to every part of the ſurface at the ſame time, and, of courſe, cannot operate ſo powerfully in bringing on catarrh, or any other dangerous attack of the lungs. Hence, though the lungs of aſthmatics be more delicate than thoſe of people in general, and in conſequence thereof are more readily diſpoſed to catarrhs and pleuriſies from the cold of the atmoſphere, ſtill it cannot be inferred that

cold-

cold-bathing is a dangerous remedy in the aſthma.

But in order to ſhew more clearly how fallacious it is to reaſon by analogy from the action of cold air to that of water in any diſeaſe whatſoever, I ſhall take the liberty of advancing a few facts, which, in my apprehenſion, will place this matter beyond the reach of doubt or uncertainty: they will alſo prove a full confutation of the laſt argument that was ſuppoſed to be advanced againſt cold-bathing in the aſthma; to wit, that the cold of winter being in general hurtful to aſthmatics, cold-bathing muſt of courſe be a very precarious remedy in this diſorder.

The cold bath is, in many inſtances, the moſt effectual remedy in chronic rheumatiſm, though the cold of our atmoſphere in general firſt gives riſe to the diſeaſe, and is frequently the ſole cauſe of preventing us

from obtaining a cure. During the intervals of the gout, eſpecially when it has ſome tendency to an atonic ſtate, cold-bathing has been employed with great ſucceſs: yet it is univerſally known, that cold air is pernicious to gouty habits, for in every cold climate the winter is found to aggravate the diſeaſe. In ſome caſes of palſy, cold-bathing has proved very powerful in reſtoring loſt ſenſation and motion; though reſiding in a cold climate is, for the moſt part, prejudicial to paralytic limbs. Having finiſhed this defence of cold-bathing in the aſthma, we ſhall endeavour to point out, in the following chapter, the particular forms or varieties of the diſeaſe that will admit of its application.

CHAP. VIII.

TO aſcertain with any degree of preciſion thoſe caſes of aſthma wherein cold-bathing may be uſed without danger, is an undertaking of much difficulty, from the neglect of phyſicians with reſpect to this practice, and the conſequent deficiency of facts to guide us in our reſearches. In truth, the importance of the ſubject, the apparently dangerous nature of cold-bathing in ſuch a diſorder as the aſthma, demand our moſt ſerious conſideration, and ſhould deter us from advancing any doctrine or opinion but what is founded on experiments and accurate obſervation. Fully per-

ſuaded of the propriety of adhering to this ſyſtem, we will endeavour to regulate our conduct accordingly.

The following are the diſorders which, joined to the aſthma, may be ſuppoſed to preclude the uſe of cold-bathing. Particular attention will be paid to every combination, and reaſons aſſigned for retaining or exploding the practice in each.

Ulcers in the lungs.

Tubercles.

Inflammation of theſe organs.

Catarrh, recent.

Catarrh of a long ſtanding, attended with expectoration of much phlegm, as in that ſpecies of the diſeaſe called humoural.

Plethora, both partial and general.

Dropſy of the cheſt.

Mal-conformation of the cheſt.

Difficulty of breathing from various cauſes.

Ulcers

Ulcers in the lungs, when complicated with aſthma, ſtill retain their characteriſtic marks, and are readily diſcovered by emaciation, purulent ſpitting, and other ſymptoms of conſumption of the lungs. When this event has once taken place, it is unneceſſary to caution practitioners againſt the cold-bath in ſuch a ſituation. The diagnoſtics, however, are more difficult when tubercles occur at the ſame time with the aſthma.

It is a common opinion with phyſicians, that when the aſthma terminates fatally, it is in general owing to the formation of tubercles, which, in length of time, come to ſuppuration, and thus produce a pulmonary conſumption. Such tumours are ſaid not to ſupervene for a conſiderable time after the firſt appearance of the aſthma, and are ſuppoſed to ariſe from the violence done to the lungs by the repeated attacks of the ſpaſms.

In

In ſome inſtances the tubercles might have exiſted previous to the aſthma, and acted as an exciting cauſe to the diſorder; but this I believe to be a rare occurrence. In either caſe, we are to form our opinion of the exiſtence of tubercles, by attending to the following circumſtances:

It is ſuppoſed that tubercles, from their indolent nature, may remain a long time in the lungs without coming to ſuppuration, and it is poſſible that this may ſometimes be the caſe; at the ſame time, I am perſuaded, that they ſeldom remain for any time in ſuch an indolent ſtate in the lungs of aſthmatics, as not to afford ſome external ſign, whereby we can judge of their exiſtence with a high degree of probability. For my part, I have never met with any combination like this, wherein a quickneſs of pulſe, ſeldom leſs than ninety ſtrokes in a minute, did not conſtantly attend it; nay, the more frequent

quent the pulſations were, the more immi-nent was the danger, and the ſooner a pul-monary hectic fever was formed. How is it poſſible that, in ſuch a diſorder as the aſthma, tubercles can remain for any length of time in an uninflamed ſtate, ſince the re-peated attacks of the fits muſt prove ſuch a cauſe of irritation as will ſpeedily inflame them? Hence, if, in the advanced ſtage of aſthma, a quickneſs of pulſe approaching to fever height, with more or leſs of difficult breathing, be diſcovered, it is to be feared that the lungs are obſtructed with tubercles. In ſuch circumſtances, cold-bathing would be attended with the moſt pernicious effects. Indeed, without any view whatſoever to tubercles, when ſuch ſymptoms as quick-neſs of pulſe and difficult breathing are com-bined with the aſthma, they are of ſufficient magnitude to deter practitioners from any idea of bathing, as they clearly demonſtrate

that

that the lungs are in a ſtate of inflammation.

Catarrh of a long ſtanding, &c.—The different organs of the human body, as the ſtomach, inteſtines, bladder, &c. that are ſupplied with mucous glands to protect them from the action of various kinds of ſtimuli, are readily affected by cold, if the ſlimy matter that lines them happens to be poured out in any conſiderable quantity. The ſubjacent nerves, thus ſtripped of their covering, acquire an uncommon degree of ſenſibility. In the humid aſthma (as it is called), beſides that from the ſpaſmodic affection, there is the delicacy in queſtion ſuperadded in conſequence of the large quantity of mucus that is at different times diſcharged by coughing: ſo that, from reaſoning *a priori*, it is not to be ſuppoſed that the lungs, in ſuch a ſtate, can poſſibly eſcape with

with impunity, if cold-bathing be employed. But however plauſible this reaſoning may appear, it muſt ſtill give way to the more ſolid and irrefragable teſtimony of facts. If we look back to the caſes in which cold-bathing was uſed, it will be found that the major part of them were attended with a copious diſcharge of phlegm; and in place of checking the ſpitting, and rendering the breathing more difficult as might be expected, the water had always the contrary effect, by promoting this evacuation, and relieving that uneaſy ſenſation of ſtuffing in the cheſt.

I have lately had an opportunity of ſeeing the cold bath afford more relief to a perſon labouring under an old catarrh, than all the remedies that experience had approved of in that diſorder. The patient indeed made the experiment without any medical advice; nor is it to be ſuppoſed that any practitioner from theory alone would ven-

ture to give his ſanction to a practice fraught with ſo many appearances of danger. In the chronic ſtage of dyſentery, when a white flux is kept up by the remaining delicate ſtate of the bowels, bathing in the ſea was not found to occaſion a relapſe, or aggravate the prevailing ſymptoms. Dr. Blane, in his Obſervations on the Diſeaſes of Seamen, remarks, when treating of the dyſentery, that though cold was in general hurtful and unſafe, he ſaw the ſailors, who, from their habits of life, are commonly heedleſs, bathe in the ſea when labouring under what they called the white flux, without any bad effects. In ſhort, if the precautions to be mentioned hereafter be carefully attended to, there is not a doubt but that cold-bathing may be employed with as much ſafety in the humid aſthma, as in any other variety of the diſeaſe, on condition that the breathing is not rendered difficult in the in-

tervals of the fits, by an accumulation of phlegm in the lungs. If this ſhould happen to be the caſe, it will be neceſſary, previous to bathing, to evacuate any ſuch matter by emetics, bliſters, and medicines intitled expectorants.

Catarrh recent.—Though we have ſpoken with ſo much confidence in favour of cold-bathing when aſthma is complicated with a catarrhal affection of a long ſtanding, we muſt totally reject this practice in the caſe of a recent cough or catarrh. Both theſe diſorders in general proceed from the ſame ſource, yet demand very different modes of treatment. In the recent catarrhal complaint, there is always more or leſs of an inflammatory tendency that requires cooling medicines, and what the phyſicians term the antiphlogiſtic regimen; while in the other a ſtate of relaxation takes place, and demands

mands the aſſiſtance of ſtimulants and tonics; and from them alone can we expect to reap any benefit or advantage. Hence it will readily appear why cold-bathing may be pernicious in the former, though ſucceſs may attend its application in the latter. No people whatſoever are more ſubject to ſlight coughs and catarrhs from cold than aſthmatics, and phyſicians ſhould be very cautious how they preſcribe cold-bathing while any degree of this affection exiſts. It is true, that there are few inſtances of aſthma in which we do not find a cough more or leſs troubleſome attending them, and that too in the intervals of the fits; but a little attention will render us capable of diſtinguiſhing this habitual cough, the concomitant of aſthma, from that which had been lately caught by expoſing the body to cold air.

When a perſon labouring under the

aſthma

aſthma has, in the common phraſe, caught cold, he finds his cough, if he had one before, very much aggravated—his cheſt unuſually bound—a ſtuffing in his head, with other ſymptoms expreſſive of the operation of cold. From the delicate ſtate of the lungs in aſthma, we may often expect to find ſuch effects as theſe; and though, when conſidered as conſtituting a morbid affection, they do not generally ariſe to ſuch a pitch as to be attended with much danger, cold-bathing, nevertheleſs, cannot be uſed with any ſafety during their prevalence.

Plethora.—In corpulent and plethoric habits, a fullneſs or accumulation of blood in the veſſels of the lungs, ſeems in a good meaſure to contribute to the aſthma; and the idea receives weight from this circumſtance, that the application of cold, which is very powerful in bringing on internal congeſtion,

is moſt commonly the exciting cauſe of the firſt attack. From this account, and from the nature of the remedies that are found to ſucceed in plethoric aſthma, as bleeding, bliſtering, &c. it may appear raſhneſs in the extreme to ſuggeſt ſuch a method of cure as cold-bathing; for the difficult breathing that ſo conſtantly takes place in this form of the diſeaſe, and that too, in all probability, from ſome degree of obſtruction in the lungs, together with the fullneſs of the habit itſelf, are circumſtances ſo unfavourable to cold-bathing, that, in every caſe where ſuch ſymptoms occur, the practice cannot be too ſtrongly reprobated. But there are probably inſtances of aſthma that can with propriety be called plethoric, wherein cold-bathing may be applied without danger. For example, if, after general and topical evacuations, by means of bleeding, bliſtering, &c. the diſorder be brought to have

complete

complete intermiſſions, with a regular pulſe, while at the ſame time no difficulty of breathing, or tightneſs acroſs the cheſt is diſcoverable, there cannot be any ſolid objection to a trial of cold-bathing.

But, on the other hand, if proper evacuations have been omitted, or if, with their aſſiſtance, the neceſſary intermiſſions have not taken place, and that the patient labours under oppreſſed or uneaſy breathing, every idea of cold-bathing ſhould be laid aſide, as a rupture of ſome blood-veſſel in the lungs, or ſome other attack equally alarming, may be the reward of our temerity.

As ſome doubts may ariſe about the preciſe meaning of plethoric aſthma, I think it neceſſary to point out the ſenſe to which I would have it reſtricted in this place. It is univerſally allowed, that a plethoric ſtate of the ſyſtem may actually take place in habits that have very little appearance of obeſity.

Thoſe of ſanguine temperaments, and robuſt conſtitutions, without arriving at that ſtate which may be properly called corpulent, are the perſons, I believe, moſt liable to a general plethora; and to ſuch only would I allow the uſe of cold-bathing. When obeſity occurs in any conſiderable degree, a partial plethora will be the conſequence, from a greater determination of blood than ordinary to certain organs; and it is principally from this circumſtance of inequality in the diſtribution of the blood, and not ſo much from the idea of a general plethora, that cold-bathing ſhould be condemned in corpulent and bloated habits.

People of this deſcription ſhould be very cautious how they make a practice of cold-bathing, though they have at different times eſcaped with impunity, as the rupture of a blood-veſſel in the head or lungs is always to be dreaded; and the probability of

ſuch

ſuch an event taking place ſhould never be loſt ſight of.

Mal-conformation of the Cheſt.—Many perſons afflicted with aſthma have their cheſts ſo narrow and contracted, as might lead to an opinion of the diſorder originating in ſuch a formation. Whether this be the caſe or no, the fact is, that a plethora in the lungs may be often the conſequence of this deformity; and the greateſt danger to be apprehended in ſuch a caſe, is the rupture of ſome blood-veſſel in the lungs, from the change that takes place in the circulation during the time of bathing. A conſtant and uniform effect of cold water on the human body, is a languid circulation of the blood at the ſurface, and a proportional increaſe of this fluid in the internal parts, ſo that we can eaſily conceive how an aſthmatic, with a cheſt ſo deformed as to give riſe

to a plethora *ad ſpatium* in the lungs, may be attacked with ſpitting of blood from bathing in cold water. To obviate ſuch an event, blood-letting may be employed, if it can be done with ſafety; the ſtomach and bowels be emptied, and, perhaps, a bliſter applied to the cheſt, as a topical evacuation in this caſe may be more effectual in removing the plethora than a general one, which acts on the ſyſtem at large. Particular care ſhould be taken to have the ſtomach empty in this variety of aſthma previous to bathing, as any fullneſs or diſtention of this organ, by preſſing on the diaphragm, muſt impede the expanſion of the lungs, and in this manner co-operate with the water in bringing on a diſcharge of blood.

Dropſy of the Cheſt.—It is poſſible that in an early ſtage we may find this diſorder complicated

complicated with aſthma. In general, however, we muſt look for ſuch a combination at an advanced period of the diſeaſe when its long continuance, and the injury offered to the lungs by its frequent repetition, will in a great meaſure account for the preſence of water in the cheſt. The characteriſtic ſymptoms of water in the cheſt are on many occaſions ſo very obſcure, that the moſt diſcerning phyſician may be miſtaken in his diagnoſtics: but when the ſymptoms of this diſorder, as deſcribed by medical writers in general, ſupervene an aſthma of any long ſtanding, there can then be no doubt of its exiſtence. Even though we ſhould not be able to form a deciſive opinion about the nature of this complaint, no bad conſequence can poſſibly follow, as the reigning ſymptoms will fully point out the danger that muſt attend cold-bathing in ſuch a ſituation.

Difficult breathing.—Though ſome obſervations have been made on this ſubject already, it is neceſſary to give it a more ample diſcuſſion in this place, as will appear by what follows:

As the greateſt expectations are to be entertained from cold-bathing when the breathing is free and natural in the intervals of the paroxyſms, ſo the more it deviates from this ſtate, and takes on the form of uninterrupted difficult breathing, the more dangerous is the bath, and the more cautious we ſhould be in making uſe of it. But if cold-bathing be confined to that form of aſthma wherein the breathing is perfectly free when the fit paſſes off, we will, in the greater number of caſes, be deprived of any benefit that may ariſe from it. That it may be more generally employed, and even extended to aſthmatics with uneaſy breathing, appears very clearly from the ſucceſs that attended

tended the practice in similar cases; for in most of the patients on whom the experiment was made, the breathing was more or less affected in the intervals of the fits.

Much discernment, however, is necessary for ascertaining the particular cases to which cold-bathing is applicable. In every instance where we can trace the affection of the breathing to plethora, tubercles, or obstructions of any kind, cold-bathing (as we noticed before) would be absolutely pernicious: it is in such cases only where the breathing is hurt by a spasmodic affection, that it can be ventured upon with any degree of safety. To distinguish the one from the other, it will be necessary to attend to the following particulars:

The breathing in the former is generally difficult, oppressed, and readily hurried by any exertion that accelerates the motion of the blood through the lungs. In the latter,

the

the patient complains of a ſtricture at the ſternum, with a ſenſe of weight preſſing on the cheſt, and impeding the free expanſion of the lungs. Together with this, the breathing will be ſometimes found uneaſy and readily hurried by motion, but by no means of ſo violent or permanent a nature as that which attends obſtructions. When obſtructions exiſt, the pulſe is often quick and irregular; while, in the mere ſpaſmodic affection, it is ſeldom quicker than the natural ſtate *. After examining the patient with due attention, if we have any doubts on our mind with reſpect to the origin of the complaint, it may perhaps be uſeful to direct ſome powerful antiſpaſmodic before we proceed any farther. If, during the operation of any medicine of this claſs, the uneaſineſs of breathing and ſtricture at the ſternum be removed, we may, without heſitation, con-

* Vide p. 22.

clude

clude that the affection is truly ſpaſmodic, and on this preſumption recommend the uſe of cold-bathing.

Perſons advanced in years, from the languid ſtate of the circulation, and the diminution of the vital powers, do not, in general, bear with impunity the change of temperature from our atmoſphere to that of cold water. If the event of ſuch a tranſition be dreaded when no diſorder diſcovers itſelf, what evils are we not to apprehend when the aſthma is added to years! What time of life ſhould then be fixed upon as a boundary which we are not to tranſgreſs in directing the bath for aſthmatics? It is impoſſible to determine this point with any degree of certainty. Different conſtitutions at the ſame time of life reſiſt, with ſuch various diverſity of power, the operation of noxious cauſes, that no criterion or ſtandard can be eſtabliſhed for regulating a matter

of

of this kind. The remarkable ſucceſs from cold-bathing in the caſe of Holland, near the age of fifty, demonſtrates that, at ſuch a period, aſthmatics are not to be deprived of this remedy, except ſome diſorder be added to the aſthma, that would, from its nature, abſolutely preclude it.

If we can rely upon the authority of Sir John Floyer, an aſthmatic of ſixty not only eſcaped with impunity, but obtained great benefit from cold-bathing. However, it is much to be dreaded that, at ſuch an advanced period of life as this, the remedy would prove a greater evil than the diſeaſe, not merely from the debility that attends old age, but more eſpecially from this circumſtance, that the aſthma of old people ſeldom appears in a ſimple form, but is generally complicated with obſtructions of the internal parts, or ſuch an affection of the lungs as muſt render cold-bathing highly pernicious.

CHAP.

CHAP. IX.

HAVING pointed out in the preceding chapter the particular varieties or forms of aſthma that admit of cold-bathing, we will now beg leave to offer ſome inſtructions to aſthmatics on the manner of uſing it to advantage.

In every caſe, before the patient attempts to bathe, it will be proper to empty the ſtomach and bowels, in order to give the lungs as much room as poſſible to act; and if he be of a full habit, a ſmall bleeding may, on ſome occaſions, be neceſſary. When any ſtricture is felt at the cheſt affecting the breathing, though no ſigns of obſtruction exiſt, it will, in general, be a prudent

prudent meaſure to apply a bliſtering plaiſter to this part, and keep it open for a few days. Among the greater number of aſthmatics, very few, I believe, can be found who on firſt expoſing their bodies to the open air, as in the common way of cold-bathing, that are not liable to be affected with cough or catarrh; at leaſt I had an opportunity of ſeeing ſeveral inſtances of this, though the patients were dreſſed and undreſſed with the utmoſt expedition, and received but one or two ſhocks from the water. This ſhould put practitioners on their guard, and render them very cautious how they allow their aſthmatic patients to bathe in open air on the firſt onſet, for an interruption to the bath at beſt will often be the conſequence, by means of a cough or ſome ſlight catarrhal complaint; and if, in ſuch a ſituation, the bathing be continued, thoſe ſalutary effects we were taught to expect will be defeated,

or ſomething of a more ſerious nature may happen. It is always an eaſy matter to provide a temporary covered bath; and as our future ſucceſs in a great meaſure depends upon ſuch a preparatory ſtep, it ſhould be eſtabliſhed as a general rule, with hardly an exception, never to omit it *.

After bathing in this manner for ſome time, the ſurface of the body, and of courſe the internal organs, become more and more inſenſible to the action of the external air, till at length the body may be expoſed to it with impunity, as long as is neceſſary for any purpoſe

* In preparing a bath of this ſort, it ſhould be contrived in ſuch a manner as to have it ſtrongly impregnated with ſalt: for, in the generality of caſes, freſh water will not agree with the lungs of aſthmatics. A perſon afflicted with the aſthma was adviſed to go into a cold bath; and as it was imagined that freſh water would anſwer the purpoſe, the patient went into it every morning for the ſpace of a fortnight, without the ſmalleſt benefit; but by adding a large quantity of ſalt to the water, the moſt viſible good effects from it immediately appeared.

intended by the bath. This effect of the cold bath in rendering the ſurface more inſenſible to the operation of cold air, is not one of the leaſt important advantages that attend it: for aſthmatics in general, from this cauſe, are ſo ſubject to coughs and catarrhs, which often terminate in an attack of the aſthma, or ſomething more ſerious, that the utmoſt care and circumſpection, the moſt powerful and approved of remedies, without the aſſiſtance of cold-bathing, will not be ſufficient to guard againſt a relapſe. However, no conſideration of its utility in this way ſhould make us tedious in our after-bathings in open air: the patient, as ſoon as he is undreſſed, ſhould be plunged into the water without the ſmalleſt heſitation, and as quickly taken out, after receiving one or two ſhocks.

In ſome complaints, eſpecially thoſe of infants, for which cold-bathing is deemed

neceſſary,

neceſſary, it has been found uſeful to raiſe the temperature of the water, by adding a certain portion of warm water to the cold, till, by degrees, the body is brought to bear the cold water without any addition. This is done in order to guard againſt any untoward accident that may happen, by ſuddenly removing the patient from a moderately warm to a comparatively cold medium. In no diſorder whatſoever does this precaution about cold-bathing appear more requiſite than in the aſthma; for, independently of the diſordered ſtate of the lungs, the conſtitution of aſthmatics, from the change that has been wrought in it, will not probably bear with impunity ſuch a ſudden tranſition.

After the body is ſufficiently prepared according to the foregoing directions, ſea-bathing, if the ſeaſon offer, ſhould be directed, as the re-action after it is more perfect than after freſh water, as it ſtimulates more

powerfully the veſſels of the ſkin, and thus promotes a glow at the ſurface, and an increaſe of the inſenſible perſpiration. But the time uſually ſpent in ſea-bathing may not, in general, be of ſufficient duration to accompliſh a radical cure, and of courſe prevent a relapſe from taking place; ſo that it will often be neceſſary to make uſe of an artificial ſalt-bath as a ſuccedaneum, which can be reſorted to in the winter, and continued during the whole ſeaſon.

Having thus acquitted myſelf as well as I was able on the ſubject of cold-bathing in aſthma, before I conclude this Treatiſe, ſome apology may appear neceſſary for recommending ſo free and extenſive an application of this remedy. Thoſe who have not had proper opportunities of making obſervations on it, may be apt to condemn a practice which, from reaſoning *a priori*,

would not only appear abſurd in itſelf, but fraught on many occaſions with the moſt imminent danger. However, it is but fair that they ſhould ſuſpend their judgment till the teſt of experiment enable them to decide with preciſion. Unwilling to obtrude any remedy on the Public, without the moſt convincing proofs in its favour, I deſire no co-incidence of opinion, no approbation, except what candour will extort from every practitioner who draws his information from the ſame ſource that I draw mine.

FINIS.

OBSERVATIONS

ON

EMPHYSEMA;

OR,

THE DISEASE WHICH ARISES FROM AN EFFUSION OF AIR INTO THE CAVITY OF THE THORAX, OR SUBCUTANEOUS CELLULAR MEMBRANE.

BY

ANDREW HALLIDAY, M. D.

Member of the Royal Medical and Natural History Societies of Edinburgh, and Fellow of the Royal Highland Society of Scotland.

LONDON:

PRINTED FOR LONGMAN, HURST, REES, & ORME, PATERNOSTER-ROW; AND JOHN ANDERSON, EDINBURGH.

1807.

H. Bryer, Printer, Bridge-street, Blackfriars.

TO

THE RIGHT HONOURABLE

Sir JAMES PULTENEY, Bart.

SECRETARY AT WAR, &c. &c.

SIR,

That regard which I have for the name of PULTENEY, *and the many obligations which I lie under to the Countess of Bath, would have been sufficient to have pointed you out as the only person to whom I could venture to inscribe these Observations.*

But,

But, Sir, though these are circumstances which I never can forget, and which I shall ever be proud to acknowledge, I had other motives in soliciting the sanction of your name to this little Work: I was anxious for such an opportunity to return YOU *my most grateful thanks for the kind interest you have taken in my fate, and to assure you with what sincerity I am,*

Sir,

Your very obedient and

devoted servant,

Andrew Halliday.

OBSERVATIONS

ON

EMPHYSEMA,

&c. &c.

Authors. Till Doctor Cullen, in his Synopsis Nosologiæ Methodicæ, chose to denominate it Pneumatosis, I believe, it was generally known and treated of under the name of *Emphysema;* a term, which as being most general, I have retained. This disease is rather of rare occurrence, it is how-

ERRATUM.

P. 144, line 2, for "*cochymata,*" read, "*ecchymosis.*"

OBSERVATIONS

ON

EMPHYSEMA,

&c. &c.

CHAP. I.

THE disease which forms the subject of the following observations, has received various appellations from the different nosological writers and Authors. Till Doctor Cullen, in his Synopsis Nosologiæ Methodicæ, chose to denominate it Pneumatosis, I believe, it was generally known and treated of under the name of *Emphysema;* a term, which as being most general, I have retained. This disease is rather of rare occurrence, it is how-

ever attended with a train of symptoms abundantly characteristic, and is of itself sufficiently dangerous, to entitle it to our consideration. As a separate disease it has found a place in every system of nosology, and is treated of by most practical writers, yet the various cases of this disease which are recorded, and which appear to have been considered as curious, have never arrested the attention of any one in particular; and so far as I know, we have but very little on this subject any where. I do not pretend to say, that in submitting these observations to the public, I should add much to what is already known concerning the disease, or that I shall bring forward any thing original respecting the cause or treatment of Emphysema; yet I should hope it may be of some advantage to the student, and useful to the practitioner, to have before him

in

in a small compass, the various opinions which have been entertained respecting this complaint, and the practice which is recommended by eminent men, and which has been adopted in some of the most remarkable cases.

Description of Emphysema as occurring from external injury.

In the history of Emphysema, there are a number of successive symptoms, in general more or less severe, according to the cause of the complaint. In enumerating these symptoms I shall confine myself to a supposed case from an injury of the thorax, and which is indeed by far the most common cause of Emphysema.

There is a constant pain of the side which has been injured, and which at first is not encreased even by a very full inspiration, but in no long time there is a very considerable difficulty of breathing, and the patient complains of a

sensation as if cords were drawn across the chest, and of a peculiar tightness at the scrobiculus cordis. If the part where the pain and uneasiness were first felt is now examined, a soft puffy tumor will be observed, so very prominent as to prevent our feeling the ribs which are immediately under it. This tumor encreases very rapidly, and is soon diffused over all the chest, but is particularly conspicuous on the neck, breast, and face. The rapidity with which it now spreads over the whole surface of the body is amazing, and in many places the skin is elevated several inches from the subjacent bones and muscles; when the swelling has become general, the patient feels it extremely difficult to expire, as well as inspire, the motion of the extremities is very much impeded, and when the skin is very much elevated, motion is almost entirely

entirely prevented. The integuments crackle under the hand, the skin is considerably paler than natural, it feels cold, and when struck, sounds like a wet drum; the air is easily pressed from any part, but it returns again immediately when the pressure is removed; the respiration is not only very laborious, but very quick; the patient makes a sudden effort to inspire, and the air, in passing the epiglottis, has a peculiar noise; expiration follows inspiration almost instantaneously, and is performed with a deep sigh, or rather groan. The patient is unable to lie on either side, and feels most ease and breathes best when sitting half erect in bed, the skin and extremities feel very cold; the pulse is sometimes quick and hard, at other times irregular and very full, but is felt with some difficulty; the eyelids are so puffed up that the patient

tient is frequently blind; the features are very much deformed, and the lips assume a purple, or rather livid hue. There is generally a short tickling cough at the commencement of the disease; this encreases with the other symptoms, so as to become almost incessant; the sputa are frothy, and generally have some admixture of blood in them; the tongue is dry, and the patient complains of a constant thirst; the voice becomes very weak, and unless the effused air is speedily evacuated so as to reduce the swelling and pressure, the patient dies from suffocation.

Some of the more general causes of the disease.

These symptoms so rapid in their progress, and at all times dangerous, I need scarcely observe are owing to an effusion of air into the cellular membrane of the lungs and under the skin: the cause of this effusion shall be more minutely enquired into in another place,

place, at present I may observe that all the cases in which air can escape from the lungs, or is effused into the cellular membrane, may be arranged under one or other of the following heads.

Injury of the pleura pulmonalis.

1st. An injury or disease of the pleura pulmonalis, causing a wound or ulceration of that membrane, and thus allowing the air to escape from the lungs, as in oblique external wounds, where the outer opening and that of the pleura costalis have healed or closed up, and in ulcers of the surface of the lungs.

Injury of the pleura pulmonalis, and pleura costalis.

2dly. The pleura pulmonalis and pleura costalis, may be wounded or ulcerated when there is no external opening, as when the ends of fractured ribs penetrate through both into the substance of the lungs, and it is from this

this accident, as shall be afterwards explained, that Emphysema most commonly takes place.

Wounds penetrating the thorax.

3dly. The common integuments of the parietes of the thorax, the intercostal muscles, and the pleura costalis, may be wounded while the pleura pulmonalis and lungs remain uninjured, so that the air admitted from without, and collected in the cavity of the thorax, may be pressed into the cellular membrane so as to occasion Emphysema. These accidents may happen on one side of the thorax or on both, but as in all these cases the various effects produced, whether according to the exertions of the patient or other circumstances, depend on mechanical principles, it will be necessary first to consider the manner in which respiration is carried on while the lungs

are

are in a sound state, and then we shall be able to comprehend more clearly, how, in each of these cases of injury, the Emphysema, or effusion of air, takes place.

The lungs in the thorax have often and not unaptly been compared to a bladder in a close pair of bellows, but if we suppose the bellows to be divided into two compartments, and each of these to contain a bladder which mutually communicate with each other, and with the external air by means of a tube which is exactly adapted to the nozzle of the bellows, and which admits the air only into the cavity of the bladders, and not into the space betwixt the bladders and bellows, we shall then have a perfect representation of the mechanical structure of the thorax; the bellows will represent

represent the thorax divided in the middle by the mediastinum, the bladders will represent the lungs of the right and left sides, and the tube which communicates with the bladders and with the external air, will represent the Trachea; the only thing which is wanting to render this mechanical representation perfect is, that the bladders should exactly fill the bellows, so as to leave no air betwixt them and the bellows.

It is evident that when we lift the handle of the bellows, the bladders will be filled by the external air rushing in through the tube which communicates with both, and that when we depress the handle, that air will be again expelled. This I conceive is exactly the way in which the lungs are filled and emptied in respiration.

The

The cavity of the thorax being enlarged, by the contraction of the diaphragm and intercostal muscles, &c. a comparative vacuum is formed, into which the air rushes through the Trachea, and we perform what is called *inspiration*, whereas by the contraction of the abdominal muscles and relaxation of others, the cavity of the thorax is diminished, and the air is expelled, or we *expire*.

The bellows and bladders will also serve to illustrate the cases of injury which I have mentioned as giving rise to Emphysema, and first as occasioned by the pleura pulmonalis of one side, being wounded or ulcerated. This case is in many respects the same as if an opening were made in one of the bladders, and which would open a communication with the space betwixt the

the bellows and bladder on one side. Now suppose that this takes place while the handle of the bellows is depressed, as soon as the handle is raised, air will rush into the space betwixt the bladder and bellows, and if you keep the handle up for a little the bladder will collapse altogether, and the place which it naturally occupied when distended will now be occupied by the air. If we attempt to force out the air by depressing the handle of the bellows, we shall find that this cannot be done, for there is no direct communication betwixt the bellows and external air; and as the effused air presses equally on all parts of the collapsed bladder, it cannot escape through it.

By the action of the muscles of inspiration the pressure is removed from the surface of the wounded lung, and the

the air which should have rushed in and distended the lung now passes through the wound, into the space betwixt the pleura pulmonalis and pleura costalis. In the living body the whole of the air inspired will not be thus effused, but as it must pass through the lung it will also at first distend it more or less, according to the size of the opening in the pleura pulmonalis, and this partial dilatation of the wounded lung will always happen while air continues to be inspired on that side. As soon as expiration begins, the general cavity of the thorax being thereby diminished, the effused air will be compressed against the wounded lung, but none of the air which has escaped can re-enter the lung again; because the whole of the air contained in the lung must be forced out, and then the pressure against every part of the collapsed

lapsed lung being equal, will prevent its separating any part so as to make a passage for itself into the Trachea. In this manner fresh air is accumulated in the space betwixt the pleura at every inspiration, while none is allowed to escape during expiration, and the quantity accumulated at last will be equal to that which was received into the other lung during the most powerful inspiration after the accident. As this is supposed in many cases to have proved fatal without the effusion of air proceeding further, those authors who have divided the disease into different species, have denominated this, *Thoracic Emphysema*. I am inclined to think that this accumulation of air, in the cavity of the thorax, is a more frequent occurrence than is generally supposed in cases of diseased lungs, and we can only explain in this way the pressing down

down of the diaphragm observed in some dissections after an ulceration of the lungs, and the force with which the air escapes when the diaphragm is punctured.

2dly. In the case when an opening exists both in the pleura pulmonalis, and pleura costalis, the same efforts will be produced till the lung has collapsed; but if the patient shall then endeavour to *expire*, that side of the thorax must, notwithstanding all his efforts, continue in a state of distention. The air, however, in general makes a way for itself through the cellular membrane, and as the passage of air into the cavity of the thorax, during inspiration, is easier than the return of that which has been already effused into the cellular membrane, this effusion continues to go on with the rapidity

pidity and symptoms already detailed, while the patient continues to live, and producing what is called *subcutaneous Emphysema*, or what I conceive to be the disease in its most perfect state.

3dly. Emphysema may take place from a wound penetrating the integuments, intercostal muscles, and pleura costalis, while the pleura pulmonalis and lungs remain sound. To render this more intelligible I shall endeavour to illustrate the manner in which the Emphysema happens, by having recourse once more to the bellows and bladders; if we suppose an opening made into the bellows without injuring the contained bladders, it is obvious that, if the access of air by this opening be more free than that by the nozzle or tube which communicates with the bladder, and you raise the handle of the bellows, more air will enter by the opening than

than by the tube, so that the bladder will not rise as formerly. If the opening of the bellows is less than that of the tube, the bladder will notwithstanding be but partially filled, and if you depress the handle of the bellows, the air contained in the bladder, and that betwixt the bladder and bellows, will be emptied in the same proportion to each other, as that in which they were formerly filled. Or if the bladder receives twelve cubic inches by the tube, while the bellows receive only four by the opening, then when the bladder contains six cubic inches of air, the bellows will contain two, and so on. This would continue to go on at each successive raising of the handle of the bellows, were it not for the natural collapse of the bladder from its gravitation.

Let us now suppose that we stop the mouth of the tube, while the handle of the bellows is raised, and the bladder partially filled, and that we then attempt to depress the handle. As no air can escape through the tube, that contained betwixt the bladder and the bellows must be first evacuated, while that contained in the bladder of the sound side, will be forced into the bladder of the diseased side, and either distend it, so as to rupture it, or cause it to protrude.

If now we apply these mechanical observations to the case we are considering, it is evident, that if the access of the air be more free by the wound, than by the Trachea, more air will enter during inspiration into the cavity of the thorax, than into the lungs, and that if the access of air be on the contrary less free, then also less air will enter

enter the thorax than will enter the lungs. In the same proportion, however, as air enters into the lungs or into the cavity of the thorax, it will likewise be expelled from these cavities during expiration. If twelve cubic inches of air enter into the cavity of the thorax, by the wound, and four cubic inches enter the lungs by the Trachea, during inspiration, the same quantities will be expelled at expiration. Air, therefore, would not accumulate in the thorax, did not the lungs always tend to collapse from their natural gravitation. Should, however, the patient, in making an effort to expire, contract the glottis, the air, contained in the lungs of the sound side, meeting with no resistance, will, by the communication of the branches of the Trachea, distend the lungs of the wounded side, so as to cause them to

protrude at the wound. This is often observed when a wound is made, for the sake of experiment, in the thorax of a dog, and has sometimes, without considering the matter, been adduced as a proof that the lungs do not collapse, when an opening is made into the thorax.

Having stated then thus briefly the history of the disease, and endeavoured to explain the manner in which these several injuries give rise to the train of symptoms which characterize *Emphysema*, it might not be improper to inquire a little further into the general effect of wounds penetrating the cavity of the thorax; but this I shall defer, until I come to speak of the various means recommended and practised for the cure of this disease.

OBSERVATIONS

ON THE CAUSES OF

EMPHYSEMA,

&c. &c.

CHAP. II.

HAVING, in the preceding chapter, detailed the various symptoms of *Emphysema*, and enquired into some of the causes of these symptoms, I shall now consider not only the various other causes of this disease, but also the ratio of the several symptoms.

I have already observed, that injuries of the thorax are, by far, the most common cause of the effusion of air into

into the cellular membrane. The various kinds of injury, however, which may give rise to this affection are, perhaps, innumerable. I shall only mention the following, viz. Cases in which the lungs have been ruptured, from too much distension, or lacerated by the sharp ends of fractured ribs penetrating their substance, by a fracture of the Sternum, or cut by sharp pointed instruments. The disease is also occasioned by Abscesses forming on the surface of the lungs, and bursting into the Sac of the Pleura. And lastly, it has been known to occur without any evident cause, or, as is supposed, from a bad habit of the circulating fluids.

Various kinds of Injury which give rise to Emphysema.

I shall consider each of these causes separately, and endeavour to illustrate each by cases which I have seen, or have been communicated to me, by some

some of my friends ; and also by extracts from some of the most remarkable cases which have been published. I once intended to have given the cases when I came to treat of the practice in this disease, but I think the various causes will be better illustrated by relating a case in point, immediately after the cause is mentioned, while a reference can be made to the practice, in any one particular case.

Cases in which the lungs are torn or lacerated by the sharp points of fractured ribs.

The first cause which I shall mention is, where the lungs are lacerated by the sharp points of fractured ribs penetrating through the pleura and inter-costal muscles. There is no accident which so frequently gives rise to Emphysema as this; for when the cells of the Bronchiæ are wounded in this manner, the inspired air has free egress not only into the cavity of the chest, but

but also into the cellular membrane under the skin, while there is no opening in the skin through which it can escape; and when once it gets admission into the subcutaneous cellular membrane, it soon becomes diffused, from the rapid manner in which it accumulates.

Doctor Alexander Monro, Senior, Professor of Anatomy and Surgery in the University of Edinburgh, for whom I have the highest respect as a philosopher and physician, and feel the most sincere gratitude for his kindness to me while a pupil, has been so kind as to favour me with the two following cases, from his note book; they are briefly detailed, but the disease was perfectly formed in both, and they were both occasioned by accidents, in which the ribs were fractured.

CASE

CASE 1.

Mr. G. father of Dr. M. G. about sixty years of age, fell from horseback, June 7, 1782, on the stump of a tree, and fractured the second, third, and fourth ribs of his left side, near their joinings with their cartilages. A subcutaneous emphysema appeared very soon after the acciden t. Iw as called to him with Mr. Ebenezer Clarkson senior, surgeon in Dalkeith. We found the whole left side of the thorax and under part of the neck emphysematous. Breathing laborious. Pulse 96. We let him blood, and not finding that the emphysema, or difficulty of breathing, increased, we maae no incision or perforation. For about ten days, a portion of the chest, where the ribs

ribs were fractured, almost as large as the palm of the hand, sunk in on inspiration, and was pushed out on expiration. By degrees, this part came to be less moveable, and the emphysema gradually disappeared. By the 24th of June, the second and third ribs could be felt, fixed by a bump of callus to the sternum, just behind the hollows that naturally receive them, and in which they play. The fourth rib had a large callus on it. Cathartics were occasionally given to move his bowels, which were much constipated. He had a complete recovery.

CASE 2.

"I was called by Mr. Clarkson, some years thereafter, to a similar case of a man of the name of Johnstone, about fifty years of age, who had two ribs fractured by an iron crow, which fell from a height upon him. In this case, likewise, a subcutaneous emphysema occurred; but he had so little difficulty of breathing, that no operation seemed necessary. It appeared to me, beyond doubt, that there were in both cases, considerable adhesions of the lungs with the pleura, which prevented them from collapsing so much as to occasion great difficulty of breathing.

(Signed) "A. MONRO, Sen."

The

The disease, in these cases, I think, from what the Doctor has suggested, was prevented, in a great measure, by the adhesions of the lungs with the pleura; for, as the lungs could not collapse, of course the further effusion of air would not so readily take place, while that which was effused might, in some degree, find its way again through the wounds, and be expired by the Trachea. It is then I should suppose, from the frequent and strong adhesions which exist between the lungs and pleura in the greater number of people that Emphysema does not occur so often as might be expected, from accidents, in which the ribs or sternum are fractured.

Some time ago I had the pleasure to receive, from my friend, Mr. James Wardrop, the following letter, in which

which he has detailed a very remarkable case; and which I should not do justice to was I not to give it in his own words:

CASE 3.

"Edinburgh, Hanover-street,
May 28, 1806.

"DEAR SIR,

"The particulars of the case of Emphysema, and the conclusions I was led to make from the mode of treatment employed, I will transcribe to you from the notes I had taken at the time of the accident.

"On the 5th instant, a young healthy boy, between five and six years of age, was thrown down before a loaded cart, and the wheel grazed along the right side of the head, and passed obliquely across the thorax.

"I saw

"I saw him six hours after the accident. A considerable quantity of blood had passed from the nose and mouth; the left side of the thorax was puffed up; and there was a prominent tumor formed over the great pectoral muscle. He complained of pain in the head, and all over the trunk, but the pain was particularly severe on the dorsal aspect of the left side of the thorax. The integuments were bruised and discoloured over the vertebral extremities of the fourth and fifth ribs of the same side, and, as well as could be ascertained, one or both of these ribs were fractured. The swelling was soft, elastic, and had the crackling sensation produced from the effusion of air in the cellular membrane; this sensation was also felt over the integuments of the abdomen. The pulse

was

was frequent and hard, but the respiration not much affected.

"Only two ounces of blood could be drawn from the arm, and he vomited an anodyne and purgative medicine, which were given him.

"The day after the accident, (the 6th May), he vomited every kind of food; the emphysema extended over the right side of the thorax, and the crepitation was felt over all the abdominal parietes, and on the back part of the neck and shoulders. His restlessness and pain increased, and he slept none during the night.

"A *double*-headed roller, about eight yards in length, was now applied round the whole chest, with a view of preventing the motion of the ribs during respiration, and of promoting the absorption

absorption of the effused air. In applying this bandage, great care was taken to make the pressure gradual and uniform, and only to such a degree as the boy could easily bear.

"The bandage had the desired effect, in promoting the absorption of the effused air, for, on the 7th, (the day after it was applied), the general Emphysema was much diminished. The pain and vomiting, however, still continued, and the pulse became full and strong. He was, therefore, bled to five ounces, and ordered a purgative.

"The bandage had become loose, and was again applied, and he allowed it to be rolled much firmer than before; it made such a number of evolutions round the whole thorax, and over the shoulders

shoulders, that the motion of the ribs during respiration was effectually prevented. Immediately afterwards he appeared easier, and although, before this was done, the slightest motion of the trunk made him cry out, and express signs of pain, he could now be moved about in bed with the greatest ease.

"On the 11th, (six days after the accident), he was so well as to be able to run about the house, and amuse himself as usual; but the advantage of the bandage was such, that although he could run about when it was applied, yet he felt great pain and difficulty in walking when it was removed.

"He still continues to wear it, and every day it is taken off and replaced, for whenever it turns loose, and alters

its place, he becomes uneasy, and is unable to walk upright.

"However useful the *double*-headed roller may have been in this case, I believe, that if due attention is not paid to the mode of applying such bandages, they will do much more harm than good; for I know of one instance, where a surgeon of eminence applied one in a case of Emphysema, produced from a fracture of the ribs of both sides of the chest, and caused immediate death.

"An uniform and gradual pressure, regulated by the feelings of the patient, is, in every disease, where bandaging is necessary, the best general rule which can be followed.

"I remain your faithful and

"obedient servant,

"JAMES WARDROP."

To Dr. Halliday, &c. &c.

I saw this boy in company with Dr. Monro, jun. on the 24th of May. He had no symptoms of the disease, at that time, but even then he could not move unless he was bound up tightly with the bandage. He complained of considerable pain in his side, and only felt perfectly easy when he was upon his knees, with his body bent a little forwards. This, as Dr. Monro observed at the time, is almost always the case in those diseases, in which the lungs are affected. In about ten days after, however, the boy was perfectly well, and able to run about as usual, though more than a month had elapsed before the bandage could be laid aside altogether.

In the Memoirs of the Academy of Sciences, for the year 1713, there is a case related by M. Merry, of Paris, in

which the disease, occurring from the same cause, did not, however, terminate so favourably.

CASE 4.

A poor man, about sixty years of age, was thrown down on the street, by a carriage, the wheel of which went over his chest. On being taken up, and examined, the fourth and fifth ribs of the left side were found to be fractured, but no other injury could be perceived at that time.

In about an hour after the accident, a pretty large Emphysematous tumor was observed over the place where the ribs were fractured. Mr. Merry concludes with saying, that the Emphysema continued to increase for four days, when

when the patient died. On examining the wound after death, Mr. Merry discovered an almost imperceptible opening, between the intercostal muscles, and on laying open the thorax he found a small portion of the pleura pulmonalis torn from the lungs, and adhering to a splinter of one of the broken ribs.

A similar case was communicated by Mr. Leake, to Dr. William Hunter, and is recorded in the third volume of the London Medical Observations and Inquiries.

CASE 5.

John Rigby, an invalid of the garrison of Plymouth, (says Mr. Leake), aged about 60 years, of a healthy constitution, and rather of a lax than rigid fibre, on the 18th of May, 1762, was coming down from the Banquette, when

when his foot gave way, and he fell, with the whole weight of his body, upon the spiked points of the palisades.

Not being able to raise himself from thence, with the assistance of a soldier close by he was taken up, and, with very little help, walked to the hospital. Being sent for, presently after the accident, I found no wound, but a slight scratch made by the point of the palisade, with little or no tension or inflammation; but, on examining the part, one of the ribs of the left side was found fractured, and on pressing gently, a small Emphysematous tumor was perceived upon the part, about the size of a crown piece.

This Mr. Leake goes on to say, contrary to his expectations, increased very rapidly, for by six o'clock in the evening

ing it had spread itself over both breasts all along the left side, backward to the spine, down as low as the scrotum and ilium, all along the neck and face, particularly on the side on which he had lain, so that the right eye-lids were much inflated, and the eye entirely closed up.

Though this patient continued very ill for some time, he had a complete recovery, which was not, however, the event in the following case which occurred to Mr. Cheston;

CASE 6.

A poor man received a violent contusion on the side, from the shaft of a waggon. An Emphysema came on, which could not be subdued; the patient's strength sunk rapidly, and he died on the third day after the accident.

On

On examining the thorax after death, Mr. Cheston found the second and third ribs, reckoning from below upwards, fractured obliquely, so as to form very sharp points, within two fingers breadth of their junction with the Vertebræ. There was an aperture through the intercostal muscles and pleura, that could readily admit the finger to pass into the cavity of the thorax, and in the lungs there appeared a wound corresponding exactly to the fracture of the ribs.

I might detail several other cases, which have occurred from the same cause, but, I presume, I have related a sufficient number to convince any one that it is a frequent consequence of such accidents, and sometimes a fatal disease.

2dly. This disease has been known to

to occur from a fracture of the sternum or breast bone, but this accident is so connected with the last mentioned, that it is difficult to distinguish betwixt them. I cannot, however, omit a case which is related by Dr. Russell, in the third volume of the London Medical Observations and Inquiries, and which is mentioned by the Doctor as occurring from this cause.

A fracture of the Sternum sometimes a cause of Emphysema.

CASE 7.

An old man, of the name of Robert Haynes, was admitted into the cutting ward of St. Thomas's Hospital, with a fractured breast bone, clavicle, and arm, on the third of July, 1760. On the day after admission, his head, face, and the whole trunk of the body became Emphysematous to a very great degree, and the scrotum was distended

distended much larger than a child's head.

Though this case is mentioned, particularly by Dr. Russell, as occurring from a fracture of the *sternum*, it may be considered as doubtful; for not only the *sternum*, but also the clavicle and arm were fractured; it is, therefore, more than probable that some of the ribs were fractured and had penetrated the lungs, or that some of the sharp points of the fractured clavicle had wounded the coats of the Trachea.

Wounds of the thorax a cause of Emphysema.

3dly. The disease has been known to occur from sharp pointed or cutting instruments penetrating into the cavity of the thorax. And as many are exposed to accidents of this kind, I was at considerable pains to ascertain, whether or not wounds of the thorax were a common cause of Emphysema. After a considerable

a considerable deal of search and reading, I have only been able to find *one* case, in which the disease occurred from a wound of this nature, it is recorded by Mons. Littre, in the Memoirs of the Royal Academy of Sciences, for 1739—

CASE 8.

A young man received a wound in the thorax by a small sword, which penetrated into the chest a considerable way. Soon after the accident, a violent Emphysema came on, and the patient died in two days. On dissection, it was observed, that the Emphysematous tumor on the chest measured eleven inches thick. On the belly nine, on the neck six, and four on other parts of the body. The wound in the lungs was

was seven or eight lines long, one and a half broad, and one deep.

Mr. Hewson endeavoured to produce artificial Emphysema, by cutting and wounding the lungs of rabbits and dogs in various ways; yet all his experiments were unsuccessful. No air was effused either into the cavity of the thorax, or into the cellular membrane. From his experiments, as well as various others which I shall mention when I come to treat of the practice, I am inclined to believe that this disease rarely happens from sharp pointed instruments, or leaden bullets penetrating the thorax and lungs, though Mr. John Bell mentions it as very frequent, after such accidents. I have known one or two instances, where a musquet ball has passed completely through the chest without producing any very alarming symptoms.

4thly,

4thly. Emphysema has been known to occur, from the lungs being ruptured by over distension, or, in other words, from the rarefaction, I suppose, of the inspired air, during a violent exertion or straining, the cells of the Bronchiæ have burst, and the air has escaped into the cellular membrane, and so occasioned this disease. When about to exert ourselves in any manner either in lifting a weight, or in giving a blow, our first act is to inspire a considerable quantity of air, and the fullness of the inspiration bears some proportion to the violence of the exertion. During the continuance of that exertion we continue to retain the air in the chest. The same action takes place in crying from pain, or in violent coughing. Now, it is evident, that unless the ribs and parietes of the thorax resisted the over distension of the

The lungs have been ruptured by over distension.

lungs

lungs, that they would be frequently in danger of being ruptured from this cause, and so allowing the air to escape into the cellular membrane, produce Emphysema.

The following case, which it is evident arose from a rupture of the lungs or Trachea, by over distension, was communicated by the late Dr. Alexander Hamilton, Professor of Midwifery in the University of Edinburgh, to Doctor Monro, many years ago, and to this distinguished Professor I am indebted for its insertion here.

CASE 9.

A young woman, about seventeen years of age, (says Dr. Hamilton), of a full habit of body, and florid countenance,

nance, while endeavouring to conceal the pains which precede labour, suddenly lost her voice, and in a short time her face became swelled in a wonderful manner. A tumor, which crackled under the hand, was quickly diffused over the whole head, neck, and thorax. Her eyes were completely shut, and the features of her face very much deformed. Her respiration was quick and laborious, pulse full and quick. She complained of no particular pain or uneasiness, but her mind was anxious, and she was very much frightened about what had happened to her. When I was called to her, I ordered a vein to be opened, and took away a considerable quantity of blood in a full stream; I also directed the tumid parts to be rubbed with Ol. Camphorat: twice in the day. For about a week the belly was kept open with

with laxative medicines, and she took an opiate at bed time.

During this time, the swelling began to give way, and in proportion as the Emphysema disappeared, she recovered her voice. About three weeks after delivery she left her lodging, and went to another part of the town. I saw no more of her for two months, when she accidentally came in my way, and even then the Emphysema could be perceived on her neck and breast; for when pressed, the crackling noise was still very distinct. Her features were quite natural, however, and she enjoyed perfect good health.

Another case, which appears to have occurred from this cause, is related at considerable length, by Mr. Kelly, of Leith, in the second volume of the Edinburgh

Edinburgh Medical and Philosophical Commentaries. I hope I shall be excused for giving it in Mr. Kelly's words, as I shall have occasion to refer particularly to it hereafter.

CASE 10.

"A man, about fifty-seven years of age, who had for several years laboured under a cough, attended with difficulty of breathing, on the morning of the 1st of April, 1769, was suddenly awakened with a severe fit of coughing, violent pain in his side, and great difficulty in breathing. The pain was fixed to one place, between the seventh and eighth ribs. It was much increased by his cough, which at the same time became more frequent. A surgeon in the neighbourhood was im-

mediately sent for, who blooded him and gave him a pectoral decoction. As he was not relieved, the bleeding was repeated in the forenoon, and a blister applied to the place in which he complained of the fixed pain. In the evening of that day, I was desired to visit him, when I found him affected with the symptoms mentioned above. His pulse beat between seventy and eighty strokes in a minute; and the blood which had been last taken from him was not in the least sizy. I ordered him a solution of gum ammoniac, and a purging clyster, as he had been costive for some days.

"On the second he still continued as before, nothing relieved by the bleeding, blistering, or clyster. His pulse was soft, and not quicker than natural. In the night he accidentally observed

observed his scrotum much swelled, but without pain. Next morning, upon a careful examination, the whole right side was found covered with an Emphysematous swelling, which yielded to the touch, but kept no impression. Wherever it was pressed, it gave a crackling noise.

"When I saw him on the 4th, the swelling had increased over his whole body. It extended also to his arms, hands, and neck, as high as the angle of the lower jaw. I directed that his whole body should be rubbed with flannel cloths and camphorated oil; and, as he was still costive, I ordered him a bolus of jalap and calomel.

"On the 5th, the bolus operated well, but the swelling still continued, and was attended with great oppression

in his breathing. The scrotum appeared to be more flaccid, but the penis itself was much enlarged. Upon mentioning this case to Dr. Monro, his advice was that the side should be accurately examined, with a view of discovering at what part the air got into the cellular membrane. If the place could be discovered, he proposed that an incision should there be made through the skin; and if that afforded no relief, or did not evacuate the air, that a perforation should be made into the thorax by means of a trocar.

"His side was carefully examined on the 6th; but it was impossible to discover from what part the air got into the cellular membrane. The pain of which he complained had shifted lower down, and farther back, than it was at first. As his difficulty of breathing, however,

however, was much increased, Doctor Monro proposed that an incision should be made at the part where he was first affected with the pain. This was accordingly done, about the middle of the thorax, between the seventh and eighth ribs. His breathing, however, was not in any degree relieved, nor was any air discharged, unless upon rubbing towards the opening. A perforation was therefore made into the thorax, obliquely, between the ribs. Upon withdrawing the perforator, such a blast of air issued through the canula, as to blow out a lighted candle, three or four times. Immediately upon this, from being before in the most miserable situation, he became easy, and almost totally free from his oppression. His pulse, which, before the operation, beat above an hundred strokes in the minute, soon fell to ninety. A cork

was

was put into the canula, which was left in the opening, and tied with a string round his body. On a violent fit of coughing, however, with which he was seized in the night, it came out but it was again introduced next morning.

"As his difficulty of breathing was very inconsiderable after the first perforation, the canula was withdrawn altogether on the afternoon of the 7th. At that time several incisions were made into the cellular membrane, in different parts of his body. Through these the air puffed out, when a pressure was made towards them, but not otherwise.

"From the 8th to the 14th, his breathing continued easy, and the swelling gradually abated. He was, however,

however, greatly distressed with his cough, particularly when in a recumbent posture, which obliged him to sleep in a chair for some nights. On the 15th, the frequency of the cough excited such a pain in his side, as to render bleeding necessary. His blood appeared very sizy; and next day the pain in his side was much abated. He then got an infusion of senna with tamarinds, by way of purgative, which operated well.

"On the 17th he was much easier, although he durst not lie in bed during the night. He walked through the house, but complained, at times, of a pain in his side, at the place where the operation was performed. He imagined, also, that there was sometimes a rising of the skin there in a lump; but this I could not perceive, although I held

I held my hand upon it for a considerable time, and made him put himself in all the different positions which he thought occasioned the swelling. Next night he ventured to go to bed, and slept easily for some hours. From this time he continued to recover; and, by the 30th, excepting weakness, he was free from all complaints. His cough was even easier than before he was attacked on the 1st of April; and he ate and slept as well as he had done at any time for thirty years before."

These are by far the most common cases of injury, which give rise to that complaint which forms the subject of our present enquiry. They may, however, be complicated in various ways. And indeed, there may be many other *kinds* of injury which occasion Emphysema, though I have not been able to meet

meet with any but such as were of the nature of those now detailed. Cullen mentions Hysteria as one of the causes, but should the disease occur during or after an Hysteric paroxysm, I imagine it must be referred to the last mentioned species, namely, as occurring from a rupture of the lungs, by their being over distended.

I recollect seeing it some where mentioned, that Boerhaave had seen a case of Emphysema, which was caused by a wound in the scalp of a boy. Dr. Cullen, if I understand him right, gives it as his opinion, that Emphysema is, in most cases, occasioned by the external air getting into the cellular membrane, through wounds in the integuments; but this, in my opinion, can never happen.

If we consider for a moment, we must be convinced that when a wound is made

made on any part of the surface of the body, so as to admit of a free communication between the external air, and the subcutaneous cellular membrane, there is no vacuum formed, to admit of the air's passing into the cells of that membrane. The pressure of the air on the sides of the wound, and, indeed, on the whole surface of the body, must be equal to that in the wound; therefore I should think it impossible either for it to penetrate into the membrane, or to accumulate under the skin in this way.

I have heard, too, of butchers introducing a pipe into wounds, and causing an artificial Emphysema in boys, by blowing them up as they do their meat, to make it look better; but, I should hope, if such a brutal custom ever

ever existed, that it has been laid aside long ago.

Having considered, then, the various kinds of accidents which occasion an effusion of air into the cellular membrane, and so give rise to Emphysema, I shall proceed, in the next chapter, to consider some of those diseases which have been found to give rise to this affection.

OBSERVATIONS

ON THE CAUSES OF

EMPHYSEMA,

&c. &c.

CHAP. III.

HAVING confined myself, in the last chapter, to the consideration of those accidents which most frequently produce the disease in question, I shall now proceed to mention those *Diseases* which have been observed to produce Emphysema.

Affections of the chest the only diseases which produce Emphysema.

The diseases which give rise to this complaint, are neither so many nor so varied as the accidents, and may be comprehended

prehended, with some propriety, under one general term, viz. local affections of the Chest.—It may be produced in consequence of pneumonic inflammation. And it may occur in phthisis; but the most common affections from which it has occurred have been those in which abscess has formed either in the substance or on the surface of the lungs.

Abscess not so common a cause as might be supposed.

As vomicæ and ulcerations of the surface of the lungs are attended with erosion and destruction of the bronchial cells, we should naturally expect they would also be attended with an effusion of air into the cavity of the chest. But when we consider that by the inflammation which precedes the formation of pus, the vesicles are condensed, and that adhesions are formed not only with each other, but with the inside of the parietes of the thorax, we must perceive

perceive that if air is effused, it will be limited for a time to the small sac which contains the purulent matter.—Mr. Heweson mentions, that his friend, Dr. Stark, had shewn him a case in which several large branches of the Trachea were eroded by matter, so as to admit of the air passing freely into the vomica.

When an abscess forms in a part where there is an adhesion, either previously existing, or occasioned by the inflammation which preceded the formation of the abscess between the pleura pulmonalis and pleura costalis, it not unfrequently happens, that both the intercostal muscles and ribs lying over the abscess are completely destroyed. In such cases, if any communication exists between the air vesicles and the vomica, Emphysema must take place,

as

as there is then a free communication between the air cells of the lungs and the subcutaneous cellular membrane. But even in cases of abscess of the lungs where no adhesion existed between the pleura and parietes of the thorax, Emphysema has been known to occur when the abscess burst, and the pus was discharged into the cavity of the thorax.—Here it is evident, the air must be effused first into the cavity of the chest, and occasion that species of the disease which some have termed Thoracic Emphysema, and be accompanied with those alarming symptoms which are observed when water or pus are collected in the thorax, and then, from the violent exertion of the patient to fill the diseased lung, the air is forced through the pleura costalis, and intercostal muscles, into the cellular membrane, and so diffused. I am inclined

to

to think that the effusion of air into the cavity of the thorax is a more frequent occurrence, when the lungs are diseased, than is commonly imagined, though the production of Emphysema without adhesion seldom happens.

The following very interesting case of this kind occurred while I had the honor of acting as Doctor James Hamilton's Assistant in the Royal Infirmary of Edinburgh:

CASE II.

Remarkable Case of J. Hay.

James Hay, aged 25 years, a private in the Royal Artillery, stationed at Leith Fort, was brought to the Hospital about five o'clock in the afternoon of ——— 25th of May, 1805. I saw him about an hour after his admission

sion, and noted down the following symptoms, which I have been permitted to transcribe from the Journal. He complained of very severe head-ach, vertigo, with nausea, and general pains; he had a slight cough, which excited some pain, about the superior part of the sternum, and he complained of a very painful feeling of fullness, at the Scrobiculus cordis, and which he attributed to having eaten a great quantity of hard dry cheese for his supper the night before.—His pulse was about 90, and very regular; his tongue was somewhat white, and his respiration rather laborious:—his face was flushed, and his eyes suffused, but his heat was nearly natural. He said he had felt unwell for some days, but that it was only in the afternoon of the 24th that he was seized with rigors and severe head-ache, to which, in the

course of the night his other symptoms had supervened. He was very anxious for an emetic, which, at his earnest entreaty, was ordered for him.

On the 26th the head-ach and vertigo were considerably abated, as was also the pain at the superior part of the sternum. But early in the morning he began to complain of great difficulty in respiring. I was called to him in a great hurry, and found him almost suffocating; I took about twenty ounces of blood from his arm, which produced a little relief—I found that the Ipecacuanha which was ordered the evening before, had not produced vomiting, but that in the course of the night he had had two loose motions.—At twelve o'clock, when Dr. Hamilton came to the Hospital, I carried him to this patient immediately; the difficulty

culty of breathing had become even more severe, his face was turgid, and his lips quite livid. On the Doctor's examining him attentively, he discovered not only an unusual fulness of the face, but also of the neck and breast, and when he pressed upon these parts with his hand, there was evidently a crackling noise. In about half an hour after Dr. Hamilton had made these observations he returned again to the patient. The fullnes or tumor was become not only more evident, but was diffused all over the chest, and down both arms. The crackling noise on pressure was also much more distinct. He had now the greatest difficulty in respiring at all, and before one o'clock every part of the surface of his body was become emphysematous, except the palms of his hands, and the soles of his feet.

A consultation of the surgeons was requested by Dr. Hamilton, and as the patient appeared evidently moribund, it was agreed that the only remaining hope was to perforate the the thorax, not that they had even much to expect from the operation, yet it appeared the only manner in which his life could be saved.

An incision was accordingly made by Dr. Inglis, about half an inch in length, through the integuments, between the sixth and seventh ribs on the left side of the thorax. The intercostal muscles were then carefully dissected, and a small opening made with the point of the scalpel through the pleura-costalis, into which a small flat silver canula was introduced.

As soon as the opening was made into

into the cavity of the thorax, every distressing symptom became more severe, and the patient scarcely survived a quarter of an hour. The body was opened by my friend Mr. George Bell, who was so very obliging as to favour me with the following accurate detail of the appearances on dissection.

Mr. Bell's Account of the appearances on dissection.

Air was found effused into the cellular membrane under the skin on every part of the surface of the body, except on the back part of the head, the palms of the hands, and soles of the feet. This effusion was greatest on the thorax and trunk, and least observable on the extremities:—the lungs on the left side were sound, nor indeed were there any marks of disease in the left cavity of the thorax, except that towards the spine, the pleura costalis shewed some slight marks of inflammation

mation and where some of the small cells were very much distended with air.

The opening between the sixth and seventh ribs, and about half way between the sternum and spine, which was made while the patient was alive, with the view of evacuating the confined air from the sac of the pleura, appeared to be about half an inch in length, as the surgeon intended it.—The mediastinum appeared rather of a looser texture than natural, and seemed as if it had been very much stretched, as did also the pericardium and surrounding parts.

There were about six ounces of serous fluid in the pericardium, the surface of which was also in a considerable degree emphysematous, the right ventricle of the heart appeared to have been

been very much inflamed, for more than a third part of it was covered with coagulated lymph, in some parts much thicker than the substance of the heart.

The lungs of the right side were completely collapsed, at least very little air could be observed in the bronchial cells, near the middle of the anterior surface of the upper lobe there was a vomica of about three inches in circumference, from which it appeared that about four ounces of pus had very lately escaped into the sac of the pleura through an opening which would scarcely admit the head of a small silver probe; upon blowing into the trachea it was observed that the air passed freely through this opening into the sac of the pleura; from this, too, it was easy to discover the size of the

the vomica, and the very free communication which there was betwixt the air cells of the lungs and the cavity of the thorax.

The other lobes of the lungs on the right side were perfectly sound. Some of the bronchial glands were very much enlarged; three or four of them were even about the size of a chesnut.

The pleura costalis of both sides of the thorax shewed evident marks of inflammation in many parts, particularly towards the spine, and also where the mediastinum is joined to the sternum.

While examining with some attention and endeavouring to discover the opening through which the air had escaped from the cavity of the thorax, a small part of the pleura costalis, between

tween the sixth and eighth ribs, and about three inches from the vertebræ was discovered, with the appearance of being more inflamed than any other part, and nearly in the centre of this small spot an opening was detected, through which the pleura and cellular membrane were easily inflated.

In addition to these circumstances, I learnt afterwards from this patient's sister that, about three months previous to his coming into the Hospital, he was at a country fair, where he got considerably intoxicated with spirits; and on his way home, lay down by the road side and fell asleep. That, in consequence of this, he had a very severe attack of pneumonia, for which he was repeatedly bled, and from which he recovered very slowly. He had complained for several weeks of difficulty

difficulty of breathing; and on the evening before he was attacked with the complaint for which he was sent to the Hospital, he had been using violent exercise with a large forge hammer.

Cases such as this, I have already observed, can seldom happen, as in most instances the patient will die of suffocation before the air can find a passage into the cellular membrane.—

M. Meckel's Case somewhat similar to that of Jas. Hay.

Professor Meckel, of Berlin, in the History of the Royal Academy of that City for the year 1759, has given a very remarkable case of a soldier, which, as illustrating, not only the distressing symptoms which air occasions, when effused and contained within the thorax, but as showing also the length of time this effusion can exist without producing subcutaneous Emphysema, I shall beg leave to relate in the Professor's

Professor's own words—as I deemed it interesting, I have made a pretty full extract:

CASE 12.

" Le 18 Janvier de l'année derniere, dans notre Hôpital de la Charité, mourut un jeune Soldat, nomme Herzog. Il étoit dans sa dixhuitieme année; son corps étoit musculeux et bien constitué; et sa stature alloit à cinq pieds et onze pouces. Pendant les dix jours qu'il passa dans cet Hôpital, il se plaignit d'une extreme anxiété et difficulté de respirer, ne pouvant le faire que quand il étoit à son séant dans le lit. Son pouls étoit fréquent; mais il n'expectoroit point de pus, sa toux n'étant même, ni continuelle, ni phtysique. La saignée ne lui procura aucun soulagement;

lagement; et il en fut de même de tous les remedes qu'il prit: au contraire, la difficulté de respirer allant toujours en augmentant, il y succomba et mourut. Avant que d'entrer à l'Hôpital, il avoit passé dix-sept semaines au lit, se plaignant toujours de la respiration difficile, mais ne pouvant indiquer aucune cause de son male.

" Je dissèquai son cadavre. Ayant ouvert l'abdomen, je trouvai le foye dans un état de dépression, étant placé au dessous des cartilages des côtes de l'hypocondre droit, et même obliquement, en sorte qu'il étoit plus élevé du côté gauche, et plus enfoncé vers embas dans le côté droit. Le diaphragme convexe par embas s'avancoit dans le côté droit dans la cavité de l'abdomen, au dessus du lobe droit du foye, de maniere qu'il paroissoité gonflé comme une vessie au dessous des cartilages des

côtes

côtes septieme, huitieme, et neuvieme. Par cette raison, le foye dans ce côté étoit déprimé au dessous de l'hypocondre, son lobe droit s'enfoncant dans la cavité de l'os droit des iles ; il étoit placé sur l'intestin cœcum, la premiere courbure du colon étant déprimée dans la region de l'os des iles, au dessous du lobe droit du foye. De se côté droit le colon passoit à la crête de l'os des iles du côté gauche, sous la grande courbure du ventricule qui s'enfoncoit dans le côté droit ; puis il remontoit derriere le ventricule dans l'hypocondre gauche jusqu'à la ratte ; d'où, faisant une courbure fort aigue, il descendoit suivant son cours naturel devant le rein droit. Je soupconnois que, comme il arrive souvent, la cause de ce phénomene se trouveroit dans du pus, ou de l'eau répandue dans la cavité du thorax, surtout voyant que le diaphragme

pressé

pressé en arriere s'avancoit vers l'abdomen avec l'apparence d'une vessie pleine d'eau. Mais quelle ne fut pas ma surprise quand, aprés l'ouverture du diaphragme, il sortit avec bruit de l'air du thorax par la playe faite au diaphragme, qui, de gonflé qu'il etoit auparavant par embas, se releva vers le thorax et se relâcha! Dans la cavitê même du thorax, à droite, au dessus du diaphragme, jusqu'à la troisieme côté, il y avoit un vuide que le poûmon ne remplissoit pas, mais qui étoit dégagé, sec, et garni partout de la pleure blanchâtre, et seulement un peu plus épaisse qu'elle n'a contume de l'être naturellement; une mucosité déliée y etant repandue par dessus."

There

There is another case, related by Professor Palfyn, in his Anatomie Chirurgicale, in the section De Scroto, which occurred from an abscess formed on the surface of the lungs; but, in this instance, the pleura had adhered to the parietes of the thorax; and it would appear that the intercostal muscles and ribs had been completely destroyed. The following is a translation of a short extract from the case, as relatedby Palfyn, p. 142 of his work:—

The Case as related by Palfyn, by no means uncommon.

CASE 13.

I was requested (says he) by the surgeon of the British Military Hospital, which, during the war, was at GAND, to be present at a consultation on the case of a soldier, about forty years of age, whose scrotum was immensely

mensely swelled, and who had also a considerable swelling all over the abdomen and breast. I also observed, that when the patient filled the chest as much as he could by inspiring fully, that there was a tumor about the size of a pullet's egg started up betwixt the second and third true ribs, reckoning from above, on the left side of the thorax, and that when he expired fully, this tumor disappeared.

"I directed the surgeon to make several small incisions in the scrotum and other swelled parts; and, observing the air to rush out with some force, I was satisfied it was a case of Emphysema.

"I was anxious to know if he had had any disease in the chest, and accordingly upon questioning him, found that

that he had coughed up a great quantity of purulent matter, apparently from an abscess."—Having learnt these things, Palfyn gives it as his opinion, that the air when drawn into the lungs during inspiration, passed immediately through the cavity of the abscess which had been formerly occupied with pus, into the cellular membrane, under the skin, and in this way produced the general Emphysema.

I consider this case, too, as rather uncommon, but by no means so much so, as Cases 11 and 12: the free communication which is formed between the cells of the lungs and subcutaneous cellular membrane, permits the inspired air to pass, in the same manner as if the parietes of the thorax had been cut or lacerated. But in such cases it is evident the patient will

always be able to breathe with more freedom than in those cases which occur from injuries, and where there is no adhesion: for here the lungs are prevented from collapsing, therefore, no very great difficulty of breathing can exist, at least for some time, and, of course, the symptoms will be less urgent, and the complaint subdued with more certainty; but of this I shall speak more at large, when I come to consider the practice in this disease.

CHAP.

OBSERVATIONS

ON THE CAUSES OF

EMPHYSEMA,

&c. &c.

CHAP. IV.

Spontaneous Emphysema not so easily accounted for as that arising from Accidents, &c.

HITHERTO we have found no difficulty in accounting for the occurrence of Emphysema; for whether arising from accident or previous disease it was evident that the effusion of air which was the cause, or indeed, constituted the complaint, proceeded from the ruptured or injured cells of the lungs.

There remains, however, still to be mentioned a more singular kind of this

disease; which, as arising from no very evident cause, has been denominated *Spontaneous Emphysema.* And of which the following case, as related by the justly celebrated Dr. Baillie, in the first volume of the Transactions of the Medical Society of London, forms a striking example:—

CASE 14.

Singular Case by Dr. Baillie.

"I had lately (says Dr. Baillie) an opportunity of observing a very uncommon appearance of disease in the living body, as well as of examining its extent after death.

"Margaret Buck, aged about ten years, was admitted, nearly three months ago, a patient into St. George's Hospital, with anasarca and ascites.—

Two

Two days before her death, I was desired by the apothecary of the hospital to see her, as Dr. Ford, the physician, who had for some time attended her, could not come on that day to the hospital. When I saw her lying in bed, her appearance differed in nothing from that of a person highly anasarcous; nor should I have at all suspected that there was any peculiarity in her complaint. Upon attempting to feel her pulse, however, I was surprised by the crackling of air under my fingers, and the skin was considerably elevated, so that the pulse by that means was indistinctly felt. I then pressed upon the skin of the back, breast, belly, &c. and there was the same crackling of air. Air was also felt in the cellular membrane of the inside of the thighs. There was at the same time a considerable quantity of

of water accumulated in the cellular membrane of the legs and face, as could be readily distinguished by the doughy feeling upon pressure. The girl herself lay in a sort of stupid state, expressing, however, a sense of considerable pain, and having a good deal of difficulty in breathing.

"After having examined the patient, I sent for Mr. Walker, one of the surgeons of the hospital, who was at that time in the house, that he might have an opportunity of seeing this very curious appearance of disease, and desired that small openings might be made through the skin for emptying the air. The patient died on the next day, and I took an early opportunity of examining the full extent of the disease by dissection.

"Air was found diffused through the

the cellular membrane of the trunk, arms, thighs, &c. as formerly related. Upon making an opening into the cavity of the abdomen, the stomach was found distended, almost as far as it could stretch, with air, and the whole intestinal canal was moderately filled with it. The air too had penetrated into some parts of the cellular membrane of the stomach and intestines. The laminæ of the peritoneum, composing the mesentery, were separated at some distance from each other by the air which occupied its cellular membrane, and the small vessels running upon the stomach and intestines were universally filled with it. There was about a gallon of water in the cavity of the abdomen.

"Upon opening into the cavity of the chest, a great quantity of air was found

found in the cellular membrane between the pleura and the pericardium, but none could be discovered in the cellular membrane connecting together the air-cells of the lungs. A considerable quantity of water was found in the cavity of the pericardium, and about two pints in the left side of the thorax.

" What is remarkable in this case is, the collection of air without any external injury in the cellular membrane of any part of the body. Emphysema generally spread over the body has been observed to take place in two ways; the one way is, by air escaping into the cellular membrane of the body, in consequence of the lungs being wounded by a broken rib; the other way is, when air is generated by a putrefactive process, as occasionally happens in mortifications. Neither of these could

could have been the cause of Emphysema in the case which I have related."

Various opinions have been entertained respecting the source of the air in cases such as the one just related, and various theories have been formed to account for the spontaneous occurrence of Emphysema. HUXAM, and along with him most of the authors of the present day, have supposed that the air was generated by a kind of putrefactive process. In a letter, which Dr. Huxam addressed to Mr. Leake, and which is published in the third volume of the London Medical Observations and Inquiries, he relates the following case:—

CASE 15.

Huxam's opinion of the causes of this species of the Disease.

About three years ago (says Doctor Huxam) a full bodied, middle aged sailor, Michael M'Cann, of the Modeste

deste man of war, was seized with a putrid fever and sore throat. He *was bled* at the beginning, but his blood appearing in a loose dissolving state he was bled no more. A blister was also applied between his shoulders, which soon dried up.

About the seventh or eighth day of his disease, an *Emphysematous* swelling appeared in his face, neck, and all over his breast, especially on the right side. The skin was greatly stuffed up, and made a crackling noise under the finger when touched, as if you had handled a half-blown dry bladder, and the patient was exceeding stiff, and uneasy with it.

Being called to see the patient, the Doctor goes on to say, I examined it with great care, and found the tumor altogether flatulent, and a complete Emphysema.

Emphysema. I advised the fomenting of it with sharp vinegar and camphorated spirit of wine. And if that should not succeed, to scarify slightly. The tumor totally vanished, in two or three days, without any scarification, and he soon recovered from the fever."

"Here (he concludes) the Emphysema was generated merely by the putrescence of the humours, as is frequently observed in a less degree in and about the incipient gangrenes of the limbs," &c.

It is indeed certain, as Dr. Huxam also observes, that during the putrefactive process much air is disengaged, both from animal and vegetable matter, yet that this process should go on so far in the living body as to produce general Emphysema, without proving fatal in the first instance, is rather to be questioned.

questioned. There is a very marked difference in the diseases under which the patients laboured, when attacked with Emphysema, and though putrefaction may have had something to do with the generation of the air in Huxam's case, it is evident it could have little or nothing to do with it in the case related by Dr. BAILLIE.

Various opinions respecting the same.

Some of the French authors have supposed that the air, in such cases, was taken up by the blood vessels in the lungs, and conveyed along with the blood to be deposited in the reticular cells of the subcutaneous cellular membrane.*—But it is now well known, that air cannot circulate in the arteries, in an uncombined state, without prov-

* Memoir de l'Academ. Royal des Sciences, pour l'Ann. 1713—Observat. sur l'Emphysema, par Mon. Lettre.

ing

ing fatal, and, as is supposed, when it reaches the heart.* This theory, therefore, requires no further refutation. There is another opinion, which I have met with some where, which is, that the air, in such cases, is merely evolved, or, in other words, brought from a fixed to a diffusible nature, by means of heat, putridity, or some other cause. I am inclined, however, to consider this as bordering too much on hypothesis. Various opinions have been formed, by different authors, respecting the kind of air that is accumulated in these cases; and there is no doubt but if this was fully ascertained it would throw considerable

* Ruysh, in his Epist. Anatom. et Problem 16, relates the case of a woman who died suddenly. The heart was very much distended, and when opened, a great quantity of air escaped from it.

light

light on the subject. But I have been able to meet with nothing satisfactory respecting it, further than that it has been ascertained to be incapable of supporting combustion.

The opinion of the Author.

I am of opinion, that the air, in cases of spontaneous Emphysema, is generated by a process somewhat similar to putrefaction; not in the solids of the body, but in that *matter* which, while the patient is in health, and the functions are natural, passes off by what is called *perspiration*. And I would explain this in the following manner:—

As it is only in cases of malignant fever, and those diseases in which the circulating fluids are materially changed, and the functions of the body considerably impaired, that this generation of air

air is observed to occur, I therefore suppose that that matter which should be thrown off by the extreme branches of the arteries, or to use the common language, that fluid which is *perspired* during health, is accumulated under the skin, and here undergoing a chemical change, is separated into its more simple constituent parts, of which azotic gas is, by far, the most abundant,—and that this being diffused through the cellular membrane, produces the windy swelling, or Emphysema.

CHAP.

OBSERVATIONS
ON THE
METHOD OF CURE
IN
EMPHYSEMA.

CHAP. V.

WE come now to what I conceive the most important part of these Observations, namely, the consideration of the various means which have been practised or recommended to be practised, for the cure of Emphysema.

From whatever cause the disease may occur, it is evident that the rapidity

dity of the of the symptoms, and their dangerous tendency, will oblige the practitioner to be prompt in deciding on the practice which he is to adopt for the recovery of his patient. The practice, no doubt, must vary in different cases, yet, as the effusion of air is, in all, the cause of the distressing symptoms, our thoughts will, in the first instance, turn to the consideration of the manner in which we can, with the greatest safety, and least delay, evacuate this fluid.

I propose, in this chapter, to consider, in separate sections, first, the several operations which have been recommended for evacuating the effused air, and lastly, the other parts of the practice and remedies which may be necessary in completing the cure.

SECTION I.

Of Scarification of the Integuments.

THE late Dr. WILLIAM HUNTER was the first, I believe, who pointed out the practice to British surgeons. In a paper which he read to the Medical Society, 1757, and which is published in the second volume of the *Medical Observations and Inquiries*, he details at great length a very severe case of Emphysema, from a fractured rib; in which this operation was attended with the most beneficial effects.

The Doctor was called to the case, he says, by Mr. Hales, surgeon, at Limehouse. The patient, *Henry Templar*, a young man of a small and slender form of body, was thrown from his

his horse, and thereby received a considerable hurt in his side, about two o'clock in the afternoon of July 13th, 1754. He complained of much pain in his left side, and difficulty of breathing. When the side was examined by the surgeon, he found so remarkable a swelling under the skin, that he could not trace nor even feel the ribs. This swelling increased fast, and spread itself over the body.—Dr. Hunter says, I visited him with Mr. Hales, about seven o'clock in the evening, (twenty-nine hours after the accident); he was in bed, panting for breath. His form was that of a human skin stuffed: I have often seen such anatomical preparations, and wondered at so much pains being taken to so little purpose; for, till I saw this man, they seemed hardly to resemble any thing human. The inflaation was great and universal, ex-

cept in his hands and feet, where it was inconsiderable.

The skin was every where shining, as it is when much distended by any kind of swelling, and, in most places, was raised one, or two, or perhaps, three inches from the subjacent muscles or bone.—The air could easily be pressed out from any part, but it immediately returned upon taking off the hand. When struck, his body sounded like a wet drum, and, when pressed, the air could be felt, and its sound distinctly heard.

The cellular membrane was less inflated, and the skin less distended upon his extremities in proportion nearly to the distance of the part from his chest. Those parts on the surface of the body, which have a more loose and yielding cellular membrane were proportionably

ably more swelled: thence his eyelids were so fixed by their own bulk, that he had not been able to see light from a few hours after the accident happened. The *penis* and *scrotum* were as much distended as I ever saw them in the worst *anasarca*.

Such is the minute and elegant description, which this celebrated Anatomist gives of this case; he adds, however, many other particulars, not less interesting, but which are common to every case; I shall not, therefore, detain the reader by extracting them, but beg leave to recommend the original paper to his attentive perusal. In this case Dr. Hunter was anxious to ascertain whether or not the cellular membrane of the more internal parts was inflated, and accordingly he examined the patient's mouth, and also the rectum;

tum ; he found all the loose membrane between the tongue and gums inflated but could feel no Emphysema within the *sphincter ani*.

After giving the history of the case, at considerable length, Dr. Hunter goes on to say, that he proposed *opening* the skin below the scapula, with the view of giving immediate relief. This being approved of by Mr. Hales, and consented to by the patient, Mr. Hales made an incision about an inch in length. The air rushed out with noise as from the mouth of a pair of bellows, and the blast continued to be audible for some time, becoming gradually, however, weaker and weaker.

I stroaked (says Dr. Hunter) the skin all round towards the wound, and each time discharged a considerable quantity of air. To make this process more

more easy, I oiled his skin, and then continued the stroaking, and in a short space of time his bulk was very much diminished. He was sensible of great relief from this, for, from the most desponding state, his spirits were immediately raised.

The Doctor being fatigued from stooping, left off, upon which the patient began to press out the air himself with great eagerness. In order to empty the head, neck, and opposite side sooner, another incision was made upon the right pectoral muscle, from which there was a great discharge of air also, and at the request of the patient a puncture was made in the scrotum, which at the first blast was reduced two thirds of its bulk.

It was agreed that the patient should be

be well emptied by pressing out the air at the punctures, and then that a thick compress, wet with spirits and vinegar, should be applied to the affected side, and bound as tight as he could bear it, and that he should lie on that side.

This Dr. Hunter says, was ordered rather with a view of preventing, as much as possible, more air getting into the cellular membrane. The wounds were kept open during the night, and his friends continued to press out the air from time to time, but the compress, &c. were not applied till next morning.

When Dr. Hunter saw the patient next day the Emphysema was very much reduced, and he had no unfavourable symptom, so that he conceived he was out of danger; and concludes with saying, that his difficulty of breathing

breathing and cough, with which from time to time he brought up some blood and viscid phlegm, were so troublesome as to require frequent bleeding. He took nitre and pectoral emulsions, then asses milk, and went into the country. The Emphysema was quite gone in a few days; and in about two months he was in all respects well.

I conceive this to be the first case on record, in which puncturing the skin, with the view of evacuating the effused air, was either practised or recommended.

Though Messrs. Merry and Littre of Paris, have detailed cases previous to Dr. Hunter's time; and though they have both treated of the disease at some length, they never even hint at such

an

an operation being considered adviseable. Nay, Mons. Merry goes so far as to say, that he believes incision in the skin would have tended to shorten the life of his patient, while in the next line almost he states, that he believes the patient died from the pressure of the Emphysema on the outside of the chest.

After the publication of Doctor Hunter's paper, we find that puncturing was the common practice, and that sometimes it was of equal benefit, as in the case related by the Doctor. In Mr. Leake's case, which I have detailed, p. 37, of these Observations, this practice was attended with the almost instantaneous relief of the patient. Upon such an unexceptionable authority, says Mr. Leake, (viz. the authority of Dr. Hunter), without farther hesitation, a longitudinal

longitudinal incision was made of about an inch and a half above the fracture, where the swelling appeared most prominent. The air immediately rushed out with noise and violence, and even a considerable time afterwards, by stroaking and pressing the parts all around towards the opening, continued to pass off with a hissing crackling noise.

The patient was very soon most sensibly relieved by the operation, and could breathe and swallow pretty freely, which he could not do before without pain and difficulty. The same gentle efforts were persevered in for near an hour and a half, by which the swelling in every part was greatly reduced, and the right eye perfectly freed and opened.

This patient was also bandaged; but

as

as the swelling increased, as also his cough and restlessness, the bandage was removed, and the air pressed out at the opening which had been made, which again relieved him, and he slept for some hours in a posture between sitting and lying. On the second day after the accident, the further effusion of air seemed to have ceased; that, already effused, began to disappear. He continued to recover rapidly, for, in less than a month, he was able to do duty.

In the case which we have extracted from Mr. CHESTON'S *Pathological Inquiries*,* this operation was also practised, but not with equal success. In that case the sense of suffocation was very great. The patient could not suf-

* See Case 6, page 39.

fer

fer the least bandage or compress upon the chest; and though repeated scarifications were made in various parts of the body, yet he was nothing relieved, for his sense of suffocation, and difficulty of breathing increased; and, on the fourth day after the accident, on inclining his head backward, his breathing became interrupted, he turned wholly insensible, and soon died.

While the communication betwixt the cavity of the thorax and subcutaneous cellular membrane remains open, I conceive this operation will be effectual in relieving the patient, as it will not only relieve the immediate distension, but prevent the further accumulation; yet, I should think there are few cases, in which scarification can alone be depended on; as we may judge from the great number of fatal

cases

cases which have been recorded, while practitioners were unacquainted with any other means of relief.

It is a practice which I think ought always to be tried, for, if it should not prove efficacious it is safe, and will in most instances relieve some of the urgent symptoms. There is no danger of that inflammation and gangrene, which so frequently takes place from similar punctures in cases of Anasarca; so that if they do not prove beneficial they are soon healed up again.

I conceive no very particular directions are necessary, with regard to the performance of this operation. The punctures ought to be made where the integuments are most distended, and as near to the part where the injury was received as possible. They should be

be made with the point of a lancet, and penetrate sufficiently deep to reach the cellular membrane. If the tumor is very great, as in Dr. Hunter's case, the air will rush out with considerable violence, and continue to do so for some time. When, however, it ceases to be discharged in this manner, the parts around the punctures should be pressed gently, and stroaked towards the openings.

I would recommend several scarifications to be made wherever the parts are very much inflated, as in the scrotum, thighs, neck, breast, &c. for the effused air will not only disappear sooner, but it will be less painful to the patient than having the air pressed along the whole body, to the punctures which may have been made on the chest, or over the injured part.

SECTION

SECTION II.

Of Paracentesis of the Thorax.

THIS I have no hesitation in saying, is one of those improvements and discoveries in Surgery, which will ever immortalize the name of *Alexander Monro;* for though this operation has been long practised and recommended in cases when it was supposed water or pus were collected in the cavity of the thorax, yet undoubtedly Dr. Monro has the merit of first proposing it in the treatment of Emphysema. Mr. Hewson as well as Mr. Bromfield have severally claimed the merit of this discovery; but I have little doubt in my mind who was the original proposer of it, and it surely is a practise of the greatest moment in Emphysema.

Doctor

Dr. Monro was present with Professor Meckel, at Berlin, and assisted him in dissecting the patient whose case I have detailed, p.75, &c. and it was from the appearances observed in that case, that he was first led to consider this operation as likely to be of advantage in cases of Emphysema, more particularly when there was great oppression of breathing. He mentioned what occurred to him at that time to Mr. Meckel, and has continued to recommend the practice in his public lectures ever since the year 1760.

This I state from my own knowledge, for I have seen a manuscript copy of the first course of lectures Dr. Monro ever gave; and in them he mentions and recommends the operation of puncturing the thorax, in cases of Emphysema. My friend, Dr. John

Gordon, of Edinburgh, in a very excellent paper, which he read to the Medical Society, in 1804, on Injuries of the Thorax, observes, that neither Monro nor Hewson have any just claims to this practical improvement, as the propriety of it was pointed out by Mons. Littre, in 1713.

If Dr. Gordon had considered Mons. Littre's observations, he would have seen at once that it was not by evacuating the air that he (M. Littre,) judged the operation would have saved the patient's life, but by discharging a great quantity of purulent bloody matter, which was contained in the sac of the pleura.

Though Mr. Hewson has not the merit of being the first proposer, every practitioner must feel much indebted

to

to him for his valuable observations on the subject; and of which in the further consideration of this operation I shall freely avail myself.

Before proceeding to the discussion of Paracentesis Thorasis as connected with the disease in question, I shall, as formerly mentioned, consider a little more minutely the mechanical effects resulting from the free admission of air into the cavities of the pleura; a necessary and immediate consequence of all wounds penetrating the chest.

On this subject the most celebrated physiologists are by no means agreed, a circumstance which appears the more surprising, if we consider respiration as is generally done, and as we have endeavoured to explain it in the first chapter of these Observations, a merely

mechanical function. By attending to the laws which regulate the operation of these powers by which the alternate dilatation and contraction is accomplished, we must find an easy explanation of every mechanical derangement which the function of respiration can possibly experience by a perforation into the cavity of the thorax.

These effects have occupied the attention of physicians and philosophers in every age, and we can only ascribe the great diversity of opinion which prevails among them, to the fallacious appearances which presented themselves on experiment; perhaps, too, to the erroneous idea, that the same effects must result from an opening made into the chest in the living, as are observed to take place in the dead subject.

The

The patient dies, says HIPPOCRATES, if, when a large wound is made into the thorax, less air passes into the chest by the mouth than by the wound.—GALEN is more minute: it is a thing, says he, well known, that the inspiration made by the mouth of an animal, must necessarily be diminished by a wound, in proportion to the quantity of air which flows through that wound into the cavity of the thorax. But, of necessity, less air must be *expired* in proportion as less was *inspired* by the mouth, and, as much as the expiration is lessened, so much must the voice become shorter by a necessary consequence.

MAYOW remarks, in his Treatise De Respiratione, that, in slight wounds of the thorax, part of the air enters by the mouth, part by the wound.—

Hence,

Hence, the lungs are only in part distended into that space of the dilated thorax, which has not been occupied by air entering through the wounds.—SWAMMERDAM's observations are nearly to the same effect, namely, that in large wounds of the thorax, the lungs do not expand, because, says he, the air finds easier access by the wounds than by the mouth. But in smaller wounds part of the air entering by the mouth, and part by the wounds, the lungs are consequently partially extended.

In these few quotations are comprehended nearly the opinions which were universally maintained on this subject, from the days of Hippocrates to the commencement of the last century.—They are evidently the result of accurate observation, and though expressed in general terms, they will be found to be

be fully as correct as the conclusions since deduced by modern physiologists from many, and some very laboured experiments.

Dr. W. Houston appears to have been among the first, who conceived that all wounds penetrating both cavities of the thorax were mortal, and he is the first who had recourse to experiment for a confirmation or refutation of his opinion.

In April 1728, Dr. Houston, with a narrow scalpel made a puncture into each side of the thorax of a small dog. After the operation the dog barked and howled as strongly as it had done before, and gave no signs of an injured respiration. Some of the Assistants from this suspected that the instrument had not been plunged deep enough into

into the cavity of the thorax, but to remove this suspicion, he made two other punctures, and the effects were entirely the same. The voice of the animal continued sound and entire from nine o'clock in the morning till about six in the evening, when he was killed n order to observe what had taken place.

Upon opening the chest, the four wounds of the pleura costalis were easily discovered, and when the lungs were inflated no air escaped from them, although the knife had penetrated almost an inch into their substance.

About the beginning of November, the same year, the Doctor opened the thorax of a middling sized dog, by a large wound on each side, and, on passing his finger into the chest, he observed

observed the lungs to be collapsed, in such a manner, that the space betwixt them and the pleura costalis was about an inch.

Upon setting the dog at liberty, he immediately got up pretty chearfully and ran about the room, and howled. Being kept for three days, he was so far from losing his voice, that his howling became rather troublesome, and, at length, being let loose, he ran away.

In January, 1729, Dr. Houston was present at the following experiment which was performed by VAN SWIETEN: A middle-sized dog was tied to a board and his thorax was opened on both sides by a large wound. His voice did not fail, and so far from the lungs collapsing, a lobule of them was pushed out, through each of the wounds.

wounds. When air was blown into the cavities of the chest, it did not seem to injure the respiration of the animal in the least. After it had lived in this manner for about half an hour without any sensible effect on the voice or respiration, the wound on one side of the thorax was enlarged by cutting through the rib, and now appeared, what, at first sight, would seem a paradox; the lungs were contracted, while the breast was dilated, and when the chest was contracted, the lungs were dilated.—The dog survived this operation also.

The simultaneous contraction of the lungs and dilatation of the thorax, which was observed to take place in this last experiment, has been a constant source of deception to those who have repeated Dr. Houston's experiments. The Doctor accounts for it himself in the following

following simple and rational manner :—

It happens entirely from the sudden diminution of the lower part of the cavity of the chest occasioned by the strong convulsive contractions of the abdominal muscles. It appears to me also, probable, that as the wounds were so large and consequently admitted more air to pass into the cavity of the chest, than the animal could inspire by the mouth, during inspiration the external air would rush in by the wounds, and so keep the lungs contracted, while it was dilated, and that during expiration, when the chest was contracted, and consequently great part of the air contained in the sac of the pleura evacuated, the lungs might from the pressure being removed, expand in some degree, and so produce the

the paradoxical appearance, which they describe.

These, and several other experiments were sufficient to convince HOUSTON of the erroneous opinion he had formed, at the same time they seemed to be repugnant to the justly received doctrine of respiration, namely, that the lungs are dilated by the weight of the air entering through the larynx when the pressure is removed from their surface, by the dilatation of the thorax. With the view of removing, or at least doing away in some measure this seeming contradiction he makes use of the following arguments;

Let a wound be made of an aperture double that of the glottis, into each cavity of the thorax. During inspiration air will enter into the thorax, in proportion

portion as it is dilated, but it will not all enter by the glottis, nor through the wounds, but through each of their apertures proportionally, and the quantity which shall enter by the glottis, will be to the quantity which shall enter through the wounds as the aperture of the glottis to the greatest aperture of the wounds, or, in the present case, as one to four. Therefore, the air by which the lungs are now inflated will be one-fifth of the quantity by which they would have been inflated, if the thorax had remained entire.

This reasoning is rather more specious than solid; for, in such a calculation, a great many more things are to be taken into consideration, than the Doctor seems to have been aware of. In the first place, the natural communication betwixt the external air, and

cavity

cavity of the chest, is a canal of considerable length, commencing with the mouth and nostrils, and terminating in the minute subdivisions of the trachea. Few parts of this canal are either equal or permanent in their dimensions. It is at one part dilated, at another contracted, or may vary every moment, with every struggle of the animal.—Surely then, the glottis, which is neither the commencement nor the termination of this canal, but a point, somewhere in its course, cannot, with propriety, be adopted as a point of comparison, or that by which we can calculate with accuracy the proportion of air which may enter by the mouth, or by a wound into the cavity of the thorax.

To illustrate this a little more, let us suppose that an animal, during the space

space of two minutes, shall inspire forty cubic inches of air, and that now a perforation, whose aperture is half that of the glottis, is made into each side of the thorax. The air which enters by the mouth must meet with considerable obstruction in its passage to the lungs, from the length as well as the irregularity of the passage through which it has to pass; while, on the other hand, the air which enters by the wounds, has a free and easy access to the cavity of the thorax. The entrance of the air by the mouth is also, to a certain extent, opposed by the gravity of the lungs themselves, which must necessarily begin to operate in some degree as soon as a communication is established betwixt the external air and their surface.

At the end, then, of the next two minutes, it will be found that twenty cubic

cubic inches, the quantity, according to Dr. Houston's calculation, has not entered the lungs by the glottis, and twenty by the wounds, but that, more probably, thirty cubic inches have entered by the wounds, and only ten by the trachea or glottis; that is to say, much more air will have entered by the wounds than by the glottis, in proportion as its entrance by the mouth shall have been opposed by the length of the trachea, and the natural gravitation of the lungs. Therefore, the air by which the lungs are now inflated will be scarcely one-fourth of the quantity by which they would have been inflated had the thorax remained entire.

According to Dr. Houston's opinion also, the whole air which enters the chest, during inspiration, should go out by the same passages through which

which it entered, during the succeeding expiration, so that no accumulation could take place. But to prove that this is erroneous, I trust I have only to refer the reader to p. 19, of these observations. The animal, by a violent exertion may, perhaps, be able to expel the whole of the air from the cavity of the pleura, but, in general, as I have there stated, a portion will remain, and this portion will accumulate at every succeeding inspiration, and so press more and more upon the surface of the lungs.

So far, however, these experiments afford us a proof, that all wounds penetrating the cavity of the thorax, so as to admit air, are not certainly, nor instantly fatal. But they have discovered none of those means by which an animal obviates the inconvenient effects of such wounds.

VAN SWIETEN repeated Dr. Houston's experiments several times, but always with similar results. On making enquiry among some of his friends as to the reason why the animal continued to live and breathe after both sides of the thorax were perforated, these philosophers, it would appear, were of the following opinion, namely: "That if the wounds inflicted had a less aperture than the rimæ of the glottis, then the air, meeting with an easier passage, through the aperture of the glottis than through the wounds, would distend the lungs, &c. and *vice versa*." But that they might be satisfied as to the truth of this opinion, the following experiment was performed:

A large wound was made into the thorax of a dog, on each side, in the middle betwixt two of the ribs, and tubes

tubes of tin, whose apertures were much larger than the glottis of this animal, were inserted into the wounds. By these means the perforations were kept open—respiration instantly ceased—the voice was lost, and the animal appeared to be dead; but, on stopping the orifices of the tubes with the fingers and strongly pressing and rubbing the abdomen, the animal soon began to breathe again.

Respiration became gradually stronger, and the voice was recovered, but when the tubes were left open as before, respiration ceased, the voice was again lost, and the poor animal expired.

This experiment was repeated several times, and always with the same results.—Hence, VAN SWIETEN con-

 ceives,

ceives, we may reasonably conclude that wounds penetrating both sides of the thorax, and admitting air, are not speedily and certainly fatal, unless their apertures exceed that of the glottis.

It is only by inserting tubes in this manner, and which was originally proposed by Dr. Houston, that we can properly ascertain the effects of wounds of certain dimensions. A puncture or simple incision into the thorax varies in size, with every struggle which the animal makes, and even with the alternate motions of the chest during respiration, so that no experiment can be considered conclusive, in which such tubes have not been employed. Van Swieten's experiment, no doubt, shews the effects of large wounds penetrating the thorax, yet it by no means warrants

rants his conclusions altogether; for since no tubes were employed whose diameters were less, or even equal to that of the glottis, we cannot assume it as a fact, that wounds of such a size would not also have proved speedily mortal.

Bremond, after having performed a great number of experiments similar to those of Dr. Houston, arrives at a very different conclusion. Observing that in all his experiments the lungs were contracted during the dilatation of the thorax, and apparently dilated during its contraction; he rejects the explanation given by Dr. Houston, and concludes that the lungs have a self-dilating power in themselves; and, that if the dilatation of the chest, and of the lungs is, as it has every appearance of being, viz. simultaneous in a state of health,

health, yet when the chest is perforated, these motions are opposed to each other.

It is unnecessary for me, after the explanation I have already given of this seeming paradox, to point out the inaccuracy of BREMOND's experiments, and the numerous fallacies by which he has so unaccountably permitted himself to be deceived. I would, however, recommend Dr. Whytt's Essays on the Vital and Involuntary Motions to the attention of the reader. Were the lungs possessed of a self-dilating power, such as Bremond has ascribed to them, no wounds of the thorax, of whatever dimensions, could possibly be fatal.

We have the most incontrovertible proof that the dilatations of the lungs and thorax are synchronous in a state of

of health, and surely then, when a perforation is made into the chest, their simultaneous action is much more necessary to obviate the effects resulting from the pressure of the atmosphere, a power which, if permitted to operate, would instantly terminate in the total extinction of respiration.

A few years afterwards HERRISANT on similar grounds, adopted the opinion of Bremond. But he appears in his experiments, which are related in the memoirs of the Academy of Sciences for 1743, to have been, if possible, more grossly deceived than his predecessor.

In Dr. Gordon's very ingenious paper, formerly mentioned, three experiments are detailed, which were performed by his friend, Mr. M'Donald, a young surgeon, whose accuracy of observation

observation I was well acquainted with, but who, I am sorry to say, died lately at a very early age at Prince of Wales's Island, in the East Indies.

In performing these experiments, Mr. M'Donald seems to have followed Dr. Houston and Van Swieten: but tubes of very different sizes were introduced into the wounds of the thorax, in the different experiments. When tubes of tin about one-fourth of an inch in diameter were introduced, the breathing of the dog became quick, and somewhat laborious, and on introducing a probe into the tubes, the lungs were found to have receded from the pleura costalis about an inch. After these tubes had been retained in the punctures for about four minutes without producing much inconvenience; they were removed, and the openings enlarged,

enlarged, and other tubes introduced, whose conjoined areas were about double that of the glottis. The respiration became now very laborious. The animal struggled violently, and in a few minutes appeared as if dead. On closing up the wounds, however, and applying friction to the chest, respiration returned, and in ten minutes he was able to walk about.

On the fifth day after performing this experiment, the dog was killed, but nothing particular was observed on dissection, excepting a slight degree of inflammation on the surface of the lungs. opposite the wound on the left side.

The same experiment was performed on a dog of a small size. On introducing the larger tubes, the animal struggled violently for about a minute, and then expired. In one instance, although

though the lungs were immediately collapsed, the motions of the heart and diaphragm continued for four and a half minutes.

From all these experiments then, it is evident that the same effects will take place when an opening is made into both cavities of the chest, as happens when a perforation is made into one, only in a more violent degree, and with the certainty of proving fatal.

These effects I have already detailed and explained in the first chapter of these observations, and shall now only observe, from the manner in which the air goes on to accumulate, the patient must, sooner or later, be suffocated, if the punctures are allowed to remain open.

Experiment

Experiment has taught us, however, that in small perforations of the thorax an animal may obviate the fatal effects by a strong contraction of the thorax, the glottis being previously closed; the air being confined within the lungs, they are rendered incompressible, while at the same time the thorax contracting on the air, existing between the pleura, it is expelled through the wounds, which if then closed, further accumulation will be prevented.

Having ascertained that such are the effects of wounds penetrating the cavity of the chest, we can enter with greater confidence on the consideration of *Paracentesis Thoracis*, as a remedy in cases of Emphysema.

It is evident that in all those cases of Emphysema which happen from a rupture of the lungs, or where they have

have been cut or lacerated by the sharp points of fractured ribs penetrating their substance, an accumulation of air must take place in that side of the chest which has been injured; and that this accumulation, by pressing upon the injured lung, must produce very distressing symptoms; as is the case when water or pus is collected in the sac of the pleura.

If the effusion of air has been occasioned by a fractured rib, the air will, in most cases, find a ready communication with the subcutaneous cellular membrane, and so long as this communication remains open, nothing further than scarification will be necessary.—But even in such cases the opening through which the air passes into the cellular membrane is apt to become interrupted; and in cases, such as the one

one detailed by M. Meckle, where the disease was fatal before it became diffused, and that of James Hay, &c. where at first there was no communication, it is only by performing this operation that he can expect to save the patient's life.

That it has been attended with the happiest effects is already clearly proved. When Monro first suggested it, and Hewson wrote upon the operation, it was only from analogy that they reasoned, but now we can refer to facts. Under the direction of Dr. Monro this operation was performed by Mr. Kelly, of Leith, and the benefits resulting from it are detailed with great accuracy, in the case which I have extracted at considerable length, p. 49, &c.

Mr. Hewson says, that as in such cases

cases as he had had an opportunity of consulting, no air had been actually discovered in the cavity of the thorax, it might, therefore, be doubted whether the symptoms, viz. tightness of the chest, difficulty of breathing, and sense of suffocation, were not owing to some other cause, such as the mere wound of the lungs (abstracting from its letting out air) or an effusion of blood into the cells of that organ, in consequence of the wound. I thought it, (says he) therefore, proper to try to ascertain, by the following experiments, the effects of a simple wound of the lungs, and the effects of air confined in the thorax; and the rather, as in some of these cases the wound of the pleura and intercostal muscles appeared so large that it might be doubted whether the air could be confined in the chest when there seem-

ed

ed to be so free a passage from that cavity into the cellular membrane.

In the first experiment Mr. Hewson took a rabbit, and pulling the skin of the chest to one side, pushed a sharp knife into the cavity of the thorax, and moved it about, so that he might be certain of wounding the lungs.—He then let the skin slip back again so as to cover the wound in the intercostal muscles: and to secure it the better applied a piece of lint and plaister, as also a bandage. He says, he expected to see the animal become emphysematous, but was much disappointed: for though he repeated the experiment several times, he could not get the air to pass from the lungs into the cellular membrane.

On killing the animal, he found the wound

wound of the lungs surrounded by a small *cochymata*, and so closed up, probably by the blood which had been effused, that no air could escape.

In his second experiment he pushed a knife into each side of the thorax of a dog, taking the same precautions, and with the same intentions as in his first experiment. He then allowed the poor animal to run about the house.—About two hours after the operation the dog seemed less lively, and afterwards seemed to him to wish to be at rest, but he had no difficulty of breathing, nor emphysema. In the evening of the same day he became as lively as before, and was so next morning, when he was killed.

On dissecting him, Mr. Hewson found no appearance whatever of air having

having escaped into the cavity of the chest, the wounds of the lungs were perfectly closed with slight ecchymosis surrounding them, and on inflating the lungs no air escaped.

From these experiments he concluded, and I think with some probability, that a puncture or incision of the lungs would seldom produce Emphysema, on account of the effusion of blood from the divided vessels, and that the emission of air more likely happens from a superficial abrasion, or laceration of the part.

In a third experiment he tried to lacerate the lungs with a blunt probe, and so produce Emphysema, but without effect. He then made some experiments to ascertain the symptoms produced by air confined in the cavity of

the chest. His results were the same with those already mentioned, when speaking of wounds of the thorax, so that I need not detain the reader by again repeating them.

What convinced Mr. Hewson not a little of the efficacy of paracentesis was a case to which he was called soon after performing these experiments :— A young man, when the house was on fire, to save his life, threw himself out of the window of a second floor, and his skull was fractured by the fall : he was taken up insensible. On the evening of the same day he became Emphysematous, and breathed with difficulty ; he expired in the middle of the night without Mr. Hewson having seen him while alive.

When Mr. Hewson went to examine the

the body—he found the external Emphysema but just perceptible, and that only on the right side of the chest. On laying open the abdomen, the diaphragm was observed to be depressed, and loose on the right side, and, upon puncturing the thorax, in presence of Dr. Hunter and others, some air rushed out. The lungs were found much collapsed, but there was not any extravasated blood or lymph, so that, (he says) it was evident there had been a considerable quantity of air in the cavity.

On examining the ribs, it was found that the first, reckoning from above, was fractured near its middle, and that it had lacerated the pleura a little; and what is somewhat remarkable, the lungs were not injured near this part, but had the air escaped from a lacera-

tion on the under part of their concave surface, where they are applied to or lie upon the diaphragm. Had Mr. Hewson been acquainted with, or consulted Professor Meckle's case, which happened many years prior to his writing this paper, and which was mentioned by Dr. Monro, in his lectures first about the year 1760, he might have been still more convinced of the propriety of this operation, in almost every case of Emphysema. But Mr. Hewson was anxious to be esteemed the author of this practical improvement, and, therefore, wished to keep out of view the idea of any other person having even hinted at it.

Mr. Bromfield, with some modesty, puts in his claim to the discovery. He had long been convinced of the efficacy of the operation, he says, but

should

should have been sorry to have prevented Mr. Hewson's making himself known to the Medical Society, by a remark which he thought new.

But, alas! Mr. Bromfield, as Mr. John Bell remarks, writes very ignorantly on the subject; and shews at least that he had but a very imperfect idea of the subject.

When Mr. John Bell presumes to tell us, in what he pompously calls the *Philosophy of Emphysema*, that the moment the lungs are wounded they fall down and continue in this collapsed state until the wound is healed, and that from the *moment* they are wounded, the use of the wounded lung is lost. I say when we are told such things by Mr. Bell, we need not be surprised at the difference of opinion which exists among

among Physiologists, for the merest Tyro in philosophy must see, at once, the foolishness of this doctrine.

That the lungs collapse, in consequence of being wounded, is certain; but that they collapse, or, as Mr. Bell has it, fall down, the *moment* they are wounded, is not only contrary to the facts observed in the experiments of HEWSON, just related, but is contradicted by all the experiments which have been made on this subject. The collapse of a wounded lung must be gradual, and it will bear some proportion to the freedom with which the air enters into the cavity of the chest.—But when there are strong adhesions betwixt the pleura pulmonalis and pleura costalis, as was supposed, in Dr. Monro's cases, the collapse will be entirely prevented; and yet we find that in these

cases

cases the wounds of the lungs healed perfectly.

We cannot subscribe to Mr. Bell's opinion either, when he says, that if the lungs, when wounded, were to continue in perpetual motion, "I do not know how we should expect a cure; for the air would be continually streaming through the wound, and the wound itself alternately dilating and contracting like that in an artery, could not heal."*

We know that in innumerable instances the wound of the lungs has healed, notwithstanding this alternate dilatation and contraction, without the lungs having fallen down to the backbone, or their continuing in a collapsed state.

*Vide Bell on Wounds, vol. ii. p. 15.

There

There is no doubt that, in many cases of Emphysema, the wounded lungs become collapsed, and continue so for some time, while the function of respiration is carried on with tolerable ease by the lungs of the sound side.—But though the wound should heal during the collapsed state of the lungs, the patient will not be able to expand them till the pressure of the effused air has been removed by the operation of paracentesis. And even in the collapsed state of the lungs I should suppose the wound would be dilated; for if the lungs do not then admit of the transmission of air through them, how would Mr. Bell account for the increasing oppression which he describes so justly, at p. 18. where he says, that "the air, &c. not only oppresses that side of the lungs, but by hindering the free play of the diaphragm, and loading

ing the mediastinum, they oppress, also, the other lung, until at last the breathing, every moment, more oppressed, falls lower and lower. The pulse also sinks in the same proportion; the extremities grow cold; cold sweat bedews the forehead; and, after great tossing, and indescribable anxieties, the patient dies."

Mr. Bell must either admit, which by the bye he does, that the lungs, even in their collapsed state, permit the air to pass through the wounds, or deny these facts—and if he admits this, I should think that the wound was just as likely to heal, when the lungs were wholly or partially dilated, as when they were lying by the back bone completely collapsed. But this is wandering from the subject under consideration.

In

In every case of Emphysema then, where there is great oppression of breathing and much anxiety, I would recommend the performing of the paracentesis; it is attended with little or no danger, and is the only remedy which can give certain or permanent relief. But it is an operation which ought not to be performed in a rash or unguarded manner.

The first thing to be ascertained, is the side on which the injury was received: this, in cases of accidents, will be no very difficult matter; but in cases similar to that of *James Hay*, it will require some consideration:—the puncture is to be made in that side on which it is supposed the lungs are injured or collapsed. If it should unfortunately

tunately be made in the sound side, it will, in most cases, prove fatal to the patient; but this can only happen from the rashness or inattention of the surgeon, or perhaps from his being confused by circumstances so unusual. The diseased side will be pointed out, in most instances, by the appearance of the subcutaneous emphysema.

The operation Mr. Hewson thinks should be performed with a scalpel, in preference to the trocar,—a small incision should be made through the skin and intercostal muscles, so as to expose the pleura costalis. This should, then, be punctured with some care by the point of the knife; if the accumulation of air is very great, it will rush out from the cavity of the chest with some violence,

lence, as in the case related by Mr. Kelly.

Dr. Monro prefers the trocar, and I confess I am of his opinion. If there is an accumulation of air within the thorax, there can be no danger of wounding the lung; and if we introduce the trocar in an oblique direction, and along with it a small silver canula, we can prevent the external air from getting into the cavity of the chest, a circumstance of very considerable importance, when we consider the danger to which we subject the patient by the free exposure of the cavity of the thorax to the action of the atmospheric air.

By performing the operation in this manner, we have it in our power also to empty the chest completely of the effused

effused air, by screwing upon the canula an exhausting syringe, or some such apparatus; and should the wound of the lungs still remain open, the canula may be kept in its place, and might be so contrived with a valve that would admit the effused air to escape, while it prevented the atmospheric air from entering.

Dr. Monro had a small silver stopper, which screwed into the end of the canula, and which the patient could unscrew at any time, when he found his breathing oppressed, and so allow the air to be evacuated.

I agree with Mr. Hewson in thinking that when the operation becomes necessary the best place for performing it, if the disease is on the right side, will be on the fore-part of the chest, between

between the fifth and sixth ribs. But that if the disease is on the left side, the opening should be made between the seventh and eighth, or eighth and ninth ribs, so as to avoid the possibility of wounding the pericardium.

Lastly, I may observe, that whether the operation is done with the scalpel or trocar, the wound ought to be carefully closed up as soon as it is supposed that the whole of the effused air is evacuated. The inflammation which follows the admission of the external air into the cavity of the chest, is as much to be dreaded as the disease itself, and therefore ought to be carefully guarded against.

SECTION

SECTION III.

Of Blood-letting, &c.

WHETHER we take into consideration the immediate symptoms of the disease, or the effects they are likely to produce, we must be convinced that they are only to be moderated or prevented by the free use of the lancet. And, accordingly, we find that bloodletting forms a principal part of the practice in all the cases which I have detailed, or have had an opportunity of consulting.

In the case related by Dr. Hunter, the patient was bled twice in the course of the first afternoon, with considerable relief of the pain of his side, and difficulty of breathing. And after the

Emphysema

Emphysema was considerably subdued, it was necessary to bleed him again pretty freely on the second day; and even after this his difficulty of breathing and cough were so troublesome, that he was bled three times more, in the course of the week.

There is little doubt but that this patient owed his safety in a considerable degree to those repeated and large evacuations.

In the two cases which Dr. Monro has favoured me with, we find, that bloodletting, and keeping the bowels gently open, was the only practice required.—Both the patients had a complete recovery. The same may be said of the case of the young woman which occurred to Dr. Hamilton, for the difficulty of breathing and oppression

sion, were very much relieved by taking a considerable quantity of blood from the arm, in a full stream. Indeed it is only necessary to direct the attention of the reader, to the cases I have detailed, when, considering the various causes of this disease, to convince him of the propriety of blood-letting, in almost every instance, when the disease occurs from an injury of the lungs or thorax.

Of Friction.

In several instances we find that the practitioners have ordered the tumid parts to be rubbed with some stimulating embrocation; and I should conceive this to be not only proper, but of considerable service in promoting the absorption, or rather in discussing the

effused air, I would recommend the use of such embrocations, and, of course, friction, chiefly in those cases which occur from internal causes, or, as I have endeavoured to explain it, from a diseased state of the circulating fluids.

In such cases no operation can be of service, except scarifying the integuments, and in such a diseased state of the system even these scarifications may be attended with danger. Friction, however, with warm flannel; the Ol. Camph. or with strong brandy, or spirits of wine, is not only safe, but may be effectual in opening the pores of the skin, and so admitting the effused air to escape.

Of

Of Bandaging.

When there is reason to suspect that the Emphysema has succeeded to a wound in the lungs, from a fractured rib, the application of a tight bandage round the chest, as recommended by BLIZARD, and, as practised by my friend Mr. WARDROP, ought always to be employed.

I cannot give any better directions for the application of such a bandage, than those with which Mr. Wardrop concludes the account of his case :— and I shall, therefore, beg leave to transcribe his words here ; they convey all I could wish to say on the subject :—

An uniform, and gradual pressure, says Mr. Wardrop, *regulated by the*

feelings of the patient, is, in every disease, where bandaging is necessary, the best general rule which can be followed.

Having now given an account of the various means recommended and practised for the cure of Emphysema, I shall conclude these observations with recapitulating, very briefly, the practice which ought to be adopted in those cases which occur most frequently, and in which a practitioner is most likely to be consulted.

If called to the patient soon after the accident, and he complains of much difficulty of breathing, and tightness across the chest, we ought immediately to take away a considerable quantity of blood from the arm, and as quickly as possible.

Upon

Upon observing the crackling tumor beginning to form over the fractured rib or injured part, several punctures should be made with the point of a lancet, pushed so deep, as to be certain they reach the cellular membrane.

These will not only relieve the lungs in some measure, by allowing the air to escape, but may also prevent the disease spreading further, or the air being more diffused under the skin.

If the Emphysema has become general, before the surgeon sees the patient, he ought to make similar punctures in various parts of the body; particularly in those parts which are most distended; and, by pressing the integuments, and stroaking them towards the wounds, endeavour to evacuate the

the air in this manner. But should the patient, after these punctures and repeated blood-letting, appear nothing relieved, and still complain of oppression and difficulty of breathing, the operation of paracentesis must then be performed. The surgeon being certain of the side which is diseased or injured, and having fixed upon the place where he is to make the perforation, let him draw the skin of the chest as much as possible to one side; and, being provided with a small trocar, covered with a blunt silver canula, he ought to introduce it into the cavity of the chest in an oblique direction, and withdrawing the trocar, allow the canula to remain. This canula might be so contrived with a valve, that when the trocar was withdrawn it would allow the air confined in the chest to escape, but prevent the external from having access

cess to that cavity. But if the canula is small, and surgeon attentive, he may manage this easily with his finger.

If, after performing the operation, we find that the wound in the lungs is still open, so as to admit of the further effusion of air, the canula should be allowed to remain for some time, and a stopper made to screw into it. But if the wound in the lungs is closed up, the canula should be withdrawn as soon as the whole of the effused air is evacuated. The oblique opening which was made by the trocar, will act as a valve to prevent the air from getting into the chest, while the skin which was retracted will cover the external part of the wound, and render a small compress only necessary.

If a fractured rib is discovered, a double-

double-headed roller, of some length, should be applied round the whole chest, with the view of preventing as much as possible the motion of the ribs during respiration.

The patient should be kept to the antiphlogistic regimen in its strictest sense, and should not be suffered to use any exertion of his body while under cure.

THE END.

H. Bryer, Printer, Bridge-Street, Blackfriars.

OBSERVATIONS

ON THE

DROPSY in the BRAIN,

BY

ROBERT WHYTT, M. D.

Late PHYSICIAN to his MAJESTY,

Preſident of the Royal College of Phyſicians, Profeſſor of Medicine in the Univerſity of Edinburgh, and F.R.S.

TO WHICH ARE ADDED

His other TREATISES never hitherto publiſhed by themſelves.

EDINBURGH:

Printed for JOHN BALFOUR,

By BALFOUR, AULD, & SMELLIE.

M,DCC,LXVIII.



CONTENTS.

OBſervations on the Dropſy in the brain - - - Page 1

Of the moſt frequent ſpecies of it, 3

An account of its ſymptoms, 11

Its diagnoſtic ſigns, - - 26

Of the cauſes of it, - - 31

An attempt to account for its ſymptoms - - - 36

Of the cure of it, - - 44

An account of ſome experiments made with opium on living and dying animals, - - - - 49

An eſſay on the various ſtrength of different lime-waters, - - - 95

A letter to the Rev. Thomas Birch, D. D. Secret. R. S. from Dr John Pringle, - - - - 115

Poſtſcript

Poſtſcript to Dr Whytt's obſervations on Lord Walpole's caſe, - - *Page* 119

Some obſervations on the lithontriptic virtue of the Carlsbad waters, lime-water, and ſoap, - - 121

An inſtance of the electrical virtue in the cure of a palſy, - - 131

Extract of a letter from Dr Whytt to Dr Pringle relating to this account, - - 137

Caſes of the remarkable effects of bliſters in leſſening the quickneſs of the pulſe in coughs attended with infarctions of the lungs and fever, - - 139

Extract of a letter from Dr Whytt to Dr Pringle on the effects of bliſters, - 157

OBSERVATIONS

ON THE

DROPSY

In the BRAIN.

Never before publiſhed.

OBSERVATIONS

ON THE

Moſt frequent Species of HYDROCEPHALUS INTERNUS,

VIZ.

The DROPSY of the VENTRICLES of the BRAIN.

THE *hydrocephalus*, or dropſy of the head, is either external or internal. The former has its ſeat in the cellular ſubſtance, between the ſkin and the *pericranium*, or between this membrane and the ſkull. In the internal *hydrocephalus*, the water is ſometimes collected between the *cranium* and *dura mater*, or between this laſt and the *pia mater;* but moſt commonly is found in the ventricles of the brain, immediately below the *corpus calloſum:* And this is not only the moſt frequent

and fatal ſpecies of the *hydrocephalus*, but alſo that with which medical writers ſeem to have been leaſt acquainted.

HIPPOCRATES, in his ſecond book *de morbis*, has enumerated the ſigns of water in the brain, as his words have been rendered by all the tranſlators. But επι τω εγκεφαλω more properly ſignifies *upon* than *in* or *within* within the brain; and that Hippocrates only ſpeaks here of water lodged between the *dura mater* and brain can ſcarcely be doubted, ſince he propoſes to evacuate it, by making a perforation in the upper part of the *cranium*, προς τον εγκεφαλον; which operation could have been of no uſe, had the water been contained within the brain itſelf.

CELSUS has only mentioned briefly the *hydrocephalus externus*, or dropſy of the tegu-ments of the head*. Aetius and Paulus Ægineta go a little farther; for when they treat of this diſeaſe, they obſerve that water

* De medicina, lib. 4. cap. 2.

water is ſometimes found between the ſkull and the membranes of the brain.

HIERONYMUS MERCURIALIS, who flouriſhed in the beginning of the ſixteenth century, mentions the collection of water in the ventricles of the brain as a thing that may poſſibly happen; but adds, that in ſuch a caſe an apoplexy muſt be the conſequence *.

WEPFER has collected ſeveral caſes from different authors, in which water was found in the cavities of the brain †; and the celebrated Boerhaave mentions ſuch a diſorder as one ſpecies of the *hydrocephalus* ‡. But none of theſe authors, nor indeed any other that I have met with, who wrote before them, have favoured us with the ſigns by which we may diſtinguiſh a dropſy of the ventricles of the brain from other diſeaſes affecting that organ.

M. PETIT,

* Opuſcula aurea, lib. de morb. puerorum.

† Hiſt. apoplecticorum.

‡ Boerhaave Aphoriſm. § 1218.

M. PETIT, in a ſhort paper on the *hydrocephalus*, publiſhed in the Memoirs of the academy of ſciences for the year 1718, obſerves, that in all the bodies which he had opened, he never found water any where within the *cranium*, but in the ventricles of the brain; and therefore ſuppoſes the other ſpecies of internal *hydrocephali* to be very rare.

THE ſymptoms of a dropſy in the cavities of the brain, according to that juſtly eſteemed author, are, in the beginning, ſlight convulſions of the mouth and eyelids, biting of the lips, grinding of the teeth, and picking of the noſe, as in the caſe of worms. The patients are either coſtive or have a purging, and ſometimes a vomiting. They are more or leſs drowſy, according to the quantity of water within the brain. They grow languid, feeble, ſad, and pale; the eyes look dull, the pupil dilates, the ſutures of the ſkull open, and its bones become ſoft. The forehead riſes, the eyes ſeem to be protruded

truded out of their orbits, the head ſwells ſo as ſometimes to burſt, and the patient dies ſoon after.

ALTHO' this account of the ſymptoms of the *hydrocephalus internus* be much more juſt than what is to be met with in any author before M. Petit; yet ſtill it is ſo far incompleat, that I may venture to ſay, that it will not be found ſufficient to diſtinguiſh a dropſy within the brain, unleſs when it is attended with a ſwelling in the head.

M. PETIT mentions ſlight convulſions of the mouth and eye-lids in the beginning; whereas I have never ſeen any convulſions till towards the end. He ſays, the patients are always more or leſs drowſy; but I, on the contrary, have often obſerved them more watchful at firſt, altho' in the advanced ſtate they not only become drowſy but comatoſe. He informs us, that he never ſaw the water collected any where, but in the ventricles of the brain. Now, were this the caſe, it

is

is certain that the opening of the ſutures and ſwelling of the head could not happen but to the youngeſt infants, who, by the bye, are not ſo ſubject to this kind of *hydrocephalus* as children of two years old and upwards; for, of about twenty patients whom I have ſeen die of this diſtemper, one only was under half a year old, the reſt between two and ſixteen; who all went off without any ſwelling of the head, opening of the ſutures, or protruſion of the eyes.

LASTLY, M. Petit has taken no notice of the averſion to light, ſquinting, the variations of the pulſe, and the degree of feveriſh heat, which, as we ſhall afterwards ſee, are the ſureſt diagnoſtics of the diſeaſe.

M. LE DRAN, who wrote after M. Petit, has deſcribed the *hydrocephalus internus* in ſuch a manner as would make one believe he had never ſeen the diſtemper, except when it happened to be joined to a collection

collection of water between the *cranium* and brain *.

Dr Donald Monro, in his treatiſe of the dropſy, has well enumerated the ſeveral kinds of the *hydrocephalus:* But by the ſymptoms he mentions, of the internal kind, we ſhall be hardly able to diſtinguiſh it from ſeveral other diſorders of the brain, as he himſelf has very juſtly remarked.

It may ſeem ſtrange, that a dropſy of the ventricles of the brain, which in our days ſo frequently occurs, ſhould have been altogether unknown to the ancients, and ſo little attended to by moſt of the moderns. The reaſon may be, that thoſe patients who were carried off by this diſeaſe have been generally ſuppoſed to die of a fever ending in a *coma*; and in ſuch caſes the head is ſeldom opened.

Altho' a dropſy of the ventricles of the brain does very rarely occaſion any

* See his Operations in ſurgery, article of the Dropſy.

opening of the ſutures, or ſwelling of the head * ; yet in moſt caſes it may be eaſily diſtinguiſhed from every other diſorder, by the following ſymptoms, which with the greateſt care I have collected, in attending about twenty patients in this diſeaſe.

An

* VESALIUS gives an account of a child of two years old, whoſe head was greatly enlarged, and in the ventricles of whoſe brain he found nine pounds of water: But this is an extraordinary caſe; and it is probable the water began to be collected ſoon after the child's birth, and before the ſutures of the ſkull could offer any conſiderable reſiſtance to its preſſure. I ſhall only add here, that I have not only never obſerved any increaſe of the ſize of the head in the ſpecies of *hydrocephalus* of which I now treat, but that it is an error, though a common one, to imagine, that thoſe children who have big heads are moſt liable to this diſeaſe; for of all thoſe whom I have attended, few or none were remarkable for the largeneſs of their head, but ſeveral had been very ſprightly, and of a delicate make.

An Account of the SYMPTOMS in the DROPSY of the Ventricles of the BRAIN.

FIRST STAGE.

CHILDREN who have water in the ventricles of the brain begin to have many of the following ſymptoms, four, five, or ſix weeks, and in ſome caſes much longer, before their death.

AT firſt they loſe their appetite and ſpirits; they look pale, and fall away in fleſh; they have always a quick pulſe, and ſome degree of fever. In ſome caſes I have ſeen a *hydrocephalus* attended with a conſiderable degree of fever, which had frequent remiſſions, but without any order or regularity: In other caſes the paroxyſms came on pretty regularly in the evening, and then the diſeaſe was taken for a ſlow irregular nervous fever, or for

one occaſioned by worms. At this time, in children of five years and upwards, I have found the pulſe at a hundred and ten, in others at a hundred and twenty, and in a few caſes at a hundred and thirty, or even at a hundred and forty ſtrokes in a minute; but rarely ever ſo full as to indicate bleeding.

In others the quickneſs of the pulſe and heat of the ſkin were not ſo conſiderable; but I do not remember to have ſeen any patient who had not ſome degree of fever in this, which I call the firſt ſtage of the diſeaſe.

While the feveriſhneſs continues or increaſes, they loſe their appetite more and more; their tongue is often white, ſometimes it is remarkably clean, and towards the end of the diſeaſe acquires an aphthous redneſs. They are thirſty, and frequently vomit once or twice in a day, or once in two days. They complain of a pain in the crown of their head, or in the forehead above their eyes. They

are

are commonly coſtive, tho' ſometimes they have returns of a looſeneſs. When bound, they are not eaſily moved by a purge; ſometimes they are troubled with gripes. Their ſpirits being low, they incline moſtly to lie in bed, altho' they are often more diſpoſed to watching than to ſleep. They cannot eaſily bear the light, and complain when a candle is brought before their eyes. They are obſerved to pick their noſe, and in their ſleep to grind with their teeth, as in the caſe of worms.

THESE are the ſymptoms of the firſt ſtage, during which it is very hard to diſtinguiſh this dropſy of the brain from a ſlow irregular fever occaſioned by worms, by ſome other diſorder in the bowels, or by ſome other cauſe. In the ſecond ſtage, the ſymptoms enable us, with ſome certainty, to diſcover the nature of the ailment. But before I proceed to enumerate them, I ſhall juſt obſerve, that I never had but two patients who had not the vomiting during either the firſt or ſecond ſtage.

One

One of theſe was a girl of eight years of age, who, tho' ſhe had an averſion to food, yet never threw it up but once, and that was on the third day before her death; nor did ſhe ever complain of a headach till twelve or fourteen days before ſhe died; whereas this laſt ſymptom, for the moſt part, begins three or four weeks, and in ſome caſes ſeveral months, before the end of the diſeaſe: She alſo could bear the light better than any I have ſeen. The other, who had no vomiting, was a boy of eleven years; he had little headach, altho' he lay much in bed, and did not like to be moved. But in general, the vomiting once or twice a-day, or once in two or three days, the headach*, and the averſion to light, are the ſymptoms which in the firſt ſtage of this kind of *hydrocephalus* characterize it moſt.

Symp-

* The headach not only in this, but the ſucceeding ſtages, is in ſome moderate, in others ſevere; in which laſt caſe, it is always eaſieſt in the morning and worſt at night; and theſe patients have commonly a great averſion to food.

Symptoms of the SECOND STAGE.

I date the beginning of the ſecond ſtage from the time the pulſe, from being quick but regular, becomes ſlow and irregular. This ſometimes happens about three weeks, often a fortnight or leſs, before the death of the patient.

In this ſtage the pulſe is commonly not only much ſlower than it was before, but often more ſo than in health. In a girl of thirteen, the pulſe, which for a fortnight beat above a hundred times in a minute, about nine days before ſhe died, fell to eighty-four, next day to ſeventy, and the day after to ſixty, becoming always the more irregular the ſlower it was. In a youth of ſixteen the pulſe, which for ſeveral weeks had been feveriſh, on the fifteenth day before his death, beat only ſixty-eight in a minute; two days after, it fell under ſixty, and once to fifty.

A boy of nine years of age, fifteen days before he died, had a pulſe from ſeventy to ſeventy-five in a minute, and irregular. In another of four years, the pulſe fell to eighty-eight on the ninth day before his end. In a girl of ſeven years old, on the fifteenth or ſixteenth day before her death, the pulſe beat a hundred and fifty times in a minute; next day, it became ſlower than natural and irregular; for five or ſix days after this, it was from eighty to eighty-ſix in a minute.

In two other children, who were leſs feveriſh in this ſtage, the pulſe from a hundred fell below eighty. I have never ſeen a patient with water in the ventricles of the brain, whoſe pulſe did not come down to its natural ſtate, or very near it, except one. This was a girl of about ſeven, whoſe pulſe, after being for ſeveral weeks about a hundred and thirty in the forenoon, and a hundred and forty in the evening, a fortnight before her death,

fell

fell two or three ſtrokes under a hundred; yet neither her heat nor thirſt, nor other complaints abated, altho' her pulſe had fallen above thirty in a minute.

In this diſtemper it is obſervable, that when the pulſe is nearly as ſlow, or ſlower than natural, it is always irregular or unequal, both as to the ſtrength and the interval of the ſtrokes. When it grows quicker, the irregularity leſſens; and when it becomes very quick, it is then moſt equal and regular. Farther, it deſerves notice, that, altho' in the ſecond ſtage the pulſe becomes much ſlower than it was before, the heat of the ſkin continues much the ſame, and ſometimes ſeems rather to increaſe.

I have inſiſted the longer on the ſtate of the pulſe in this period, as from thence we can learn the ſureſt *diagnoſtic*.

During the ſecond ſtage, moſt of the ſymptoms mentioned in the firſt continue. The ſick are then unable to ſit up, tho' generally they ſleep little, till towards

the end of this period, when they begin to grow drowſy. They moan heavily, yet cannot tell what ails them. Their eyes are often turned towards their noſe, or they ſquint outwards, and ſometimes they complain of ſeeing objects double. Some, towards the end of this ſtage, grow delirious, and cry out in a wild manner, as if they were much frightened: About this time alſo, or later, they frequently void either real worms, or ſome ſubſtance like worms in a diſſolved ſtate; yet this diſcharge gives no relief to the patient, and only helps to deceive the leſs experienced practitioner with regard to the nature of the diſeaſe.

THE urine in this, as well as in the other ſtages, varies; it has often a large ſediment, ſometimes none at all; but moſt commonly it depoſites one of a light conſiſtence and a white colour. In ſeveral I have obſerved the urine have a large furfuraceous ſediment, till within a few days

days of their death, when it had no ſeparation.

THE breath has now, but eſpecially in the laſt ſtage, ſuch a ſickiſh and offenſive ſmell, as I do not remember to have obſerved in any other diſtemper. During the ſecond as well as the firſt ſtage, the patients are often, for ſome days, or parts of days, much eaſier than at other times.

Symptoms of the THIRD STAGE.

WHEN the pulſe (which for ſome time was nearly as ſlow or ſlower than in a healthful ſtate) riſes again to a feveriſh quickneſs, and becomes regular, the third and laſt ſtage may be ſaid to begin.

THIS change in the pulſe is obſerved five, ſix, or ſeven days before death. In two patients only the pulſe did not become more frequent till two days before they died; and in two others it began

to

to grow quicker nine or ten days before that event.

As the time of this change in the pulſe is different in different patients, ſo is the degree of its quickneſs. In ſome it riſes gradually from below ſeventy, eighty, or ninety in a minute, to a hundred and twenty, a hundred and forty, a hundred and ſeventy, and ſometimes above two hundred, before they expire. In others the pulſe gets up more ſuddenly, in one day perhaps from a hundred to a hundred and fifty. In the laſt ſtage, after the pulſe grows quicker, it does not keep conſtantly to the ſame meaſure, but will be often a good deal ſlower for part of a day, and quicker all the reſt. The pulſe beats generally faſter on the day they die than at any time before. In one of thoſe whom I attended, it beat above two hundred and ten times in a minute. I never knew any go off in this diſeaſe whoſe pulſe did not riſe to near a hundred and thirty ſtrokes in that time.

In the third ſtage, the patient, who before was little diſpoſed to ſleep, becomes then drowſy and comatoſe. When rouſed, he utters only a few incoherent words, and appears to be inſenſible. The beginning of the *coma* is uncertain; it is often about the end of the ſecond ſtage before the pulſe grows quicker for the ſecond time; but in a few caſes I have known this quickneſs of the pulſe come on before the patients become comatoſe.

Frequently one eye-lid loſes its motion, and afterwards the other becomes alſo paralytic. About this time, or rather ſooner, the pupil of one or both eyes ceaſes to contract, and remains dilated in the greateſt light. But the time of this ſymptom varies much: In ſome it happens five, ſix, or ſeven days, in others only two or three days, before they die. Three or four days before the death of a boy of five years old, I was ſurpriſed to find the pupils, which had been much dilated before, no larger than natural. At firſt I

flat-

flattered myſelf, that the diſtemper had taken ſome favourable turn; but was ſoon undeceived; for, upon giving the child a ſpoonful of weak cinnamon water, with ſome drops of *ſpiritus volatilis oleoſus*, the pupils became as wide as they had been the day before. In leſs than half an hour after, they contracted again; but immediately dilated upon holding ſome ſpirit of *ſal. ammoniacus* to his noſe. I have ſince obſerved the ſame interchanges in the pupils of a boy of four years old, on the third day before he died. In this caſe the pupils not only were enlarged, by giving him a ſpoonful of wine, or holding volatile ſpirits to his noſe, but alſo by ſo ſmall a *ſtimulus* as my lifting up his eye-lids, which had loſt all their motion, and had fallen ſo far down as to cover near the half of the eye. Before they are ſeized with the *coma*, they ſometimes complain of ſeeing ſtrange and frightful objects. A day or two before death, the *tunica conjunctiva* of one or both

both eyes frequently becomes inflamed; but they generally continue to hear for ſome days after they are blind.

In this ſtage, the patients are ſometimes obſerved to be conſtantly raiſing one of their hands to their head; and are generally troubled with convulſions of the muſcles of the arms, legs, or face, as well as with a *ſubſultus tendinum*. In a girl of thirteen, the day before ſhe died, the hands were ſtrongly bent inwards by a fixed ſpaſm of their muſcles. A youth of ſixteen, who when in health had been liable to ſpaſms, about the end of the ſecond ſtage began to be affected once or twice a-day with a cramp in one of his arms, which aſcended to his throat, and often prevented his ſpeaking for ſome minutes. One of the cheeks will twice or thrice in a day grow hot and red, while the other, with the lips, remains pale and cold. Theſe fluſhings generally appear two, three, or four days before death. In a boy of five years old, one ſide of both

his

his arms became frequently red, while the other ſide never changed its colour. After death, the arms and breaſts have been ſeen of a deep purple colour.

I had one patient who, four days before he died, bled once and again at the noſe.

THOSE who have been coſtive before, often become looſe in the third ſtage, and complain of gripes. A day or two before death, the patient either ſwallows with difficulty, or not at all. Laſtly, the reſpiration grows more frequent and laborious; and in ſome there is a conſiderable pauſe after every expiration. This kind of breathing I have alſo obſerved in thoſe who have died of an apoplexy, ariſing from a ſuppreſſion of urine.

UPON opening the heads of ten of thoſe patients from whom I have collected the ſymptoms above mentioned, I found in all of them a clear thin fluid in the anterior ventricles of the brain, immediately below the *corpus calloſum*.

There

There was frequently the ſame kind of liquor in the third and fourth ventricles; but whether this is always the caſe, I cannot ſay, as I had not attended ſufficiently to this circumſtance. I never met with water between the *dura mater* and the brain, between the hemiſpheres of the brain, or immediately above the *corpus calloſum*. Altho' there ſeems to be a communication between the two anterior ventricles; yet, in two caſes, I found one of them much diſtended, while the other contained but little water.

THE quantity of water contained in the ventricles of the brain was generally from two ounces to five; but I have been told of one caſe in which it amounted to near eight ounces. This fluid does not coagulate with heat, like the *ſerum* of the blood, or the lymph that is found in the *pericardium*, or what is taken from the abdomen by tapping in a dropſy; and this difference ſeems to be owing to the exha-

ling arteries of the brain being much ſmaller than thoſe of the other parts.

The DIAGNOSTIC SIGNS of a Dropſy within the Brain.

HAVING given an account of all the various ſymptoms commonly attending a collection of water in the brain, I ſhall now recapitulate ſuch of them as are the ſureſt ſigns by which we may diſtinguiſh this diſorder from others, which ſo much reſemble it as ſometimes to deceive an experienced phyſician: And this will be the more neceſſary, as the ancients were altogether ignorant of the diſeaſe, and as the few of the moderns who treat of it ſeem to have deſcribed it more from theory than obſervation.

WHILE moſt of the later writers have confounded the ſigns of a dropſy in the ventricles of the brain with thoſe of the

hydro-

hydrocephalus externus, a few have more reaſonably aſſigned to this ſpecies of dropſy ſuch ſymptoms as commonly attend a compreſſion of the brain, but without giving ſuch a diſtinct account of the firſt appearance and progreſs of this diſorder as could enable a phyſician to diſtinguiſh it from others of the head, from worms, from a foulneſs in the ſtomach and bowels, or from a ſlow fever ending in a *coma*.

I have already obſerved, that in the firſt ſtage it is hard to diſcover this internal *hydrocephalus*. But when we meet with a patient under fifteen or ſixteen years of age, ſeized with a ſlow fever of no certain type, and irregular in its acceſſions and remiſſions; when in that fever the patients vomit once a day, or once in two or three days; when they ſhun the light, and complain of a pain in the crown of their head, or over their eyes, after the fever has continued for ſome time, or of

a pain thereabouts, that in ſome days does not abate like the headach in ordinary fevers: When theſe complaints neither yield much to repeated vomits, gentle purges, nor bliſters, I ſay there is reaſon to ſuſpect water in the ventricles of the brain. But as worms, and other diſorders of the ſtomach and inteſtines, are ſometimes attended with moſt of theſe, as well as other ſymptoms that accompany the internal *hydrocephalus* in its firſt ſtage, we are often at a loſe to find out this diſeaſe, till it arrives at its ſecond period, when the pulſe begins to grow nearly as ſlow, or even ſlower than natural, but irregular; for this change of the pulſe, added to the ſymptoms of the firſt ſtage, is, as I have obſerved, almoſt an infallible ſign of water in the brain, if at the ſame time the patient is not relieved, and if the feveriſh heat does not abate with the quickneſs of the pulſe *.

WHEN

* If we are to judge of the heat of the body in this diſeaſe, by feeling the hands and wriſts, we ſhall be often deceived;

When the glands of the meſentery become ſcirrhous, the patients are liable to a ſlow fever; their pulſe is quick and ſometimes irregular, but is never ſo ſlow as in health. In the caſe of worms in the ſtomach and inteſtines, altho' the pulſe be generally quick, yet ſometimes it is ſlower than natural, and irregular; but when this happens, the ſkin is cool, and there is no fever. But in the dropſy of the brain, when the pulſe becomes ſlow and irregular, neither the heat of the ſkin, nor any other of the feveriſh ſymptoms are ſenſibly abated: For in this caſe the motion of the heart is not accelerated in proportion to the degree of heat and fever.

We often find a ſlow irregular pulſe, in perſons of a delicate habit, when labouring under cramps of the ſtomach, ſpaſmodic colics, and violent nervous headachs,

deceived; for when theſe are expoſed to the air, they become rather cold, while ſuch parts as are well covered have a feveriſh heat.

achs, (as they are commonly called); but it is obſervable, that in ſuch caſes this kind of pulſe is always attended with a cool ſkin.

When therefore, with a ſlow and irregular pulſe we meet with thirſt and a feveriſh heat, watching, a *ſtrabiſmus*, or double ſight, a *delirium*, and ſcreaming, ſucceeding the ſymptoms mentioned in the firſt ſtage, we may ſtrongly ſuſpect water in the ventricles of the brain. But this is ſtill more evident, when ſoon after the patient grows comatoſe, the pupil dilates and loſes its motion, the pulſe becomes quick, the cheeks are fluſhed, the tendons ſtart, and convulſions follow.

It is true indeed, that ſome of theſe very ſymptoms are obſerved towards the end of common fevers, in which, from the brain being much affected, the patient falls into a *coma* before his death. But a fever from water in the brain is eaſily diſtinguiſhed from others, by attending to the whole courſe of the diſeaſe,

and

and particularly to the pulſe, which, after having been at firſt quick, becomes ſlow and irregular; and laſtly acquires a greater frequency than ever. Beſides, the ſcreaming, ſquinting, and dilatation of the pupil, rarely occur in other fevers.

THE ſymptoms of no diſtemper reſemble theſe of water in the brain ſo much as thoſe which ariſe from worms in the ſtomach; for with a ſlow fever there is a want of appetite, vomiting, pain in the head, raving, and convulſions; but when worms in the ſtomach or inteſtines occaſion a ſlow and irregular pulſe, the patients have not that feveriſh heat ſo obſervable in the internal *hydrocephalus*.

Of the CAUSES of a DROPSY in the Ventricles of the Brain.

THE immediate cauſe of this diſeaſe, and indeed of every kind of dropſy, is always the ſame, *viz.* ſuch a ſtate of the parts

parts as makes the exhalant arteries throw out a greater quantity of fluids than the abſorbent veins can take up.

THIS may be owing to ſeveral cauſes:

1. THERE may be an original laxity, or weakneſs in the brain, whereby the ſmall exhalant arteries of the ventricles will throw out the lymph faſter than the abſorbent veins can imbibe it.

IN children under a year old, I have frequently met with a *hydrocele*, or collection of water between the *tunica vaginalis* and the teſticle, from ſuch a cauſe: And this diſeaſe I have cured by ſmall doſes of rhubarb, by applying linen cloths dipt in brandy, or impregnated with the fumes of *myrrh*, *olibanum*, and *ſuccinum*, to the *ſcrotum*, and by ſupporting the teſticles with a bandage or truſs. If in young children we could diſcover the dropſy of the brain as early as we do that of the teſticles, and could apply our remedies

as

as near to the part, we ſhould probably often ſucceed in the cure: Tho' a dropſy in the brain would always be more unfavourable, as the circulation there is ſlower and more languid than in any other part.

2. ALTHO' there has been no original weakneſs in the brain, yet it may have ſuffered ſo much in the time of birth, by the compreſſion of the ſkull, as afterwards to give riſe to a collection of water in its cavities.

3. A ſcirrhous tumour of the *glandula pituitaria*, or in any part contiguous to the ventricles of the brain, by compreſſing the neighbouring trunks of the abſorbent veins, will prevent the due abſorption of that fluid which the ſmall arteries conſtantly exhale, and occaſion a dropſy in the brain; in like manner as a ſcirrhous liver, ſpleen, or *pancreas*, are often the cauſe of an *aſcites*. As a proof of this,

we may obſerve, that M. Petit often found the *glandula pituitaria* ſcirrhous in thoſe who died of a dropſy of the ventricles of the brain.

In one caſe I met with a hard tumour within the right *thalamus nervorum opticorum:* It was almoſt as large as a ſmall hen's egg, of a yellowiſh colour within, and of a firm conſiſtence.

4. Altho' there may be no obſtruction in any part of the brain, a dropſy may be formed in it, merely from a too thin or watery ſtate of the blood. When the blood is too thin, the exhalent arteries will pour forth their fluids in greater quantity than uſual; while the bibulous veins will abſorb them more ſparingly; and from this cauſe the water will be apt to accumulate, either in the *abdomen*, *thorax*, or brain, according as one or other of theſe parts is the weakeſt. I have known an inſtance of a dropſy in the cavity of the *abdomen*, where there were no obſtructed *viſcera* to be ſeen after

after death, and where the cauſe of the diſeaſe ſeemed to be no other than a diſſolved ſtate of the blood joined to an uncommon relaxation of the veſſels.

About fifteen years ago, I had a patient who died of the *hydrocephalus*, probably owing to this cauſe; for this child, about a year before his death, and after the meaſles, falling into a bad ſtate of health, the blood taken from his arm was obſerved to be preternaturally thin. From this time he never recovered his looks or ſtrength; and, about ten months after, the ſymptoms of the *hydrocephalus* appeared. In this caſe I thought it probable, that the water began to be collected in the brain ſoon after the meaſles, which firſt broke the health of the child, and then the blood became too watery.

5. A ſuppreſſion, or a diminiſhed ſecretion of urine, may alſo give riſe to this diſeaſe. Thus grown people, who die of an *iſchuria*, have often water in the ventricles

tricles of the brain, and become comatoſe before their death; but ſuch patients generally die before any conſiderable quantity of water is collected in theſe cavities.

6. LASTLY, in tedious chronic diſeaſes, water is often collected in the ventricles of the brain, as well as in the cavity of the *pericardium*, but not in ſuch quantity as to occaſion the ſymptoms of a dropſy within the brain.

An ATTEMPT to account for ſome of the moſt remarkable SYMPTOMS attending a Dropſy in the Brain.

IN general, the whole ſymptoms of this diſeaſe proceed from different degrees of the ſame cauſe, *viz.* the preſſure or diſtenſion of the parts of the brain, occaſioned by the water contained in its ventricles.

1. *THE*

1. *THE loſs of appetite and inclination to vomit*, are owing to the diſordered ſtate of the brain, between which and the ſtomach there is ſo great a ſympathy, that in wounds of the head, where the brain is hurt, a vomiting is almoſt a conſtant ſymptom.

2. *THE averſion to light, in the firſt and ſecond ſtage of the diſeaſe*, proceeds from an increaſed ſenſibility of the *retina*; and this is probably owing to the irritation of the *thalami nervorum opticorum*, in conſequence of the water accumulated in the anterior ventricles of the brain.

3. *THE ſlow irregular pulſe in the ſecond ſtage.*

THE motion of the heart is owing to the irritation of the returning venous blood poured into its ventricles. This irritation, however, could have no effect upon the heart, were it not for its ſenſibility, which depends intirely on its nerves.

Wherefore,

Wherefore, in a *hydrocephalus*, when the water is collected within the brain in ſuch quantity as to preſs, with a conſiderable force, on the medullary ſubſtance, the nerves proceeding from it will in ſome degree loſe their powers, and conſequently the heart will be leſs ſenſible. And hence the pulſe becomes often as ſlow, and ſometimes ſlower than in a natural ſtate, altho' there be a real fever in the body; which fever, were it not for this preſſure on the origin of the nerves, would occaſion a quick pulſe.

When, in this diſeaſe the pulſe is ſlow, it is always more or leſs irregular; and this may alſo be owing to the nerves of the heart being, in ſome meaſure, deprived of their uſual power, by which means that organ cannot move with its wonted ſteadineſs and regularity.

4. *THE quick pulſe in the third ſtage.*

Of all the ſymptoms that attend a dropſy in the brain, there is none ſo hard to

to be accounted for as the quick pulſe towards the end. For if the preſſure of the water occaſioned the ſlow pulſe in the ſecond ſtage, one would imagine that in the third, when this preſſure is increaſed, the ſenſibility of the heart ſhould be ſtill more impaired; and that therefore its motion ſhould be ſlower, inſtead of being quicker. However, we find in fact, that the pulſe is remarkably quicker towards the end, when the preſſure of the water muſt be greateſt; let us therefore inquire what may probably be the reaſon of this ſymptom.

When, in the ſecond ſtage, the preſſure on the ſides of the ventricles of the brain occaſions the ſlow irregular pulſe, it ſeems to produce this effect, by leſſening the ſenſibility and other powers of the cardiac nerves. When in the third ſtage the water increaſes, this preſſure muſt be greater; and therefore it might be natural to think, that theſe nerves ſhould be rendered ſtill more unfit for performing their function.

But

But we muſt conſider, that when the ſides of the ventricles are ſtretched by the water beyond a certain pitch, the violence done to the medullary fibres of the brain cauſes ſuch an uncommon irritation as muſt quicken the pulſe: For in animals newly dead (where we muſt ſuppoſe the nerves to be ſtill more inſenſible and unfit for action, than in the third ſtage of the *hydrocephalus*) an irritation of the *medulla oblongata* reſtores the motion of the heart; and if, as I have obſerved above, the volatile ſalts held to the noſe, or cinnamon-water taken into the mouth, by their *ſtimulus*, though for a ſhort time, give new vigour to the nerves of the *uvea*, (which towards the end of this diſeaſe begin to loſe their powers), why may not the irritation of the medullary part of the brain, occaſioned by the immoderate diſtenſion of its ventricles, ſo affect the nerves of the heart as to accelerate its motion?

In an apoplexy, the pulſe, tho' at firſt ſlow, becomes very quick towards the end; and indeed, in almoſt every diſeaſe, the pulſe is uncommonly quick before death, not becauſe the nerves of the heart are then more ſenſible, or fitter for performing their office, than they were before, but becauſe at that time there is an uncommon ſtruggle in the body, and all its powers are excited into action by the great irritation of the brain and nervous ſyſtem. The ſame ſeems to be the caſe in thoſe who are dying of a dropſy in the brain; for how much ſoever the medullary part of the brain may be compreſſed, yet the convulſions which happen in the laſt ſtage ſhow that the brain and nerves are ſenſible of irritation, and ſtill retain their power of putting the muſcles in motion.

5. *THE dilatation of the pupil.*

The contraction of the pupil is owing to the uneaſy ſenſation excited in the *re-*

tina by ~~two~~ too much light; and hence it is, that in a dark place, or when the *retina* becomes inſenſible of the *ſtimulus* of light, the pupil is always obſerved to be wide. In the *hydrocephalus*, when the water in the ventricles preſſes ſo much on the *thalami nervorum opticorum* as to render the optic nerves in a great meaſure inſenſible, the *retina* will no longer feel the impreſſion of light; and therefore the pupil will remain dilated.

In the account of the ſymptoms of the third ſtage, I mentioned an inſtance of a boy of five years of age, whoſe pupils were much dilated on the fifth day before he died; but we obſerved them next day to be as much contracted as is uſual in a perſon in health placed in a moderate light. At this time, having endeavoured to rouſe the patient, by holding a volatile ſpirit to his noſe, and making him ſwallow ſome cinnamon-water, the pupil inſtantly became as wide as it had been the night before. In about half an hour after,

ter, I found the pupils again contracted; but they were preſently enlarged as before, upon holding the ſpirit of *ſal. ammoniacus* to his noſe. This experiment I repeated four times in two days, and always with the ſame ſucceſs.

In this caſe the dilatation of the pupil was at firſt owing to the compreſſion of the *thalami nervorum opticorum* by the water contained in the anterior ventricles of the brain. But ſoon after, the origin of thoſe nerves which ſerve the *uvea* being alſo conſiderably compreſſed by the increaſed quantity of water, the longitudinal fibres of this membrane (which by their natural contractility dilate the pupil) become paralytic and flaccid, as happens in the bodies ſome time after death; wherefore the edges of the pupil being leſs drawn outward, of courſe it would become ſmaller.

The volatile ſpirits applied to the noſe, by irritating its nerves, ſo affected the brain as to give ſome vigour for a ſhort

time to the nerves of the *uvea*, by which means its longitudinal fibres, regaining their power of contraction, immediately dilated the pupil; but as ſoon as the effect of this *ſtimulus* ceaſed, the fibres of the *uvea* being again deprived of their contractility, the pupil returned to its former dimenſions.

6. THE ſlow reſpiration towards the end of the diſeaſe.

In this kind of breathing (which I have alſo obſerved in patients who died of an apoplexy and an *iſchuria*) there is a conſiderable pauſe after every expiration before a new inſpiration ſucceeds. This pauſe is ordinarily for a few ſeconds; but I have ſometimes obſerved it longer, and in one apoplectic caſe it continued above half a minute. Now the brain being greatly compreſſed, the uneaſy ſenſation ariſing from the difficulty the blood finds in paſſing through the lungs will be much leſs felt than uſual: Hence, after expiration

expiration (which is performed by the power the cartilages of the ribs have to reſtore themſelves) a long pauſe interveens before a new inſpiration takes place; becauſe the mind is not excited to put in motion the muſcles concerned in inſpiration, till the ſenſe of ſuffocation in the breaſt becomes ſo great as to rouſe, as it were, the ſentient principle from its lethargic ſtate.

Of the CURE of a DROPSY in the BRAIN.

If this diſeaſe could be known early, and before any conſiderable quantity of water has been collected, it might probably be ſometimes cured by purgatives, diuretics, bliſters, frictions, exerciſe, and diet. But as it never diſcovers itſelf till ſo much water is accumulated as, by its preſſure on the ſides of the ventricles, to diſturb the action of the brain, we have little

little to hope from any medicine. An *aſcites* indeed has been often cured by diuretics, or purgatives. But if we conſider the diſtance between the brain and the *abdomen*, (where theſe medicines by their *ſtimulus* increaſe, in a particular manner, the action of the abſorbents, at the ſame time that they evacuate the watery part of the blood), the extremely ſlow motion of the fluids in the ſmall veſſels of the brain, and the preſſure of the water on the ſides of its ventricles, which muſt render the abſorption of that fluid ſtill more difficult, we ſhall ſee the reaſon why diuretics and cathartics ſhould be ſo inefficacious here.

In an *aſcites* the patient is generally relieved, and ſometimes cured by tapping; but in a dropſy of the ventricles of the brain, any ſuch attempt to draw off the water, could have no other effect than to haſten death.

I freely own that I have never been ſo lucky as to cure one patient who had

thoſe ſymptoms which with certainty denote this diſeaſe *; and I ſuſpect that thoſe who imagine they have been more ſucceſsful, have miſtaken another diſtemper for this. I remember ſeveral years ago, that an able and experienced phyſician being called to a child of a year old, in a fever attended with convulſions and a *coma*, was of opinion, that the diſorder proceeded from water in the head; on which account, beſides bliſters which had been applied before, he ordered a purge of ſalap and calomel, which had a very good effect; for in two or three days the *coma* and convulſions ceaſed, and the patient ſoon recovered; which, I am perſuaded, could not have been the caſe, had he

* The medicines I chiefly uſed were repeated purges of rhubarb or jalap, with calomel and bliſters; by which laſt I have ſeen the patients ſomewhat relieved for a ſhort time in the ſecond ſtage. I have alſo ordered the powder of *aſarum* to be drawn up into the noſtrils, with a view to make a diſcharge of a watery humour from the veſſels of the head.

he laboured under a dropſy of the brain. Farther, this child was not only ſuddenly ſeized with the fever, (as commonly happens when it takes to the head), but at no time of his illneſs had he either an irregular or a ſlow pulſe, or indeed any number of the other ſymptoms which I conſider as eſſential for diſtinguiſhing the *hydrocephalus internus* from another diſeaſe.

THE END.

AN ACCOUNT OF

Some EXPERIMENTS made with OPIUM on Living and Dying ANIMALS*.

THE ancient phyſicians imagined, that *opium* extinguiſhed the flame of life in animals by its exceſſive cold; and in later times, there have not been wanting thoſe who deduced its effects from a quite oppoſite quality, whereby it was thought to rarefy the blood, and to compreſs the brain or origin of the nerves. Theſe falſe notions, however, of the nature and action of *opium* have been refuted by ſeveral of the moderns, whoſe writings have thrown conſiderable light upon this ſubject.

* Auguſt 7. 1755.

THE following experiments were made with a view ſtill further to illuſtrate the manner in which this wonderful drug produces its effects, and particularly to ſhew its influence upon the motion of the heart.

1. HAVING injected a ſolution of *opium* in water, into the ſtomach and guts of a frog, I obſerved, that in little more than half an hour it ſeemed to have loſt all power of motion, as well as feeling; for there was no contraction produced in the muſcles of its limbs and trunk by irritating them. I opened the *thorax* an hour after the injection, and found the heart, inſtead of between 60 and 70, making only 17 pulſations in a minute. The auricle, which was much diſtended with blood, always contracted firſt, and after it the ventricle.

2. A frog continued to move its limbs, and leap about for above an hour after

I had cut out its heart, and was not quite dead after two hours and a half.

FIVE minutes after taking out the heart of another frog, I injected a ſolution of *opium* into its ſtomach and guts. In leſs than half an hour, it ſeemed to be quite dead; for neither pricking nor tearing its muſcles produced any contraction in them, or any motion in the members to which they belonged. After cutting off its head, a probe puſhed into the ſpinal marrow made its fore-legs contract feebly.

3. EIGHTEEN minutes paſt four in the afternoon, I injected a ſtronger turbid ſolution of *opium* in water than that uſed in the preceeding experiments*, into the ſtomach and guts of a frog; and as it ſquirted out moſt of the ſolution injected

* *Viz.* half an ounce of *opium* diſſolved in eight ounces of water; which was alſo made uſe of in all the following experiments. The heat of the ſolution was nearly the ſame in all the experiments, *viz.* about 60 degrees of Farenheit's thermometer.

injected by the *anus*, I threw in ſome more in its place. At twenty four minutes paſt five, I opened this frog, and obſerved the heart with its auricle greatly diſtended with blood, and beating very ſlowly, not above ſeven times in a minute. When the heart was touched with the point of a pair of ſciſſars, its motion was rendered quicker for two or three pulſations: after which it became as ſlow as before.

4. IMMEDIATELY after decollating a frog, I doſtroyed its ſpinal marrow, by puſhing a ſmall probe down through its ſpine, which occaſioned ſtrong convulſions of all the muſcles, eſpecially thoſe of the inferior extremities. Ten minutes after this, I opened the *thorax*, and found the heart beating at the rate of 45 times in a minute. Sixteen minutes after decollation, it moved 40 times in a minute. After half an hour it made 36, and after fifty minutes, only 30 pulſations in the minute;

minute; which were now alſo become very ſmall and feeble.

N. B. When I opened the *thorax* of another frog immediately after decollation, and deſtroying its ſpinal marrow, I obſerved its heart beating at the rate of 60 in a minute, which is four or five pulſations leſs than I have generally ſeen the hearts of frogs make in that time, when their *thorax* was opened without decollation.

5. At nine minutes paſt eleven in the forenoon, immediately after decollating another frog, I deſtroyed its ſpinal marrow with a red hot wire, which produced terrible convulſions in all the muſcles, as in the laſt experiment. I opened the *thorax* of this frog thirty-five minutes after decollation, and obſerved its heart beating 30 times in a minute. The contraction of the auricle regularly preceeded that of the heart. The auricle was not near ſo much diſtended with blood, nor the heart ſo much ſwelled as in thoſe frogs which had a ſolution

lution of *opium* injected into their ſtomach and guts *. At one o'clock (*viz.* an hour and fifty-one minutes after decollation) the heart of this frog made 20 pulſations in a minute. At half an hour paſt two, when the room was become warmer by the ſhining of the ſun, it beat 25 times in a minute; and when placed in the ſun-beams, it performed 31 contractions in that time. After this, I removed the frog to an eaſt window, where it was expoſed to a cool breeze; upon which the motion of its heart became ſlower, ſo that in a ſhort time it only made 25 pulſes in a minute. I then expoſed it a-new to the ſun-beams, by which its motion was ſoon quickened, ſo that it beat 30 times in a minute.

At twenty-five minutes paſt five in the evening, (*viz.* ſix hours and ſixteen minutes after decollation and the deſtruction

* See No. 3. above, and Eſſay on the vital and other involuntary motions of animals, p. 371 & 372.

tion of its ſpinal marrow) the auricle of this frog's heart, which was ſtill filled with blood, contracted 12 times in a minute; but the heart itſelf lay without motion, was ſwelled and very red: However, when pricked with a pin, it performed two or three pulſations, and then remained at reſt, till rouſed by a new *ſtimulus*. At thirty-five minutes paſt five, the heart ſeemed to be quite dead, but the auricle continued its motion; nay, at half an hour paſt eight, near three hours after the heart had been without motion, the auricle, which was very near as much filled with blood as when I firſt opened this frog, beat 11 or 12 times in the minute: Its pulſations, however, were not now ſo regular as to time, as they had been before.

Is it not probable, that the auricle of this frog's heart beat longer than uſual, becauſe it continued, to the laſt, to be filled with blood; whereas generally the auricles of frogs hearts, which are open-

ed after decollation and the deſtruction of their ſpinal marrow, expell after ſome time the blood which they contain, and acquire the appearance of a ſmall pellucid bladder filled with air?

6. I laid bare the abdominal muſcles and *thorax* of a frog, by diſſecting off the ſkin, and at twenty minutes before nine in the morning, I immerſed the whole body of the frog in a turbid ſolution of *opium* in water, in a ſmall baſon, which I covered to prevent the frog from leaping out of it. Thirty-five minutes after immerſion, I took it out of the ſolution, and opened the *thorax* and *pericardium*. The heart's auricle, which was much diſtended with blood, beat 15 times in a minute, but the heart itſelf only 6 times. Forty minutes paſt nine (*viz.* twenty-five minutes after the frog was taken out of the ſolution of *opium*) the heart ſeemed to have recovered more life; for it performed eight pulſations in a minute: The contractions of the auricle now became feebler,

feebler, and were ſcarce more numerous than thoſe of the heart, but always preceeded them ſome little time. Six minutes before ten this heart moved only ſix times in a minute. Twenty-four minutes paſt ten it made only five pulſations in ſixty-five ſeconds, the firſt, third, and fifth of which pulſations were after an interval of fifteen ſeconds, and the ſecond and fourth after a pauſe of ten ſeconds. Seventeen minutes before twelve, and two hours and twenty-eight minutes after the frog was taken out of the ſolution of *opium*, its heart moved only thrice in ſeventy-five ſeconds, and performed its *ſyſtole* very ſlowly. Before two o'clock afternoon the heart was quite dead; but how long, I cannot ſay, not having had leiſure to obſerve it from a quarter before twelve till near two.

7. AFTER cutting off a frog's head, and deſtroying its ſpinal marrow with a red hot wire, I laid bare the abdominal muſcles and *thorax*, as in the laſt experiment,

ment, and immerſed the whole body of the frog in a turbid ſolution of *opium*, at half an hour paſt nine in the morning. Thirty-ſix minutes after immerſion I took it out of the ſolution, and opened its *thorax* and *pericardium*. The heart and its auricle beat, each, twenty-ſix times in a minute, and the pulſations of the auricle preceeded thoſe of the heart regularly. The heart did not appear to be more ſwelled or redder than in a natural ſtate, and the auricle was not near ſo full of blood as in Exp. 6. Twelve minutes paſt ten, *viz.* ſix minutes after this frog was taken out of the ſolution of *opium*, its heart beat twenty-ſeven times in a minute. At eleven o'clock it performed eighteen vibrations in that time; and ſixteen at a quarter before twelve. At two o'clock after noon, the auricle, which, having expelled all its blood, was now only filled with air, continued its motions; but the heart lay at reſt. Ten minutes paſt four, *i. e.* five hours and forty-four minutes after

the frog was taken out of the ſolution, the auricle of its heart beat nine times in ſixty-four ſeconds.

8. I laid bare the abdominal muſcles and *thorax* of another frog, and at fourteen minutes paſt eight in the morning, immerſed it as above in a turbid ſolution of *opium*. Fourteen minutes paſt nine, I took it out of the ſolution, and laid open its *thorax* and *pericardium*; after which the heart began to beat at the rate of nine times in a minute: But the auricle, which was greatly diſtended with blood, made no motion, except in ſo far as it was agitated a little by the pulſation of the heart: Nor were the muſcles of the legs or thighs brought into contraction by cutting or tearing their fibres. At half an hour paſt nine the heart beat only ſeven times in a minute; and the auricle, which was now pretty empty of blood, and, in place of it, filled with air, had a pulſation as well as the heart. Thirteen minutes before ten, *i. e.* thirty-three minutes

nutes after the frog was taken out of the ſolution, the auricle ſhewed, at conſiderable intervals, a very faint pulſation; but the heart lay without any motion.

9. THE ſame day, after cutting off the head and deſtroying the ſpinal marrow of another frog, I laid bare its abdominal muſcles and *thorax*; and, at eighteen minutes paſt ten, immerſed it in a ſolution of *opium*, as above. Eighteen minutes paſt eleven, I took it out of the ſolution and opened its *thorax* and *pericardium*, after which the heart began to move at the rate of eight times in a minute. Twenty-five minutes paſt eleven, the heart beat 15 times in a minute; and at twelve o'clock it performed between 13 and 14 vibrations in the ſame time. At two o'clock, (*viz.* two hours and forty-two minutes after the frog was taken out of the ſolution), the auricle, which was now filled with air, continued to vibrate weakly about 11 times in the minute; but the heart itſelf was without motion. At ten

minutes

minutes before four in the afternoon, the auricle ſtill continued to move, but more feebly than the auricle of N° 5.

10. I laid open the whole *abdomen* of a larger frog than any of the former; and, at twenty-two minutes paſt ten in the morning, immerſed it in a ſolution of *opium*, as above. Thirty-five minutes after immerſion, I took it out of the ſolution, and opened its *thorax* and *pericardium*. The heart was vaſtly red and much ſwelled, and its auricle greatly diſtended with blood; but both were without any motion: After two minutes, however, the heart began to vibrate at great leiſure, ſcarcely performing nine pulſations in a minute; but the overſtretched auricle made not the ſmalleſt motion. During every *ſyſtole*, the heart was remarkable paler, and in the time of its relaxation became much redder; which appearance I obſerved likeways in all the frogs hearts in the above experiments, but more remarkably in thoſe frogs who had been

expoſed

expoſed to the action of *opium*. Another thing, which I remarked in all theſe experiments, was, that the heart during its *ſyſtole*, became manifeſtly ſhorter, and was lengthened in the time of its relaxation. But to return; at ſix minutes paſt twelve, (*i. e.* an hour and nine minutes after the frog was taken out of the ſolution), its heart made only ſix pulſations in the minute; and at eleven minutes paſt twelve, obſerving it without motion, I pricked it with a pin, and breathed upon it, in order to renew its pulſation; but to no purpoſe.

II. TWENTY eight minutes paſt ſeven in the evening, I laid open the whole *abdomen* and *thorax* of a frog, and immediately after immerſed it in a ſolution of *opium* as above. Thirty-eight minutes paſt ſeven, when I pricked its legs with the point of a penknife, it made very little motion. Two minutes after this, I turned it to its back, and obſerved its heart moving only between ten and eleven

times

times in a minute. Having laid the frog again on its belly, that it might be more expoſed to the action of the *opium*; at forty-eight minutes paſt ſeven, *i. e.* twenty minutes from the firſt immerſion, I turned it again to its back, and obſerving the heart without motion, I opened the *pericardium*; which producing no effect, I cut the heart out of the body, and laid it on a plate, when it gave two or three pulſes, and never after moved, though it was pricked once and again with a pin.

No motion was produced in any of the other muſcles of this frog, by irritating them.

12. I cut off a frog's head and deſtroyed the ſpinal marrow with a hot wire, then laid open its *thorax* and *abdomen*, and immerſed it in a ſolution of *opium* at nineteen minutes paſt eleven. Eight minutes before twelve, *i. e.* thirty-three minutes after immerſion, I obſerved its heart beating very ſlowly: But two minutes before twelve, when I took it out of the ſolution

of *opium*, it had no motion. After this, I opened the *pericardium*, and irritated the heart two or three times with the point of a *ſcalpel*, which always produced a few pulſations. I then put the frog in the ſolution for five minutes more, and, upon taking it out, found its heart quite dead.

13. AFTER cutting off a frog's head and deſtroying its ſpinal marrow, I laid open its whole *abdomen*, and immerſed it in a ſolution of *opium*, twenty-three minutes before one. After it had lain ſixteen minutes, I cut up its *thorax* and *pericardium*; and obſerving the heart beating very regularly and pretty ſtrongly twenty-one times in the minute, I immerſed it again in the ſolution, which had now immediate acceſs to the heart. After five minutes, I took it out of the ſolution; and finding the heart without motion, I pricked it with the point of a knife; upon which it began to beat at the rate of fourteen times in a minute, and continued

nued its motions very languidly, and not without ſome interruption, for about a quarter of an hour.

14. I cut out the heart of a frog, and put it in fountain-water at ten minutes paſt ten; immediately after immerſion, it beat about twenty-eight times in the minute. Eighteen minutes paſt ten, it made ſix pulſations in thirty ſeconds. Twenty minutes after ten, I took it out of the water and laid it on a table, and obſerved, that as often as it was gently touched with any thing, it made one full and ſtrong contraction, and no more: However, in four or five minutes, it began to beat of its own accord, and, at twenty-eight minutes after ten, performed nineteen pulſations in a minute. Thirty-five minutes paſt ten, it beat twelve times in a minute.

15. TWENTY three minutes paſt twelve, I cut out the heart of another frog, and put it in fountain-water. After twelve minutes immerſion, I took it out

out of the water, when it beat above twenty times in a minute. Having put it in the water for five minutes more, it ceaſed from motion, and when taken out, did not move except when pricked, and then only performed one pulſation.

16. EIGHT minutes paſt eleven, I cut out the heart of a third frog, and put it into fountain-water. Eleven minutes after immerſion its heart beat eight times in a minute, and four minutes after this it vibrated eleven times in thirty ſeconds; but the motion was confined to about one third part of the heart next its *apex*. Twenty minutes after immerſion, it continued to move much in the ſame way; but in two minutes more, obſerving no motion in it, I took it out of the water, and laid it on a table, where it remained at reſt, unleſs when touched. Soon after this, however, it began to move; and at twenty-five minutes after immerſion, it made nine pulſes in ſixty-three ſeconds. Four minutes after this, it moved only thrice

thrice in fifty ſeconds, and then ceaſed altogether; unleſs that, when pricked with the point of a knife, it gave one very faint pulſation. At forty-ſeven minutes paſt eleven, it was quite dead.

17. I cut out the heart of a fourth frog, and at thirty minutes paſt ten immerſed it in a turbid ſolution of *opium* in water of the ſame degree of heat with the fountain-water uſed in the three laſt experiments *. After this heart had been immerſed ten minutes, I took it out of the ſolution, and laid it on a table, but it made not the ſmalleſt motion; and when pricked with the point of a knife, though it quickly recovered its ſhape, yet it was not excited into a proper contraction, as the heart of N° 14. I continued to obſerve this heart from time to time for more than half an hour; but it never made the leaſt motion.

18. I cut out the heart of a fifth frog, and put it into a ſolution of *opium* in water

* *Viz.* Nearly ſixty degrees of Farenheit's thermometer.

ter five minutes before eight. After ſeven minutes immerſion, I took it out, and laid it on a plate, where it remained at reſt. When pricked with a knife, it did not perform a full pulſation like N° 14. but ſeemed to feel a little, by a very faint kind of motion which was excited in ſome of its fibres.

19. At thirteen minutes before twelve, I cut out the heart of a ſixth frog, and immerſed it in a ſolution of *opium*. Six minutes after immerſion, it had no motion; but when pricked made one pulſation. After lying five minutes more in the ſolution, it was quite dead.

20. I cut out the heart of a ſeventh frog, and at thirty-ſeven minutes paſt nine in the morning, immerſed it in a ſolution of *opium* as above. Forty-two minutes after nine, when I took it out of the ſolution, it was without motion; but when touched with the point of a knife or probe, it performed one contraction, but with leſs vigour and more ſlowly than

than the heart of N° 14. Forty-ſeven minutes paſt nine, it began to beat of its own accord. Two minutes after this, it moved ſix times in a minute, but much more feebly than N° 14. Six minutes before ten, it beat only four times in a minute: after this, it began to beat much faſter; but its motions ſoon returned to their former ſlowneſs. At ten, after having lain near a minute without motion, it began again, of its own accord, to beat at the rate of ſeventeen times in a minute, and continued for eight or ten minutes after this to beat very feebly, and in an irregular manner as to time.

21. Mr Robert Ramsay ſtudent of medicine in this place, having diſſolved two ſcruples of *opium* in an ounce of water and a dram of liquid *laudanum*, injected it blood-warm into the *inteſtinum rectum* of a very ſmall dog near ſix months old. In leſs than a minute after the injection was made, the dog could not ſtand on his hinder-legs; and in

three

three or four minutes he had loſt the uſe of them ſo much, that when they were ſtrongly pinched, he neither moved them, nor ſeemed in the leaſt degree ſenſible of pain. He could, however, ſtill ſcramble about with his fore-legs; and when they or his ears were pinched, he howled remarkably, and ſeemed to feel conſiderable pain. Ten minutes after the injection, he lay as if he had been quite ſtupid; only when a noiſe was made by beating on the ground, he opened his eyes a little and howled, but preſently after fell into a profound ſleep. In a few minutes after this, he began to be convulſed; upon which Mr Ramſay injected a ſtrong ſolution of ſea ſalt in water into his guts, which purged him ſeverely, and occaſioned a *prolapſus ani*; ſoon after this, he awaked from his ſleep, and gradually recovered the uſe of his hinder-legs; ſo that in leſs than an hour he could run about the room, though he often fell down, his legs bending under him. After three or four hours,

hours, he ſeemed to be quite well in every reſpect; but altho' the experiment was made at mid-day, he could taſte no meat till late at night. When he was in the moſt ſtupid ſtate, he could make uſe of his fore-legs, and complained when his ears were pinched.

22. THE ſame young gentleman, at my deſire, made the following experiment. On the 9th of April 1755, after making an opening into the cavity of the *abdomen* of the dog on which the laſt experiment was made, he injected by the wound a dram of *opium* diſſolved in two ounces and a half of water; but before he could ſtitch up the wound, about an ounce of the ſolution eſcaped. The dog loſt the power of his hinder limbs almoſt inſtantaneouſly. Two minutes after the injection was made, he began to be convulſed; and, in two minutes more, after having raiſed himſelf upon his fore-legs, he fell down ſenſeleſs. At this time Mr Ramſay laid bare the *thorax*, by diſſecting off the

teguments, which did not ſeem to give the dog any pain, and could plainly feel the motion of his heart thro' the *pleura*: it beat ſeventy-ſix times in a minute, but became gradually ſlower *. Immediately after counting the pulſe, Mr Ramſay cut the ribs on each ſide of the *ſternum*, which he laid back in the uſual way. The heart, which was thus brought in view, appeared quite turgid, and continued in motion about five minutes; during which time it performed only between ſixty and ſixty-five weak vibrations, for they were not compleat contractions. While the heart was thus moving, warm *ſaliva* was firſt applied to it, then cold water, and laſt of all oil of vitriol; which ſhrivelled the parts it touched almoſt in the ſame manner as a hot iron would have done; but none of them accelerated the heart's vibrations, which became gradually ſlower, till they ceaſed altogether.

THE

* The dog's heart in a natural ſtate, and before the injection of the ſolution of *opium*, beat 150 in a minute.

THE fibres of ſome of the intercoſtal muſcles on the right ſide of the *ſternum* continued to be agitated with a weak tremulous motion near half an hour after the injection was made into the *abdomen*; but the intercoſtal muſcles attached to the ribs on the ſides of the *thorax* were not obſerved to move, nor did the diaphragm make any motion when its fibres were pricked or cut.

NOTHING remarkable was ſeen in the *abdomen*; only, although it was opened ten minutes after making the injection, the inteſtines had no motion; whereas, in another young dog, which had got no *opium*, Mr Ramſay obſerved the periſtaltic motion continue half an hour after laying open the *thorax*.

THE dog loſt little or no blood in making the wound into his *abdomen*, nor were any of his bowels hurt by it.

23. A ſmall dog into whoſe ſtomach the late celebrated Dr Mead had forced, at four different times, a ſolution of two drams

drams of *opium* in water, lived above an hour and three quarters after getting the firſt doſe. *Vid.* Treatiſe on poiſons, eſſay 4.

24. It may not be improper to add here an experiment related by Dr Alston, in his learned diſſertation on *opium* *. Into the crural vein of an old dog forty-two pounds weight, he cauſed be injected, at three different times, half an ounce of *opium* diſſolved in four ounces of water, filtrated, and of the ſame warmth with the blood of the animal. The firſt time, about fifteen drams were thrown in, and very ſlowly. It had no obſervable effect. About an hour after, eight drams more were injected ſlowly, and immediately the dog was ſeized with ſtrong convulſions: The pulſe was frequent and ſmall, and after ſome time he foamed at the mouth. But there appearing no ſigns of immediate death, after waiting an hour more,

* Edinburgh Med. Eſſays, vol. v. p. 1. art. xii.

more, the laſt nine drams were thrown in quickly; upon which the pulſe became full and ſlow, and in a minute or ſo the dog expired.

FROM the preceeding experiments, we may, I think, fairly draw the following concluſions.

(*a*) *Opium* applied to the ſtomach, guts, cavity of the *abdomen* and *thorax*, and abdominal muſcles, ſoon leſſens, and after ſome time intirely deſtroys, all feeling and power of motion, not only in the parts to which it is applied, but through the whole body, N° 1. 2. 3. 8. 11. & 22.

(*b*) *Opium* produces theſe effects much more quickly in animals which are ſoon killed by want of food and air, than in thoſe which can live long without them, and the parts of whoſe bodies preſerve a power of motion and appearances of life, for a conſiderable time after they are ſeparated from each other, N° 1. 3. *&c.* compared with N° 21. 22. & 23.

(*c*) SINCE

(*c*) SINCE a ſolution of *opium* injected into the ſtomach and guts deſtroys the ſenſibility and moving power of frogs, fully as ſoon when they are deprived of their heart, as when this organ remains untouched; it follows, that *opium* applied to theſe parts does not produce its effects by entering the blood, and being by its means conveyed to the brain, as ſome have imagined, but by its immediate action on the organs and parts which it touches; N° 1. compared with N° 2. See alſo Edinburgh Medical Eſſays, edit. 3. vol. 5. part 1. p. 140.

(*d*) SINCE after decollation and the deſtruction of the ſpinal marrow, *opium* operates much more ſlowly in deſtroying the heart's motion in frogs, than it does when the animals are intire (N° 6. compared with N° 7.); it follows, that it muſt produce its effects chiefly, if not wholely, by its action on the brain, ſpinal marrow, and nervous ſyſtem. The heart of the frog N° 7. whoſe brain and ſpinal

marrow

marrow had been deſtroyed, beat 27 times in a minute, after the animal had lain thirty-ſix minutes in a ſolution of *opium*; which was only three pulſations leſs than the heart of the frog N° 5. performed thirty-five minutes after the deſtruction of its brain and ſpinal marrow, although it was not expoſed to the action of *opium*.

(*e*) WHEN *opium* injected into the veins, and thus mixed with the blood, leſſens or deſtroys the ſenſibility and moving power of animals much in the ſame way as when it is applied to their ſtomach, guts, or cavity of the *abdomen*, (N° 24.); is it not probable, that it produces theſe effects by its action on the extremities of the nerves which terminate upon the internal ſurface of the heart and whole vaſcular ſyſtem; and perhaps alſo by affecting immediately the *medulla cerebri* itſelf? And when a ſolution of *opium* applied to the bare abdominal muſcles of a frog deprived of its brain and ſpinal marrow,

does

does after a long time conſiderably impair the heart's motion; is it not reaſonable to think, that this is owing to the finer parts of the *opium* being abſorbed by the bibulous veins and carried to the heart, and thus brought into contact with the nerves of this organ? N° 7. compared with N° 9.

(*f*) SINCE *opium*, without entering the blood, or being carried to the ſeveral parts of the body, deſtroys the power of feeling in animals merely by acting on the nerves to which it is applied (*c*) (*d*), it follows, that the nerves are the inſtruments of ſenſation, or at leaſt neceſſary to it. Nor is it ſufficient to deſtroy this concluſion, that there have been inſtances of animals endowed with feeling whoſe brains were ſo greatly diſeaſed, as to ſeem incapable of performing their functions. It is far from being ſafe to build theories in phyſic upon a few monſtrous appearances in nature.

(*g*) IT appears from N° 4. and 5. compared

pared with No 3. 6. 8. 10. and 11. that decollation and the deſtruction of the ſpinal marrow does not weaken or deſtroy the heart's motion in frogs, near ſo ſoon as *opium* injected into their ſtomach and guts, or applied to the muſcles and bowels of the lower belly and *thorax*.

(*h*) ALTHO' a ſolution of *opium* applied to the opened *thorax* and *abdomen* of a frog, after decollation and the deſtruction of its ſpinal marrow, ſoon weakens or deſtroys the motion of the heart; yet it does not produce theſe effects ſo ſpeedily as when the brain and ſpinal marrow are intire, No 11. and 12. In the former caſe, the *opium* can only affect the heart by its topical influence; in the latter, it not only acts this way, but alſo exerts its powers upon the brain, ſpinal marrow, and whole nervous ſyſtem; and therefore muſt produce more ſudden effects.

(*i*) IT appears beyond doubt, from the preceeding experiments, that the heart is not exempted from the power of *opium*,

as the learned Dr Haller has affirmed *, but has its motion deſtroyed by it, as well as the other muſcles, only not ſo ſoon. See No 4. and 5. compared with No 3. 6. 8. & 10. and No 14. 15. & 16. compared with No 17. 18. 19. & 20.

'Tis true, that the fibres of the intercoſtals on the right ſide of the *ſternum* of the dog No 22. continued to be agitated with a tremulous motion conſiderably longer than the heart, and when the intercoſtal muſcles attached to the ribs were quite dead. But did not this happen becauſe, after ſeparating the *ſternum* from the ribs, and thus cutting off all communication between it and the ſpinal marrow, the muſcles attached to it could be no more affected by the *opium*, which had been injected into the cavity of the *abdomen*; while the heart and other muſcles whoſe communication, by means of the nerves, with the brain and ſpinal marrow was intire,

* Act. Gotting, vol. 2. p. 147. & 154.

tire, continued to be expoſed to its action?

(*k*) As Dr Langriſh has obſerved, that the diſtilled water of laurel-leaves injected into the cavity of the *abdomen*, kills dogs ſooner than when it is taken into the ſtomach *; ſo No 21. and 23. compared with No 22. ſhew, that *opium* injected into the ſtomach and great guts of dogs, does not produce either ſuch ſpeedy or powerful effects as when thrown into the cavity of the *abdomen*. And No 6. compared with No 10. ſhews, that a ſolution of *opium* applied to the abdominal muſcles, does not kill frogs ſo ſoon as when all the *viſcera* of the lower belly are expoſed to its action.

(*l*) Altho' it ſeems probable, from No 22. compared with No 24. that a ſolution of *opium* injected into the veins of dogs, does not kill them ſo ſoon as when thrown into the cavity of the *abdomen*; yet this cannot be certainly concluded ſince

* Phyſical experiments on brutes, p. 64.

ſince the dog of No 24. was much older, and above ten times heavier than the other.

(*m*) It appears, that a ſolution of *opium* injected into the great guts of a dog, affects the inferior part of the ſpinal marrow much more remarkably than its ſuperior part, or the brain; ſince the dogs of No 21. and 22. not only loſt the power of motion ſooner in their hinder legs than in their fore ones, but alſo were inſenſible of any pain in them, and yet howl'd ſtrongly when their ears were pinched.

(*n*) A ſolution of *opium* injected into the cavity of the *abdomen* or great guts of dogs, does not deſtroy the feeling and power of motion of their hinder limbs, by ſending any *effluvia* to their muſcles; otherways it could not produce theſe effects ſo inſtantaneouſly, (No 21. & 22.). Beſides, ſince *opium* thrown into the ſtomach and guts of a frog, after being deprived of its heart, deſtroys the ſenſibility and moving power of its muſcles equally ſoon

as

as if the animal had been intire (No 2.); 'tis plain, that theſe effects cannot be owing to the finer parts of the *opium* being received into the blood, and by its means carried to the ſeveral muſcles and organs.

(*o*) Nor does a ſolution of *opium* injected into the great guts, or cavity of the *abdomen* in dogs, produce its effects by tranſmitting through the nerves any ſubtile *effluvia* to the ſpinal marrow; otherways its operation could not have been ſo inſtantaneous, (No 21. and 22.); nor could the ſpinal marrow and its nerves have recovered their functions ſo ſoon, after the *opium* was evacuated by a purgative clyſter, No 21.

(*p*) It remains therefore that *opium*, by affecting the extremities of the nerves of the parts to which it is applied, does, by means of their connection and ſympathy with the brain and ſpinal marrow, deſtroy or prevent through the whole nervous ſyſtem, the operation of that power upon which depends ſenſation and motion in the bodies of animals.

(*q*) Since

(*q*) SINCE *opium* applied to the abdominal muſcles of a frog deprived of its brain and ſpinal marrow does not deſtroy the motion of the heart ſo ſoon as when it is applied to the abdominal muſcles of a frog, whoſe brain and ſpinal marrow are intire, (No 6. and 7.), it follows, that the brain and ſpinal marrow, and conſequently the nerves derived from them, have a greater influence than any other part of the animal ſyſtem upon the motion of the heart.

(*r*) OPIUM does not only deſtroy the moving power of the muſcles of animals, by intercepting the influence of the brain and ſpinal marrow, but alſo by unfitting the muſcular fibres themſelves, or the nervous power lodged in them, for performing its office: Otherways a ſolution of *opium*, when applied to the abdominal muſcles or *viſcera* of a frog, would not put a ſtop to the heart's motion ſooner, or indeed ſo ſoon, as decollation and the deſtruction of its ſpinal marrow, (No 4. and 5. compared with No 8. and 10.).

Opium

Opium therefore does not produce its effects ſolely by putting a ſtop to the function of the brain and ſpinal marrow; but its influence reaches to the fibres of the muſcles themſelves, or to the extremities of the nervous filaments which terminate in them.

When I ſay the influence of *opium* reaches to the nervous filaments which terminate in the muſcular fibres, it is not meant, that any *effluvia* or ſubtile parts of the *opium* are tranſmitted to them, (See (*n*) and (*o*) above), but that it deſtroys their powers by means of that ſympathy which they have, through the brain or ſpinal marrow, with the nerves to which the *opium* is immediately applied.

(*ſ*) From the above experiments we may infer, that not only the power of voluntary motion in the muſcles, but alſo their irritability or power of motion when ſtimulated, proceeds from the nerves, or is at leaſt immediately dependent on their influence; ſince *opium*, which produces its effects

effects ſolely by affecting the nervous ſyſtem, (*m*, *n*, and *o*), deſtroys thoſe powers ſo ſuddenly. I know it has been lately argued by a celebrated author, that the irritability of the muſcles muſt be independent of the nerves, becauſe the muſcles of animals preſerve a power of moving when irritated for ſome time after the communication between them and the brain, by means of the nerves, is cut off*. But ſince a ſolution of *opium* applied to the abdominal muſcles of frogs, merely by its action on the nerves, puts a ſtop to the irritability or moving power of the heart much ſooner than the deſtruction of the brain and ſpinal marrow (*g*); is it not reaſonable to conclude, that the tremulous motions of irritated muſcles, after their nerves are tied, proceed from the integrity of the nervous filaments below the ligature, and the nervous power ſtill remaining in them or in the muſcular fibres themſelves?

THE

* Act. Gotting. vol. 2. p. 134. &c.

THE tying or cutting of a nerve, only prevents the derivation of any new influence from the brain to the parts to which it belongs; but does not immediately deſtroy the power or influence remaining in the nerve itſelf. *Opium* applied in ſufficient quantity to the ſenſible parts of animals, not only quickly puts a ſtop to the function of the brain and ſpinal marrow, and thus produces in the muſcles all the effects of a ligature on their nerves, but alſo deſtroys the power of every nervous filament in the body (*r*); and therefore puts a ſtop to the motion of the heart in frogs ſooner than the deſtruction of the brain and ſpinal marrow.

(*t*) THE almoſt inſtantaneous palſy brought on the hinder legs of a dog, by injecting a ſolution of *opium* into the cavity of its *abdomen*, (No 22.), and the effects of the ſame ſolution injected into the ſtomach and guts of a frog deprived of its heart, (No 2.), where no part of the *opium* could be conveyed to the muſcles,

nor be conceived to alter the nature of their *gluten*, ſhew, that the irritability of the muſcles has not its ſeat in this *glue*, as ſome have lately imagined *. But if the motions of irritated muſcles be owing to a diſagreeable ſenſation excited in them or their nerves, as we have elſewhere endeavoured to ſhew †, it is eaſy to ſee that *opium* muſt, by deſtroying the ſenſibility of the muſcles, of conſequence alſo deſtroy their irritability.

(*u*) In animals which have got a large doſe of *opium*, the veins, eſpecially thoſe of the membranes of the brain, are obſerved to be much ſwelled; whence it has been thought, that *opium* produces its effects in the bodies of animals, partly at leaſt, by rarefying the blood and compreſſing the brain: but this diſtenſion of the veins ſeems to be no more than a conſequence of the very ſlow motion of the blood

* Act. Gotting. vol. 2. p. 152.

† Eſſay on the vital and other involuntary motions of animals, ſect. ix.; and Phyſiological Eſſays, p. 188. &c.

blood through the heart, on account of the inſenſibility with which this organ is affected *.

(*v*) SINCE *opium* ſoon puts a ſtop to the vital motions of animals, which yet continue in time of ſleep with little or no diminution of their vigour; ſince it often eaſes pain without bringing on ſleep; and ſince, by its topical action on the heart, it deſtroys the motion of this organ after all communication between it and the origin of the nerves is cut off †; it follows, that the effects of *opium* are not owing, as ſome have thought, to its producing ſleep: On the contrary, the ſleep which it occaſions ſeems to be only a conſequence of its impairing the ſenſibility of the whole nervous ſyſtem.

THE

* In frogs, into whoſe ſtomach and guts I had injected a ſolution of *opium*, I not only found the heart's auricle, but alſo the great veins leading to it, much diſtended with blood. Vid. Eſſay on vital motions, &c. p. 371 & 372.

† Vid. No 12. 13. 17. 18. 19. and 20. &c. above.

THE other effects of *opium* may be alſo deduced from the ſame cauſe, particularly its reſtraining all evacuations that are owing to an unuſual irritation of the parts of the body, and at the ſame time promoting thoſe natural ſecretions which have been diminiſhed or ſtopt by ſpaſmodic ſtrictures of the veſſels, from ſome uncommon *ſtimulus* affecting them.

(*w*) LASTLY, does not *opium* kill animals by rendering their ſeveral organs wholely inſenſible of the *ſtimuli* which are deſtined by nature to excite them into action; whence not only a ſtop is put to the periſtaltic motion of the guts, and to the propulſion of the chyle *, but the fluids

* In a ſmall dog, which Dr Kauu Boerhaave opened, after having given him three grains of *opium*, he obſerved ſcarce any periſtaltic motion in the guts: the ſtomach was much diſtended; the *pylorus* was ſhut; and the bread and milk, which the dog had taken with the *opium* about ten hours before, was indigeſted. There was nothing like chyle in the *duodenum*, nor any lacteal veſſels to be ſeen in the meſentery. The bladder of urine and great guts were

fluids alſo begin to ſtagnate firſt in the ſmaller and afterwards in the larger veſſels *; while the heart becoming gradually leſs ſenſible of the *ſtimulus* of the blood with which it is diſtended, contracts more feebly and at greater intervals, till at laſt it ceaſes from motion altogether?

AN

were much filled, nor had the animal evacuated either urine or *fæces* from the time he ſwallowed the *opium*; *Impetum faciens Hippocrati dictum*, p. 402. & 403. The learned Dr Haller has alſo obſerved, that *opium* puts a ſtop to the periſtaltic motion of the guts in frogs and other animals; Act. Gotting. vol. 2. p. 154.

* This my worthy colleague Dr Alſton obſerved with a microſcope in frogs into whoſe ſtomach he had conveyed a few drops of a ſolution of *opium* in water. *Vid.* Medical Eſſays, vol. 5. part 1. art. 12. And indeed the great diſtenſion of the heart and its auricle in frogs killed with *opium* (No 5. compared with No 3. 6. and 10. above) indicates a more than ordinary reſiſtance to the blood's motion in the arteries, as well as a leſs degree of irritability in the heart. Further, is not the ſlow full pulſe, and dry parched mouth, in thoſe who have got an over-doſe of *opium*, owing partly to the ſlower motion of the fluids in the ſmall arteries and ſecretory veſſels of the glands? Though it muſt be confeſſed, that the dryneſs of the mouth may be in ſome meaſure owing to the perſpiration being greatly increaſed by the *opium*.

AN

ESSAY

ON THE

Various Strength of different LIME-WATERS.

THE Reverend and ingenious Dr Stephen Hales having informed me, in a letter dated May 1751, that he had found the ſtrength of lime-water much increaſed, by powering it a ſecond time on quick-lime, freſh from the fire; I thought it might be worth while to make a few experiments, in order to determine, with ſome degree of certainty, the different ſtrength of different lime-waters: From theſe experiments it appeared, that lime-water acquired a conſiderable addition of ſtrength by being powered on quick-lime newly taken from the

fire; and that the firſt water got off quick-lime was ſenſibly ſtronger than the fourth and ſucceeding ones *.

On the other hand, my worthy friend and colleague Dr Alſton, having obſerved, ſeveral years ſince, that quick-lime continued to communicate its virtues to water much longer than any one before had imagined, tells us, that he found afterwards, by experiments, that half a dram of ſtone quick-lime yielded forty ounces of lime-water; and that, after a pound of the ſame quick-lime had afforded five hundred pounds of lime-water, the water procured from it was as ſtrong of the lime as ever †. Hence he imagines, that as water can only be impregnated to a certain degree by quick-lime, ſo this will happen equally, whether the quick-lime be freſh from the fire, or has had five hundred

* Eſſay on the virtues of lime-water, &c. p. 38. 39.

† Philoſoph. Tranſact. vol. 47. p. 266.; and Diſſertation on quick-lime, &c. p. 4. 5. & 6. where the ſame thing is affirmed of oiſter-ſhell lime.

hundred times its weight of water powered on it before, provided the water be allowed time enough to extract the virtues of the lime *. And further affirms, that the ſtrength of lime-water cannot be increaſed by ſlacking new-made lime in it, becauſe the water can take up no more of the lime than it had before †.

As theſe experiments and concluſions appeared inconſiſtent with what I had advanced, the Doctor has endeavoured further to weaken the credit of my experiments, by ſome arguments drawn chiefly from the imperfection of the hydroſtatical balance, and from the nature of quick lime and its water. In order therefore to know whether I might not have been miſtaken in what I had ſaid concerning the ſtrength of different lime-waters, I thought it neceſſary to make ſome new experiments; an account of which I beg leave to lay before the ſociety.

* Diſſert. on quick lime, p. 11. & 53.

† Ibid. p. 11.

I. (*a*) HAVING got from my ingenious friend Mr James Gray, a cylindrical copper-veſſel ending in a narrow neck, which contained exactly 100 cubical inches; I filled it with the fountain-water of this city, and by means of a very nice balance, found it weighed 25320 Troy grains *, beſides the weight of the veſſel itſelf, which amounted to 13055 grains.

(*b*) I powered upon 90 grains of calcined oiſter-ſhells, newly taken from the fire, and reduced to a powder, 96 ounces, or five hundred and twelve times their weight of boiling water. After 92 hours, during which time the infuſion was frequently

* According to Mr Gray's experiments, the water which this veſſel contains, only weighs 25318 grains, that is, two grains leſs than we have made it. This difference may have ariſen from our having put a few more drops of water into the veſſel than Mr Gray did. But although, in weighing fluids with this veſſel, one might err ſix times more than this, yet it would not affect the point we have in view, which is not to determine with the greateſt accuracy the different ſpecific gravities of different lime-waters, but only to ſhow that they are *different*.

quently ſtirred and ſhaked, I decanted off the clear water, and filtered it through a piece of a very thick linen-cloth doubled; by which means it was rendered free of any cruſts, and equally pellucid with fountain-water. With this lime-water I filled the above veſſel, and found its weight to be 25356 grains *.

(*c*) MONDAY, at ſeven in the evening, I poured upon a pound of calcined oiſter-ſhells, freſh from the fire, ten times their weight of water. Next morning at ten I decanted off the clear lime-water, and having filtered it, as above, filled the veſſel with it; it weighed 25397 grains.

(*d*) TUESDAY at mid-day, I poured ſeven pounds of the ſingle lime-water (*c*) upon one pound of calcined oiſter-ſhells, newly taken from the fire, ſtirring them well for ſome time after; at three quarters paſt ſix in the evening, I decanted off,

* The oiſter-ſhells made uſe of in this, and the following experiments, were got from among the rubbiſh on the ſouth ſide of the caſtle of Edinburgh, and were quite free of any ſea-ſalt.

off, and filtered as above, the clear lime-water; and having filled the veſſel with it, found its weight to be 25457 grains.

HENCE it appears, that 100 cubical inches of the lime-water (*b*) exceeds in weight that quantity of fountain-water by 36 grains, (*c*) exceeds it by 77 grains, and (*d*) by 137 grains.

THE ſpecific gravity therefore of the weak lime-water (*b*) is to that of fountain-water, nearly as 704 to 703; the ſpecific gravity of the ſingle lime-water (*c*) is to that of common water nearly as 329 to 328; and the double lime-water (*d*) is in ſpecific gravity to water nearly, as 186 to 185.

IT is obſervable, that the ſpecific gravities of the ſingle and double lime-waters (*c*) and (*d*) are conſiderably leſs than the ſpecific gravities of the ſingle and double lime-waters (*a*), and A. and B. mentioned *p.* 39. and 40. of my eſſay on the virtues of lime-water, *&c.* But if it be conſidered, that, in making the latter, a much leſs proportion of water was added to the quick-

quick-lime, than in making the former; it will appear that this difference of their ſpecific gravities does not infer any thing againſt the accuracy of the hydroſtatic balance; but clearly ſhews, that the ſtrength of lime-water varies according to the quantity of water poured on the quick-lime.

It may be worth while to obſerve, that the ſpecific gravities of the lime-waters, (*b*), (*c*), and (*d*) did not differ more than their taſtes. The firſt was weakeſt and leaſt diſagreeable; the ſecond was ſtronger; and the third ſtill ſtronger and ſomewhat pungent. Further, while the double lime-water (*d*) gave, in a few minutes, a copper-colour to ſilver, the weak lime-water (*b*) produced no ſenſible change upon it.

II. Having formerly found, that lime-water and claret wine, mixed together in a certain proportion, acquired a colour like that of gun-powder *, I thought, that by

* Eſſay on the virtues of lime-water, p. 47.

by mixing claret with different lime-waters, one might judge whether they were all equally ſtrong of the lime or not. The reſult of the experiments was, that one tea-ſpoonful of claret required four tea-ſpoonfuls of the lime-water (*b*); two and about one third of (*c*); and one and a half of (*d*), to give it the full gun-powder colour. Theſe experiments, tho' not ſo accurate as thoſe made with the balance, yet clearly demonſtrate a remarkable difference of ſtrength betwixt the above lime-waters.

III. TWENTY grains of ſalt of tartar being mixed with eight ounces and two drams of the weak lime-water (*b*), after it had ſtood five days on the lime, the mixture became immediately white and turbid, and ſoon precipitated a white powder; which, being ſeparated from the water by filtration, and dried, weighed $2\frac{2}{3}$ gr.

THE ſame quantity of ſalt of tartar, mixed with eight ounces and two drams of

of double lime-water, that had ſtood eight days on the lime, became conſiderably thicker and whiter than the former; and afforded rather more than ſeven grains of white powder.

THE ſame quantity of ſalt of tartar being mixed with eight ounces and two drams of the double lime-water (*d*), which had ſtood 24 hours on the lime, gave eight grains of a white powder.

IT was obſervable, that theſe three lime-waters retained the taſte of the lime, after being mixed with the ſalt of tartar, and this equally after precipitation as before it.

SINCE the earthy powder precipitated by theſe different lime-waters proceeds wholely, or almoſt wholely, from the waters, and not from the fixed alcaline ſalt; * theſe experiments ſhew beyond doubt,

O that

* What proves this is, that the calcarious matter, precipitated by mixing ſalt of tartar with lime-water, is greater or leſs, in proportion to the ſtrength and quantity of the lime-

that double lime-water may contain thrice as much lime, as lime-water made by pouring on quick-lime 512 times its weight of water.

IV. 1. MONDAY 24th December, at eight in the evening, I poured upon a dram of freſh calcined oiſter-ſhells, reduced to a powder, 520 drams of boiling water.

2. AT the ſame time, I poured upon a pound of the ſame calcined ſhells, eight pounds of boiling water.

3. TUESDAY, at eleven before noon, I poured fifty ounces of the lime-water N° 2. on nine ounces freſh calcined oiſter-ſhells; and, at eight in the evening, I filtered through brown paper theſe three waters, and put ſixteen ounces of each of them into a baſon by itſelf; and, having placed the baſons in a cloſet, where they might be

lime-water; but not in proportion to the quantity of the ſalt. Thus 12 grains of ſalt of tartar, mixed with four ounces of ſtrong lime-water, yielded as much of this matter as the ſame quantity of this lime-water mixed with 18 grains of the ſalt.

be pretty free from duſt, I let them ſtand 19 days. After this, I filtered the ſeveral waters through brown paper, and having collected the earthy cruſts, and dried them them well, I found, that No 1. afforded very near four grains, No 2. near 12 grains, and No 3. rather more than 13 grains.

ALTHO' theſe three lime-waters had, at the time they were filtrated, quite loſt their taſte; yet, obſerving that No 2. and 3. became turbid when mixed with ſalt of tartar, I added eight grains of this ſalt to twelve ounces of theſe two waters; and the white powder which was precipitated, when dried, weighed juſt one grain and a half.

HAVING filtered the lime-waters of No 2. and 3. into the ſame bottle, before I ſuſpected that any thing of the lime remained in them, it became impoſſible to know which of them afforded moſt of the calcarious powder precipitated by the alcaline ſalt, or whether it did not proceed

ceed wholely from No 3.; in which caſe ſixteen ounces of it muſt have contained 17 gr. of the earthy part of the lime, and No 2. only 12 gr.

Since No 2. and 3. were not quite free of the lime, although they had ſtood expoſed to the open air 19 days, and had loſt above $\frac{1}{4}$ by evaporation; it follows, that the ſureſt way of knowing the quantity of calcarious earth contained in lime-water, is to evaporate it, as Dr Langriſh did *: And if it be objected to this, that all water affords ſome earth when evaporated, the quantity of this may be determined by experiment; though in many waters it may well be neglected, on account of its ſmallneſs.

It has been argued, that quick-lime muſt, after many repeated affuſions of water, yield as ſtrong lime-water as at firſt; becauſe, as long as there remains any virtue in the lime, the water will extract it, and continue to do ſo till it has taken

* Phyſical Experiments on brutes, p. 11.

taken up as much of the lime as it can bear. But to this we cannot agree: For, though there is undoubtedly a certain degree of ſtrength which lime-water can never exceed; yet, in order to communicate to water this degree of ſtrength, ſlacked lime may not only be inſufficient, but repeated additions of quick-lime may be neceſſary; unleſs perhaps a very ſmall proportion of water is poured upon it. Quick-lime, freſh from the fire, yields its virtues more eaſily than when weakened by long expoſition to the air, or by many affuſions of water: The water muſt extract the virtues of the latter, while the former, by a ſort of exploſive force of its own, quickly impregnates the water. Nor is it to be wondered at, that quick-lime, freſh from the fire, ſhould, at firſt, impregnate water more ſtrongly with its virtues than it does afterwards. This is as eaſily conceived, as that boiling water ſhould extract more of the virtues of tea or coffee than cold water. The only difference is,

that

that the *menſtruum* in the latter caſe acts more powerfully, while in the former the ſubſtance to be extracted affords its finer parts more readily, and in greater abundance.

UPON comparing the experiments No I. with thoſe of No III. and IV. it appears, that the difference between the ſpecific gravities of different lime-waters and common water, is much more than the weight of the calcarious matter contained in theſe lime-waters: There muſt, therefore, be ſomething elſe beſides this earthy matter which quick-lime communicates to water, by which its weight is increaſed*. Perhaps

* As lime-water, after its earthy part has been precipitated by an alcaline ſalt, continues to taſte ſtrongly of the lime, it follows, that, beſides this earth, it contains ſome more active and ſubtile part, to which its taſte and virtues are chiefly owing: For we know that the calcarious matter of lime-water is perfectly inſipid and void of any other virtue than what all abſorbent earths poſſeſs. This active and more ſubtile part of lime-water ſeems to be ſeparated from its earth by the alcaline ſalt, which ſtrongly attracts and embraces it. And hence lime-water mixed with ſalt of

haps quick-lime may alſo, in ſome other way unknown to us, alter the ſpecific gravity of water. But whatever may be in this, it is evidently unreaſonable to deny, that lime-water is as much ſpecifically heavier than common water, as the hydroſtatic balance or other accurate experiments ſhew, becauſe we cannot account for this exceſs of gravity from any thing we know of the contents of lime-water. This is no leſs unphiloſophical, than if one was to doubt of univerſal gravity, beccauſe philoſophers have hitherto attempted in vain to account for it. If we miſtake not the matter much, the contrary has always been the opinion of mankind, *viz.* that every well atteſted fact is to be believed, although we are ignorant

of tartar does not loſe its taſte of the lime, by being expoſed to the open air. Does not a ſolution of a fixed alcaline ſalt in water, poured on quick-lime, ſeparate this ſubtile active matter of quick-lime from its earthy part, by ſtrongly attracting it? And do not ſoap-leys conſiſt of water and fixed alcaline ſalt united with this active part of quick lime, without any, or almoſt any, of its earthy part?

ignorant of its cauſe, or cannot ſhew the particular way in which it happens.

ENOUGH, it may perhaps be thought more than enough, has been ſaid, to ſhew, that the ſtrength of lime-water is very different, according to the different quantities of water poured on quick-lime. However, I muſt be allowed to ſay, that this point, which has been diſputed by my good friend, is of that conſequence as to deſerve to be fully cleared up; ſince to ſuch as drink lime-water, with a view to the cure of the ſtone, it is of no ſmall importance to know, how it may be prepared ſo as to have the ſureſt and ſpeedieſt effects. And as lime-water, injected into the bladder will undoubtedly diſſolve a ſtone lodged there; it is evident, that, after the bladder has been accuſtomed to the weaker lime-waters, or to theſe even ſoftened with a little ſweet milk, the diſſolution of the ſtone may be much haſtened, by injecting ſuch as are more ſtrongly impregnated with the virtues of the lime.

WITH regard to the lithontriptic powers of oiſter-ſhell and ſtone lime-water, I ſhall only ſay, that, as in a variety of experiments made during the courſe of ten years, I had always obſerved the ſuperior efficacy of the oiſter-lime water, I thought it to no purpoſe to make a new trial: Any one who doubts on which ſide the truth is, may eaſily ſatisfy himſelf. But, in making the experiment, the *calculi* ſhould either be immerſed in a large quantity of lime-water, or elſe it ſhould be renewed upon them every three or four days.

A

LETTER

TO THE

Rev. THOMAS BIRCH, D.D. Secret. R. S. from JOHN PRINGLE, M. D. F. R. S. incloſing two papers communicated to him by ROBERT WHYTT, M.D.F.R.S.

Pallmall-Court, St James's, Dec. 10. 1757.

SIR *,

ABOUT three weeks ago I put into your hands an extract of a letter I had then received from Dr Whytt, containing a poſtſcript to his obſervations on Lord Walpole's caſe, and ſlightly mentioning ſome doubts he had then about the juſtneſs of Dr Springsfeld's experiments

* Firſt publiſhed in the Phil. Tranſ. and read December 15. 1757.

ments with lime-water, from ſome trials he himſelf had made, upon reading that gentleman's curious treatiſe on the extraordinary lithontriptic quality of the waters at Carlſbad in Bohemia. Within theſe few days, Dr Whytt having favoured me with a full account of thoſe experiments, I have herewith ſent you his paper, in order, if you pleaſe, to lay it before the ſociety; which the author deſires may be done, in caſe theſe obſervations ſhould be judged uſeful.

THE other paper incloſed was ſent me by the ſame hand, to be likewiſe preſented to the ſociety, as a well-atteſted inſtance of the electrical power in the cure of a palſy. To the other teſtimonies I have ſubjoined what Dr Whytt ſays in his letter to me, by way of ſtrengthening the evidence. I ſhall only add, that ſince Mr Brydone, the author of this account, has omitted telling how long the patient has continued in perfect health ſince the operation, it appears ſhe muſt have been

welll

well for ſome months before the date of his paper; becauſe, before the end of laſt ſummer, Dr Whytt tranſmitted the ſame caſe to me, which I then returned, in order to have it drawn up in a fuller manner, and with other vouchers beſides the gentleman who performed the cure. The Doctor has been ſo good as to comply with my requeſt, having procured a more ample account of the circumſtances from Mr Brydone, and the atteſtation of two miniſters, beſides that of the patient herſelf *. My difficulties being thus removed,

* After this paper was read at the ſociety, Dr Pringle having acquainted Dr Whytt, that Mr Patrick Brydone had omitted, in his account, the name of the pariſh where the woman lived, the time when ſhe was cured, and alſo that he had not fully dated his paper; Dr Whytt ſome time after wrote to Dr Pringle, that having deſired Mr Brydon to furniſh him with theſe particulars, he had received for anſwer, "That the woman, on "whom the cure was performed, had lived all her life "in the pariſh of Coldingham, and for the laſt twelve "years in that town: That her father had died of the "palſy ſeven years ago, after having been ſubject to "that

ved, I believe I may now with freedom offer this very curious caſe to the attention of the ſociety. I am,

SIR,

Your moſt obedient humble ſervant,

JOHN PRINGLE.

" that diſtemper for ſeveral years: That the cure was " performed in his father's houſe as Coldingham, on " the 4th, 5th, 6th, and 11th days of April 1757, a " circumſtance he had noted down: That as to the date " of his paper preſented to the Royal ſociety, he only " recollects it was written ſome day in the beginning of " November laſt: But as the woman ſtill continued well, " he hoped the preciſe day of the month was no mate- " rial omiſſion." This letter to Dr Whytt is dated, Coldingham, January 9. 1758.

POST,

POSTSCRIPT

TO

Dr WHYTT's obſervations on Lord WALPOLE's CASE*.

" I Do not know, if it be worth while to
" obſerve, that lately, in making ſome
" experiments with different *calculi*, there
" was one almoſt as white as chalk, but
" of a leſs hard ſubſtance than the others;
" and which was not in the leaſt degree
" diſſolved or ſoftened by being infuſed
" twenty days in oiſter-ſhell lime-water,
" but yielded ſomewhat to a ſolution of
" Spaniſh ſoap in common water.

" FROM this experiment one may con-
" clude, that it is better to preſcribe both
" ſoap

* Read December 8. 1757.

" ſoap and lime-water for the ſtone, than " any one of them alone; and that, if " one of theſe remedies has failed of gi- " ving relief, the other ought to be tried: " for as the above white *calculus*, which " yielded a little to the ſolution of ſoap, " reſiſted lime-water; ſo there may " perhaps be others that are readily diſ- " ſolved by lime-water, but little affected " by ſoap.

" DR SPRINGSFELD'S experiments " with lime-water are ſomehow not juſt; " for in ſeveral *calculi* I have found the " diſſolving power of oiſter-ſhell lime-wa- " ter above eight times greater than he " makes it."

SOME

SOME

OBSERVATIONS

On the Lithontriptic Virtue of the Carlſbad waters, lime-water, and ſoap: In a letter to Dr JOHN PRINGLE, F.R.S. from Dr ROBERT WHYTT, F.R.S. and Profeſſor of medicine in the univerſity of Edinburgh.

SIR*,

FROM the experiments related in Dr Springsfeld's *Commentatio de prærogativa thermarum Carolinarum, &c.* which you were ſo good as to ſend me ſome time ago, it appears, that theſe waters are not only poſſeſſed of a very extraordinary power of diſſolving the ſtone, but that in

* Read, December 15. 1757.

this reſpect they greatly exceed lime-water.

(A) THUS, Dr Springsfeld having infuſed, for 14 days, in a heat of 96 degrees of Fahrenheit's ſcale, three pieces of the ſame *calculus*, each weighing 30 grains, in eggſhell-lime-water, the Carlſbad water, and in the urine of one who daily drank this laſt water, renewing theſe ſeveral menſtruums every day, he found, on the 15th day, that the *calculus* in the lime-water had loſt one grain, the *calculus* in the Carlſbad water ſix grains, and that in urine five grains.

(B) AGAIN, having divided another *calculus* into four parts, each of which was reduced to 80 grains, he put the firſt in oiſter-ſhell lime-water, the ſecond in Carlſbad water, and the third in the urine of a perſon who drank this water. After 20 days, during which time the menſtruums were renewed every day, and kept in a heat of 96 degrees, the dried *calculi* had

had loſt of their weight as follows: The firſt 3 grains, the ſecond 18 grains, and the third 14 grains.

ALTHOUGH I make no doubt that Dr Springsfeld, who appears to be a man of candour, as well as learning, has faithfully related the event of the experiments which he made; yet either the lime-water he uſed muſt have been very weak, or ſome other miſtake muſt have happened in his experiments: For in all the numerous trials I made, about fifteen years ago, of lime-water as a ſolvent for the ſtone, I always found its diſſolving power much greater than it appears in Dr Springsfeld's experiments. And as in theſe trials different urinary ſtones were uſed, it can ſcarcely be imagined, that it was owing to the peculiar hardneſs of Dr Springsfeld's *calculi*, that the lime water made ſo little impreſſion on them. However, to be ſtill further ſatisfied of this matter, I made the following experiments.

1. I put a piece of a very hard *calculus*, which I ſhall call *x*, weighing 80 grains, in oiſter-ſhell lime-water, renewing the lime-water every day, and keeping it in a heat between 90 and 106 degrees of Fahrenheit's ſcale. After 20 days, I took out the *calculus*; and having ſet it by for ſome days, till it was become quite dry, I bruſhed away all the rotten part of it, which was reduced to a kind of chalky powder, and found that the undiſſolved part of it weighed 57 grains.

2. At the ſame time a piece of another *calculus*, *z*, weighing 15 grains, was, after a like infuſion of 20 days in oiſter-ſhell lime-water, reduced to 10 grains.

3. I put a piece of *z*, weighing 14 grains, in a ſolution of half an ounce of the internal part of Spaniſh ſoap in nine ounces of water, and every third day renewed the ſolution, which was kept in a heat of about 60 degrees. After 14 days, I found the undiſſolved part not to exceed 11 grains.

4. A

4. A piece of white chalky *calculus*, *y*, weighing 30 grains, had near 4 grains of its ſubſtance diſſolved, by being 14 days infuſed as above in a ſolution of ſoap.

FROM N° 1. above, compared with Dr Springsfeld's exper. (B), it appears, that the diſſolving power of oiſter-ſhell lime-water is to that of the Carlſbad water as 23 to 18, ſuppoſing the *calculi* uſed in theſe experiments to have been equally eaſy to diſſolve.

N° 3. compared with Dr Springsfeld's exper. (A), ſhews, that the diſſolving power of a ſolution of the inner part of Spaniſh ſoap, in a heat of 60 degrees, is to that of the Carlſbad water, in a heat of 96 degrees, as 15 to 14.

FROM N° 4. compared with (A), the diſſolving power of ſoap is to that of the Carlſbad water only as 4 to 6; but it is probable, that had the ſolution of ſoap been kept in a heat of 96 degrees, its diſſolving power would, even in this experiment,

ment, have nearly equalled that of the Carlſbad water. It may, perhaps, be worth while to obſerve, that a piece of the white chalky *calculus* of N° 4. was not in the ſmalleſt degree diſſolved by lying in lime-water 20 days.

5. In exper. 19. of my Eſſay on the virtue of lime-water, a piece of *calculus*, *b*, weighing 31 grains, loſt 7 grains by being infuſed 36 hours, in a heat of above 100 degrees, in very ſtrong oiſter-ſhell lime-water. And in the ſame water, of a moderate ſtrength, another piece of *b* loſt, in the ſame time, 5 grains.

In this laſt experiment, the lithontriptic virtue of lime-water appears to be ſtronger than in N° 1. and 2. above; and greatly exceeds that of the Carlſbad water in Dr Springsfeld's exper. (A) and (B).

But although, from what has been ſaid, it appears, not only that lime-water, but alſo a ſolution of ſoap, diſſolves the ſtone

ſtone in cloſe veſſels as faſt, nay faſter than the *thermæ Carolinæ*; yet theſe laſt waters, when the *calculi* were ſo placed in open veſſels, that the water from the fountain might conſtantly flow along them, effected a much quicker diſſolution than lime-water or even ſoap-ley, or indeed any known *menſtruum*, except, perhaps, ſtrong ſpirit of nitre: For, in the firſt experiment made by Dr Springsfeld, a *calculus* of two ounces and a half was, in this manner, quite diſſolved in ſix days. From this experiment, compared with that of Dr Springsfeld mentioned above (B), it will be found, upon calculation, that the diſſolving power of the Carlſbad water, when it is allowed to flow conſtantly from the fountain along the ſtone, is nearly 39 times greater than when it is only poured freſh on the *calculus* once a-day*. What may have been the reaſon of this ſurpriſing difference of the lithontriptic power of the Carlſbad water in theſe different

* Vid. Eſſay on the virtues of lime water, edit. 2. p. 176. 177.

different circumſtances, I will not pretend to ſay. I think it can ſcarcely be accounted for from the gentle motion of the water along the ſurface of the *calculus*. Was it then owing to ſome very volatile active part, which the water quickly loſes, after being taken from the fountain?

But how great ſoever the diſſolving power of the Carlſbad waters may be, when they iſſue from the bowels of the earth; yet that they do not communicate a much greater diſſolving power to the urine than lime-water, will appear from comparing the two following experiments.

In Dr Springsfeld's exper. (A) above, the urine of a perſon who drank the Carlſbad waters, reduced, in 14 days, a piece of *calculus*, weighing 30 grains, to 25 grains. And in an experiment made by Dr Newcome, now Lord Biſhop of Llandaffe, who drank four Engliſh pints of oiſter ſhell lime-water daily, his Lordſhip's urine reduced, in four months, a

piece

piece of *calculus*, weighing 31 grains, to three ſmall bits, weighing in all ſix grains *. Whence it follows, that the diſſolving power of his Lordſhip's urine muſt have been to the diſſolving power of the urine of the perſon who drank the Carlſbad waters nearly as 35 to 65 †. But if we conſider, that the *calculus* infuſed in the urine of the perſon who drank the Carlſbad waters was kept always in a heat of 96 degrees, while in Dr Newcome's experiment, which was made during part of the autumn and winter, no artificial heat was uſed, it will appear probable, that the diſſolving power of his Lordſhip's urine was little inferior to that of the perſon who drank the Carlſbad waters; for lime-water, in a heat of 96 degrees, diſſolves the *calculus* at leaſt twice as faſt as in the common heat of the air in winter. Further, if it be attended to, that the quantity of Carlſbad waters drank e-

* Eſſay on lime-water, edit. 2. p. 208. &c.

† Ibid. p. 176. & 177.

very day before dinner is from ſix to eight lib. while his Lordſhip only drank four lib. of lime-water in 24 hours, it will follow, that whatever the different diſſolving powers of the lime-water and Carlſbad waters may be out of the body, yet the former ſeems, in proportion to the quantity drank, to communicate at leaſt an equal diſſolving power to the urine.

BUT without preſuming to decide certainly as to the comparative virtue of the Carlſbad waters and lime-water, I ſhall conclude with obſerving, that though the Carlſbad waters are leſs diſagreeable to the taſte, and may be drank in larger quantity than lime-water; yet this laſt may be drank equally good in all places, and at all ſeaſons of the year; which is not the caſe with the Carlſbad waters.

November 30. 1757.

AN

AN

INSTANCE

OF THE

ELECTRICAL VIRTUE in the cure of a PALSY.

By Mr PATRICK BRYDONE*.

ELIZABETH FOSTER, aged 33, in poor circumſtances, unmarried, about 15 years ago, was ſeized with a violent nervous fever, accompanied with an *aſthma*, and was ſo ill, that her life was deſpaired of. She recovered, however, from the violence of her diſtemper; but the ſad effects of it remained. For, from this time, ſhe continued in a weakly uncertain ſtate of health, till the month of July

* Read December 15. 1757.

July 755, when ſhe was again taken ill of the ſame kind of fever; and after it went off, ſhe was troubled with worſe nervous ſymptoms than ever, ending at laſt in a paralytic diſorder, which ſometimes affected the arm, ſometimes the leg, of the left ſide, in ſuch a manner as that theſe parts, though deprived of all motion for the time, yet ſtill retained their ſenſibility. In this condition ſhe remained till the ſpring 1756, when unexpectedly ſhe grew much better; but not ſo far as to get quite rid of her paralytic complaints, which, in cold weather, ſeldom failed to manifeſt themſelves by a numbneſs, trembling, ſenſation of cold, and a loſs of motion in the left ſide.

THIS paralytic tendency made her apprehenſive of a more violent attack; which accordingly ſoon happened: For, about the end of Auguſt, in the ſame year, her ſymptoms gradually increaſed, and, in a very ſhort time, ſhe loſt all motion and ſenſation in her left ſide. In

this

this ſtate ſhe continued throughout laſt winter, with the addition of ſome new complaints; for now her head ſhook conſtantly; her tongue faltered ſo much, when ſhe attempted to ſpeak, that ſhe could not articulate a word; her left eye grew ſo dim that ſhe could not diſtinguiſh colours with it; and ſhe was often ſeized with ſuch an univerſal coldneſs and inſenſibility, that thoſe who ſaw her at ſuch times ſcarce knew whether ſhe was dead or alive.

WHILST the woman was in this miſerable condition, obſerving that ſhe had ſome intermiſſions, during which ſhe could converſe and uſe her right leg and arm, in one of theſe intervals I propoſed trying to relieve her by the power of electricity. With this view, I got her ſupported in ſuch a manner as to receive the ſhocks ſtanding, holding the phial in her right hand, whilſt the left was made to touch the gun-barrel. After receiving ſeveral very ſevere ſhocks, ſhe found herſelf

ſelf in better ſpirits than uſual; ſaid ſhe felt a heat, and a prickling pain in her left thigh and leg, which gradually ſpread over all that ſide; and after undergoing the operation for a few minutes longer, ſhe cried out, with great joy, that ſhe felt her foot on the ground.

THE electrical machine producing ſuch extraordinary effects, the action was continued; and that day the woman patiently ſubmitted to receive above 200 ſhocks from it. The conſequence was, that the ſhaking of her head gradually decreaſed, till it entirely ceaſed; that ſhe was able at laſt to ſtand without any ſupport; and on leaving the room, quite forgot one of her crutches, and walked to the kitchen with very little aſſiſtance from the other. That night ſhe continued to be well, and ſlept better than ſhe had done for ſeveral months before, only about midnight ſhe was ſeized with a faintiſhneſs, and took notice of a ſtrong ſulphureous taſte in her mouth; but both faintneſs and that taſte

went

went off, upon drinking a little water. Next day, being electriſed as before, her ſtrength ſenſibly increaſed during the operation, and when that was over, ſhe walked eaſily with a ſtick, and could lift ſeveral pounds weight with her left hand, which had been ſo long paralytic before. The experiment was repeated on the third day; by which time ſhe had received in all upwards of 600 ſevere ſhocks. She then telling us that ſhe had as much power in the ſide that had been affected as in the other, we believed it unneceſſary to proceed farther, as the electricity had already, to all appearance, produced a complete cure. And indeed the patient continued to be well till the Sunday following, *viz.* about three days after the laſt operation; but upon going that day to church, ſhe probably catched cold; for upon Monday ſhe complained of a numbneſs in her left hand and foot; but, upon being again electriſed, every ſymptom

tom vaniſhed, and ſhe has been perfectly well ever ſince.

Coldingham,
Nov. 1757.

PATRICK BRYDONE.

THAT the above is a true and exact account of my caſe, and of the late wonderful cure wrought on me, is atteſted by

ELIZABETH FOSTER.

I was eye-witneſs to the electrical experiments made by my ſon on Elizabeth Foſter, and ſaw with pleaſure their happy effects. By the bleſſing of God accompanying them, from a weak, miſerable, and at ſometimes almoſt an inſenſible ſtate, ſhe was, in a very ſhort time, reſtored to health and ſtrength; of which the above is, in every reſpect, a true account.

ROBERT BRYDONE,
Miniſter of Coldingham.

EXTRACT

EXTRACT

OF A

LETTER

FROM

Dr WHYTT to Dr PRINGLE, relating to this account: Dated *Edinburgh*, 1ſt *December* 1757.

SOME days ago, I had tranſmitted to me Mr Brydone's account (incloſed) of the ſucceſs of the electrical ſhocks in a paralytic patient, atteſted by the patient herſelf, and by Mr Brydone's father, who is miniſter at Coldingham, in the ſhire of Berwick. At the ſame time I had a letter from the Reverend Mr Allan, miniſter of Eyemouth, (in the neighbourhood), informing me, that he had examined the

patient particularly, and found Mr Brydone's account to be perfectly true. He further informs me, that he never obſerved the electrical ſhock ſo ſtrong from any machine as from Mr Brydone's. It ſeems, that gentleman has not only applied himſelf to the ſtudy of natural philoſophy, but alſo of medicine.

ROBERT WHYTT.

CASES

CASES

OF THE

REMARKABLE EFFECTS of BLISTERS,

IN

Leſſening the Quickneſs of the Pulſe in Coughs attended with Infarction of the Lungs and Fever.

First Publiſhed

In the PHILOSOPHICAL TRANSACTIONS, Vol. 50. Part 2.

CASES

OF THE

REMARKABLE EFFECTS of BLISTERS,

IN

Leſſening the Quickneſs of the Pulſe, in Coughs attended with Infarction of the Lungs and Fever *.

ONE of the moſt natural effects of bliſtering plaiſters, when applied to the human body, is to quicken the pulſe, and increaſe the force of the circulation. This effect they produce, not only by means of the pain and inflammation they raiſe in the parts to which they are applied, but alſo becauſe the finer particles of

* Read February 16. 1758.

of the *cantharides*, which enter the blood, render it more apt to ſtimulate the heart and vaſcular ſyſtem.

THE apprehenſion, that bliſters muſt in every caſe accelerate the motion of the blood, ſeems to have been the reaſon why ſome eminent phyſicians have been unwilling to uſe them in feveriſh and inflammatory diſorders, till after the force of the diſeaſe was a good deal abated, and the pulſe beginning to ſink. However, an attentive obſervation of the effects which follow the application of bliſters in thoſe diſeaſes, will ſhew, that inſtead of increaſing, they often remarkably leſſen the frequency of the pulſe. This I had occaſion formerly to take notice of *, and ſhall now evince more fully by the following caſes.

I. A widow lady, aged about fifty, was ſeized (December 1755) with a bad cough, oppreſſion about her ſtomach and breaſt, and a pain in her right ſide, tho' not

* Phyſiological eſſays, p. 69.

not very acute. Her pulſe being quick, and ſkin hot, ſome blood was taken away, which was a good deal ſizy: Attenuating and expectorating medicines were alſo preſcribed. But as her complaints did not yield to theſe remedies, I was called on December 26th, after ſhe had been ill about ten days; at which time her pulſe beat from 96 to 100 times in a minute, but was not fuller than natural. I ordered her to loſe ſeven or eight ounces more of blood, which, like the former, was ſizy; and next day, finding no abatement of her complaints, I adviſed a bliſter to be applied, in the evening, to that part of her right ſide which was pained. Next morning, when the bliſter was removed, the pain of her ſide was gone, and her pulſe beat only 88 times in a minute, and in two days more it came down to 78. However, after the bliſtered part became dry, the pulſe roſe in in one day's time to 96, and continued between that number and 90 for four days;

days; after which I ordered a large bliſter to be put between her ſhoulders. When this plaiſter was taken off, her pulſe beat under 90 times in a minute; and next day it fell to 76, and the day after to 72. The cough and other ſymptoms, which were relieved by the firſt bliſter, were quite cured by the ſecond.

II. JOHN GRAHAM bookbinder in Edinburgh, aged thirty-ſeven, of a thin habit of body, formerly ſubject to coughs, and thought to be in danger of a *phthiſis pulmonalis*, having expoſed himſelf unwarily to cold in the night-time, was, about the end of January 1756, ſeized with a bad cough and feveriſhneſs; for which he was blooded, and had a diaphoretic julep, a pectoral decoction, and a mixture with *gum. ammoniacum* and *acetum ſcilliticum*, given him by Mr James Ruſſel, ſurgeon-apothecary in this place. On the 12th of February, after he had been ill above a fortnight, I was deſired to viſit him.

him. He ſeemed to be a good deal emaciated; his eyes were hollow, and cheeks fallen in: He was almoſt conſtantly in a ſweat; coughed frequently, and ſpit up a great quantity of tough phlegm, ſomewhat reſembling *pus*: His pulſe beat from 112 to 116 times in a minute. In this condition I ordered immediately a bliſter to be applied between his ſhoulders, which leſſened in ſome degree his cough and ſpitting, as well as the frequency of his pulſe; but the bliſtered part no ſooner began to heal, than he became as ill as before, and continued in this bad way nine or ten days, gradually waſting with continued ſweats, and a great ſpitting of a thick *mucus*. During this time he uſed *tinctura roſarum*, and the mixture with *gum. ammon.* and *acet. ſcillit.* without any ſenſible benefit, and had ſix ounces of blood taken away, which was very watery, and the *craſſamentum* was of a lax texture. In this almoſt deſperate condition, another bliſter,

larger than the former, was put between his ſhoulders, which remarkably leſſened his cough and ſpitting, and in two or three days reduced his pulſe to 96 ſtrokes in a minute. After this he continued to recover ſlowly, without the aſſiſtance of any other medicine, except the *tinctura roſarum*, and the mixture with *gum. ammon.* and *acet. ſcillit.* and at preſent he enjoys good health.

III. Mrs. ——, aged upwards of forty, who had for ſeveral years been ſubject to a cough and ſpitting in the winter-months, was, in October 1756, ſeized with thoſe complaints in a much greater degree than uſual; to remove which ſhe was blooded, and got ſome attenuating and pectoral medicines from Mr John Balfour, ſurgeon apothecary in Leith. I was called on November 11th, after ſhe had been ill ſeveral weeks, and found her in a very unpromiſing condition. She had a frequent and ſevere cough, with great

great ſhortneſs of breath and wheezing; her lungs ſeemed to be quite ſtuffed with phlegm, of which ſhe ſpit a vaſt quantity every day, and of ſuch an appearance, that I was apprehenſive it was, in part at leaſt, truly purulent. When ſhe ſat up in a chair, her pulſe beat above 130 times in a minute. She had a conſiderable thirſt, and her tongue was of a deep red colour, with a beginning aphthous cruſt on ſome parts of it. She was ſo weak, and her pulſe ſo feeble, that there was no place for farther bleeding: A bliſter was therefore applied to her back, November 11th, which ſomewhat lowered her pulſe, and leſſened the ſhortneſs of breathing and quantity of phlegm in her lungs. November 16th, a ſecond bliſter was laid to her ſide, which gave her ſtill more ſenſible relief than the former, and reduced her pulſe to 114 ſtrokes in a minute. November 25th, a third bliſter was applied to her back, by which her cough and wheezing were rendered conſiderably

ſiderably eaſier, and the phlegm which ſhe ſpit up, loſt its purulent appearance, became thinner, more frothy, and was much leſs in quantity. Her pulſe beat now only 104 times in a minute. After this her cough and ſpitting increaſing again, ſhe had, on the 20th of December, a fourth bliſter applied to her back, which, like the former, did her great ſervice. Her ſtomach being extremely delicate, I ſcarce ordered any medicines for her all this time, except a cordial julep, with *ſpir. volat. oleoſ.* tincture of rhubarb as a laxative, and a julep of *aq. roſar. acet. vin. alb.* and *ſyr. balſam.* of which laſt ſhe took two table-ſpoonfuls twice or thrice a-day in a quarter of a pint of lint-ſeed tea. After the fourth bliſter, ſhe drank for ſome time a cup-full of *infuſum amarum* twice a-day, and continued to recover ſlowly: And though during the remaining part of the winter ſhe was, as uſually, a good deal troubled with a cough,

yet

yet in the ſpring ſhe got free from it, and is now in her ordinary health.

IV. CHRISTIAN M'EWEN, aged twenty-one, had laboured under a cough, thick ſpitting, pain of her breaſt, and pains in her ſides affecting her breathing, for about a twelve-month: And after getting, by proper remedies, in a good meaſure free from thoſe complaints, her cough, from catching a freſh cold, increaſed to a greater degree than ever, became hard and dry, and was attended with a conſtant difficulty of breathing, pain in her left ſide, and headach. After having been ſeven or eight days in this condition, ſhe was admitted into the Royal Infirmary, January 9th, 1757. As her pulſe was ſmall, though very quick, *viz.* beating 130 times in a minute, I thought it unneceſſary to bleed her, as from former experience I did not doubt but that bliſtering alone would relieve her. I ordered, therefore, a large bliſter to be applied to her left

left ſide, where ſhe complained of pain, and preſcribed for her the following julep:

R. Aq menth ſimp. ſpirit. Minderer. ana unc. iij. acet. ſcillit. unc. i. ſacchar. alb. unc. ij. Miſce; cap. coch. ij. ter. in die.

She was alſo deſired to breathe frequently over the ſteam of hot water, and to drink lintſeed-tea.

JANUARY 10th. Her pulſe beat only 112 times in a minute, and was ſomewhat fuller than on the 9th. The bliſter was not removed till late in the evening, and made a plentiful diſcharge. The cough having been ſo ſevere laſt night as to keep her from ſleep, I ordered her the following anodyne draught.

R. Spirit. Minderer. unc. ſs. acet. ſcillit. drach. i. ſyr. papav. alb. drach. vi. Miſce; cap. hor. ſomni.

JAN. 11th. The cough eaſier laſt night; difficulty of breathing leſs; pulſe 108 in a minute. Ordered the anodyne draught

to

to be repeated, and the uſe of the julep, with *acet. ſcillit.* to be continued.

JAN. 12th. Pulſe ſlower; cough and pain of the ſide eaſier; but ſtill complains of a headach.

JAN. 13th. Pulſe 94 in a minute; cough continues eaſier in the night, but is troubleſome in the day-time.

JAN. 14th. Every way better; pulſe only 80 in a minute. As her cough is ſtill bound, ordered her, beſides the medicines above mentioned, a pectoral decoction of *rad. alth. &c.*

JAN. 15th. Cough and other complaints in a great meaſure removed: Pulſe 65 in a minute.

FROM this time her cough gave her little trouble; but on the 18th ſhe complained of a pain in the *epigaſtrium*, with ſickneſs at ſtomach, want of appetite, and a giddineſs in her head, which were conſiderably relieved by a vomit, *infuſum amarum*, and ſtomachic purges; and were almoſt wholely cured by the return of her

her *menſes* on the 5th of February, after an interval of eight weeks.

V. A girl of twenty-one months old, who had (December 1756) a great load of the ſmall pox, and not of a good kind, with a cough and obſtructed breathing, was, on the ſeventh day from the eruption, bliſtered on the back; by which the pulſe was leſſened from 200 to 156 ſtrokes in a minute. Next day her legs were alſo bliſtered, and the pulſe thereby fell to 136. But the child's lungs being much oppreſſed, and her throat being ſo full of puſtules that ſhe could ſcarce ſwallow any thing, ſhe died towards the end of the ninth day.

I could add ſeveral other caſes of the remarkable effects of bliſters in leſſening the quickneſs of the pulſe in coughs attended with fever, pain in the ſide, and pituitous infarction of the lungs: But thoſe above may be ſufficient to

put

put this matter out of doubt, as well as to remove any prejudice that may ſtill remain againſt the free uſe of ſo efficacious a remedy.

In a true peripneumony, eſpecially where the inflammation is great, repeated bleeding is the principal remedy, and bliſters early applied are not ſo proper. But when the peripneumony is of a mixed kind; when the lungs are not ſo much inflamed as loaded with a pituitous matter; when bleeding gives but little relief; when the pulſe, though quick, is ſmall; when the patient is little able to bear evacuations, and the diſeaſe has continued for a conſiderable time: In all theſe caſes bliſtering will produce remarkable good effects, and, far from increaſing, will generally leſſen the frequency of the pulſe, and fever, more ſpeedily than any other remedy.

On the other hand, when the fever and frequency of the pulſe proceed from a true inflammation of the lungs, from

large obſtructions tending to ſuppuration, or from an open ulcer in them, bliſters will be of leſs uſe, nay, ſometimes will do harm, except in the laſt caſe, where they, as well as iſſues and ſetons, are often beneficial, though ſeldom able to compleat a cure. But as in pituitous infarctions of the lungs, with cough and fever, repeated bliſters applied to the back and ſides are far preferable to iſſues or ſetons, ſo theſe laſt ſeem moſt proper in an open ulcer of the lungs. The former make a greater and more ſudden derivation, and are therefore adapted to acute caſes; the latter act more ſlowly, but for a much longer time, and are therefore beſt ſuited to chronic diſeaſes. Further, while bliſters evacuate chiefly the ſerous humours, iſſues and ſetons generally diſcharge true purulent matter, and on this account may be of greateſt ſervice in internal ulcers.

In what manner bliſters may leſſen the fever and frequency of the pulſe attending internal inflammations, I have elſewhere endeavoured

endeavoured to explain (*); and ſhall only add here, that in the caſes above recited, where the quick pulſe and feveriſhneſs proceeded more from a pituitous infarction than a true inflammation of the lungs, bliſters, by relieving this organ, in ſome meaſure, of the load of humours oppreſſing it, would render the circulation through its veſſels freer, and conſequently leſſen the quickneſs of the pulſe and other feveriſh ſymptoms.

It may not, however, be improper briefly to point out the reaſon why bliſters, which have been obſerved to be remarkably efficacious, even when early applied, in pleuriſies †, are leſs ſo in true peripneumonies. This difference, I imagine, may be accounted for from there being no immediate communication between the pulmonary veſſels and thoſe of the ſides and back, to which the bliſters are

* Phyſiological Eſſays, p. 69.

† Dr Pringle's Obſervations on the diſeaſes of the army, part 3. chap. 2.

are applied; whereas the *pleura* and intercoſtal muſcles are furniſhed with blood-veſſels from the intercoſtal arteries, which alſo ſupply the teguments of the *thorax*: So that while a greater flow of ſerous humours, and alſo indeed of red blood, is derived into the veſſels of the external parts, to which the veſicatories are applied, the force of the fluids in the veſſels of the inflamed *pleura*, or intercoſtal muſcles, muſt be conſiderably leſſened. Further, as the intercoſtal muſcles and *pleura* are, as well as the teguments of the *thorax*, ſupplied with nerves from the true intercoſtals, bliſters applied to the back and ſides may perhaps, on this account, alſo have a greater effect in relieving inflammations there than in the lungs, which have nerves from the eighth pair, and from the intercoſtals improperly ſo called.

Edinburgh, May 23.
1757.

EX-

EXTRACT

OF A

LETTER

FROM

Dr WHYTT, Profeſſor of Medicine in the Univerſity of Edinburgh, and F. R. S. to Dr PRINGLE, F. R. S.

Edinburgh, 10th Nov. 1757.

WHAT you remark with regard to bliſters being freely uſed by the phyſicians at London, in the caſes mentioned in the paper I laſt ſent you, is very juſt, and indeed what I knew; but although their efficacy in ſuch circumſtances is now generally acknowledged both in England and Scotland, yet I do not remember that their remarkable quality in leſſening

leſſening the quickneſs of the pulſe has been particularly attended to. This, therefore, I thought it might not be amiſs to aſcertain by a few careful obſervations.

I agree intirely with you, as to the uſe of bliſters in fevers; being of opinion, that when there is no particular part obſtructed or inflamed, they are of little ſervice, and ſometimes hurtful, unleſs perhaps towards the end, when the pulſe begins to ſink. Nay, in fevers, where the ſubſtance of the brain is affected, and not its membranes, I have never found any ſenſible benefit from bliſters: And I always ſuſpect the brain itſelf affected, when a fever and *delirium* come on without any preceeding headach, or redneſs in the *tunica albuginea* of the eyes. This kind of fever I have met with ſeveral times, and have obſerved it to be generally fatal.

THE END.

APPENDIX*.

An ACCOUNT of an Epidemic Diſtemper at Edinburgh, and ſeveral other parts in the South of Scotland, in the Autumn of 1758; in a Letter to Dr Pringle †.

Edinburgh, Nov. 10. 1758.

THE month of May, this year, was remarkably dry and hot. June was cold and dry. In July and Auguſt, we had but juſt as much rain as was ſufficient to bring forward the fruits of the earth: the air was temperate, or perhaps a little warmer than is common in Scotland during thoſe months. Towards the

* The twof ollowing papers having been omitted in making the collection, they are here inſerted by way of appendix. And as the contents was printed before theſe papers, it is hoped, that the reader will excuſe his not finding in it any references to them.

† Firſt publiſhed in vol. 2. of the London Medical Obſervations and Inquiries, in the year 1762.

end of Auguſt, and for the firſt week of September, the weather was warmer than uſual in that ſeaſon; but leſs ſo than at the ſame time in the preceding year. From the 8th to the 16th of September it was mild. From the 16th to the 20th, we had a ſtrong eaſterly wind, which, though not extremely cold, yet cooled the air conſiderably. During the whole month of September, and till the 8th of October, we had ſcarce a ſhower ſufficient to lay the duſt. On the 8th of that month, we had a violent wind from the north-eaſt with rain, which continued thirty hours. From the 8th to the 26th the weather was moſtly clear and froſty, with ſome gentle breezes. From the 28th of October to the 8th of this month, the winds have been ſoutherly, and accompanied with wet.

DURING the months of July, Auguſt, September, and October, the wind blew more from the eaſt than ever had been known before in this country, at that time

of

of the year. In Auguſt and September, we had ſeldom any ſtrong winds from the weſt as uſual; from whatever point they came, they were moderate; and although it was calm weather for many days together, yet, as far as I can recollect, there was not one foggy day during the autumn. The barometer was higher throughout September, and the greateſt part of October, than ordinary.

I thought it proper to lay before you this account of the weather, in order to judge how far any of the ſenſible changes of the air might influence the health of the people here. But, for my part, conſidering how remarkably mild and dry our ſeaſon was, I can hardly aſcribe the riſe of our epidemic to any of the known qualities of the air.

BEFORE I proceed to the deſcription of that diſtemper, it may be proper to take notice, that, during the months of July and Auguſt, a fever, with a bloody flux, raged in Lorn, and other parts of Argyleſhire;

ſhire; and was not only mortal among the common people, but carried off ſeveral perſons of a higher rank. The ſame diſeaſe prevailed no leſs at Newcaſtle upon Tyne, in Auguſt and September; and likewiſe at Haddington *, about the ſame time, but in a leſs degree. In the months of September and October, we had a bad ſort of ſmall pox at Edinburgh, and in other parts of this country. In ſome pariſhes near Cupar in Fife, eight died out of twenty-eight; and in ſome parts of Teviotdale, three or four died for one that recovered.

As for what I call the epidemic, it was firſt taken notice of in this city, ſoon after the change of the weather, upon the eaſterly winds, that blew from the 16th to the 20th of September: Several children began then to be affected with a ſlight degree of fever, attended with the common ſymptoms of a cold; but this was not thought extraordinary at that ſeaſon

* A town within twelve computed miles of Edinburgh.

ſon of the year. About the end of September, the diſtemper grew much more general, both here and in the neighbourhood; and in the laſt week of that month, in the ſpace of two or three days, thirty boys out of ſixty, at the grammar-ſchool of Dalkeith *, were ſeized with it. In the beginning of October, the ſickneſs became ſtill more frequent at Edinburgh, Dalkeith, and throughout a great part of the Lothians †. Old as well as young were taken ill: Nay, even women in childbed, who were not expoſed to the cold air, were affected; and in particular, I knew one, who had but juſt recovered of a dangerous fever after her delivery.

THE ſickneſs continued to increaſe in all the places above mentioned, till about the 24th of October, when it began to abate: But whether the decline was owing to any alteration in the air, or becauſe the diſtemper had already ſeized moſt people,

* A village four miles from Edinburgh.

† The ſhire of Edinburgh, and the two adjacent ſhires, ſo called.

I cannot determine; though the latter ſeems more probable, as I am perſuaded, that in Edinburgh, and the neighbourhood, not one out of ſix or ſeven eſcaped; and I am aſſured, that in ſome places it was ſtill more general.

HITHERTO I have only mentioned the riſe and progreſs of this epidemic here and in the places adjacent. I ſhall now, as far as I have been able to learn, inform you of the time of its appearance in other parts of the country. In Fife, about Kirkaldy, it was not obſerved till the firſt week of October: At St Andrew's, not till the 10th or 12th of that month. In Angus, it began ſooner. In Perthſhire, it raged moſt between the middle and end of October; and many died of it. In the ſhire of Air, and at Glaſgow, it was at the worſt after the middle of October. In Teviotdale, it began later. At Ormiſtoun, a village only four miles from Dalkeith, it did not appear before the 15th of October. And

at

at Whitburn, about half way between Edinburgh and Glaſgow, it was little taken notice of, till towards the end of that month. I have been informed, that the ſame kind of illneſs prevailed through Aberdeenſhire, and other parts in the North; but that, at the end of October, it had not reached the ſhire of Roſs. A gentleman told me, that in the Carſe of Gowrie *, in the month of September, before this diſeaſe was perceived, the horſes were obſerved to be more than uſually affected with a cold and a cough.

HAVING given you this ſummary account of the epidemic, I ſhall now more particularly deſcribe the ſymptoms. In general, people were differently affected. Some complained firſt of a ſlight ſore throat, with a feveriſhneſs; and, after a few days, they were ſeized with a cough. Many had a heavy dull pain in their forehead, with watery eyes; either a ſneezing or

* The name of a large vale, on the north ſide of the river Tay, in Perthſhire.

or diſcharge at the noſe; but with little fever. Some, all at once, felt a ſoreneſs in the inſide of the *trachea*, as if that part had been excoriated. Others had a hard dry cough, without this ſoreneſs; but generally with a quick pulſe. Several were attacked with a ſlight *diarrhœa;* and others with bleedings at the noſe, ſometimes profuſe, and continuing for ſeveral days; till either by the hæmorrhage, or by opening a vein, the pulſe returned to its natural ſtate: For in all thoſe who had this ſymptom, the pulſe was not only quick, but, for the moſt part, remarkably full. Two of my patients were troubled with a ſevere pain over their whole head, but had little or no fever. In one, the head-ach becoming periodical, went off upon lying a-bed, encouraging perſpiration, and taking an electuary of the bark, with ſome glaſſes of claret: This perſon having weak nerves, could not bear evacuations. The other had his whole head bliſtered; leeches applied to the temples;

ples; took camphire, *tinctura ſacra*, and *laudanum;* but with little benefit. Sudorific boluſes of *gum. guaiac.* with *ſal ammoniac. volat.* ſeemed to do him moſt ſervice. After taking a few doſes of this medicine, the pain left his head, and ſeized the loins and right thigh, but more ſlightly, and then went off gradually; from whence it appears, that thoſe pains were of the rheumatic kind. Some complained of pains only in the cheek-bones, teeth, and ſides of their head. Others had a fever without a head-ach, ſore throat, or cough, or indeed any other ſymptom, in the beginning: But when the fever began to abate, as it uſually did in a few days, if the patient lay a-bed, more or leſs of a cough ſucceeded. In two patients, the cough ſeemed to be critical; for it no ſooner took place, than the pulſe returned almoſt to its natural ſtate. One of them, a married lady, aged about thirty, had been feveriſh for four days; a raſh or ſcarlet eruption appeared, but did

not come fully out; and as ſhe was reſtleſs and uneaſy, I was ſent for about ten at night. Her pulſe then beat 120 times in a minute, and was full; but as ſhe had a moiſture on her ſkin, I delayed ordering her any medicine, till I ſhould ſee her again in the morning. About midnight ſhe was ſeized with a troubleſome tickling cough, which hindered her from ſleeping. At half an hour paſt four, being called upon to ſee her, I found her ſkin cooler, her pulſe leſs full, and beating only 96 times in a minute. After this ſhe ſlept; and at eight in the morning, I found her pulſe down at eighty. Here it ſhould ſeem, that the morbid matter, not thrown off by the ſkin, had fallen upon the *trachea*; ſo that the cough might be ſaid to have been truly critical. Few, upon being taken ill, complained of any coldneſs or ſhivering, commonly the firſt feveriſh ſymptoms: However there were ſome, who were ſeized in a more violent manner, and with the *horror febrilis*; e-

ſpecially

ſpecially when, from want of care, they had a relapſe, which was often much more ſevere than the firſt attack.

In regard to your queſtion, whether the diſtemper was infectious or not? As far as I have obſerved myſelf, or been informed by others, our epidemic did not ſpread by contagion, from one perſon to another, like the plague, ſmall-pox, or meaſles; but ſeemed to be owing to ſome particular quality of the air. Thoſe who attended the ſick, were not more liable to be affected than others; and I myſelf eſcaped, notwithſtanding my viſiting many of the ſick, and being obliged to travel frequently into the country, and ſometimes in the night. I had no opportunity to obſerve, whether nurſes infected the children they ſuckled, or the infants their nurſes; but I do not believe they did, from what I remarked in other caſes.

As to the cure. In the beginning, when the diſeaſe was mildeſt, it generally yielded to lying in bed, keeping the body open with clyſters, and promoting ſweat by warm

warm diluent liquors. Afterwards, a higher degree of fever, which many had, required bleeding; and then the blood was almoſt always ſizy, even in thoſe who had no fixed pain, nor any conſiderable ſymptom, except heat, and a quick pulſe. In ſome, eſpecially among the country-people, the coat of the blood, inſtead of being tough, thick, and ſizy, was tranſparent like a jelly; the *craſſamentum* was of a looſe texture, and ſeparated but little *ſerum*. For the cough, and ſoreneſs of the *trachea*, the uſual medicines were ordered: But when the patients only complained of a dry tickling cough, attended with little or no fever, a doſe of *laudanum* at bed-time was the beſt remedy.

THOSE who expoſed themſelves too ſoon to the cold, before they had perfectly recovered, frequently relapſed, were often worſe than at the firſt attack, and generally required more bleeding. Many were ſo ſlightly affected, as to need no medicine at all.

FEW

FEW died of the diſeaſe, eſpecially when it firſt appeared, except ſome old people; or thoſe whoſe lungs had been greatly obſtructed, or long preſſed with phlegm. In ſuch caſes, beſides bleeding, when the pulſe required it, bliſters and boluſes of *gum. Ammoniac.* with *ſal. Ammoniac. vol.* were the chief remedies I uſed, with a ſlight pectoral decoction, or infuſion, acidulated with vinegar.

TOWARDS the end of October, and in the beginning of November, the diſtemper, eſpecially if neglected at firſt, became more dangerous, by falling on the lungs, *pleura*, or muſcles of the *thorax*. Then repeated bleedings were requiſite; and afterwards, bliſters to the parts affected had remarkable good ſucceſs.

IN ſome parts of the country, when the diſeaſe was not taken care of in the beginning, as being attended with no alarming ſymptoms, it aſſumed the form of a ſlow fever, which ſometimes proved mortal.

EXTRACTS

EXTRACTS of ſeveral LETTERS to Dr PRINGLE, relating to the uſe of the SUBLIMATE, in the cure of Phagedænic Ulcers *.

Extract of a Letter, dated Edinburgh, January 15. 1757.

WE have had ſeveral inſtances here, of carcinomatous or phagedænic ulcers of the face, cured by the Baron Van Swieten's medicine for the *lues venerea*; I mean the ſolution of the corroſive ſublimate in malt ſpirits †. We give it from one to two table-ſpoonfuls a day; and alſo direct the ſores to be waſhed with it. In one inſtance, by the internal uſe only, it cured a perſon, whoſe

* Firſt publiſhed in vol. 2. of the London Medical Obſervations and Inquiries, in the year 1762.

† Dr. Whytt always ſuppoſes this medicine to be made according to the proportions mentioned in the firſt volume of the London Medical Obſervations and Inquiries.

whole

whole face was over-run with a ſore of this kind; but the cure was not performed till after three months; during which time, the patient took between two and three quarts of that medicine.

Extract of a Letter, dated Edinburgh, March 17. 1757.

YOU having obſerved, in a former letter, that the word *phagedænic* was of a very vague ſignification, I have incloſed the caſes of two patients, taken from the regiſter of the Royal Infirmary: The one, of a carcinomatous ulcer on the cheek and noſe; the other, of an ulcer in the leg, of that kind commonly called ſcorbutic, which were both cured by the ſolution. We had another inſtance of the efficacy of that medicine ſtill more remarkable. A woman of Dalkeith, about fourteen years ago, happened to ſcratch

ſcratch a ſcab, or wart that grew on one of her temples; upon which, an inflammation or foreneſs of the part enſued, ſpreading over the whole face, eating away great part of the lips, and the point of the noſe; and running down upon the ſkin of her neck to the clavicle. This woman, by uſing three or four quarts of that mercurial, was, in the ſpace of three or four months, to appearance, cured; though the ſkin of her face ſtill looked as parts commonly do, after having been ſeverely burnt †.

I

* Dr Whytt gives the ſequel of this caſe, in a letter dated the 11th of November 1758, in theſe words: "The "woman of Dalkeith, whoſe head, face, and breaſt were "over-run with a *herpes exedens*, or phagedænic ſore, was "to appearance quite cured by the ſublimate; yet after "diſcontinuing it for ſome conſiderable time, the ſore be-"gan to break out again, but was ſoon checked, by re-"turning to the uſe of the ſolution; ſince which, ſhe has "been frequently threatened with a relapſe, but has al-"ways been able to prevent it by having recourſe to her "medicine."

I ſhall only trouble you at preſent with another caſe, of a man about 57, who was a patient of my own, and had a kind of cancerous ulcer on his noſe, near the inner angle of the eye. He had ſpit three weeks with the *pil. mercurial. Pharm. Edinb.* during which time the ſore became manifeſtly worſe. I made him waſh the part frequently every day, at firſt with the common ſolution; and afterwards, with a ſtronger preparation of the ſame kind, *viz. ſcrup.* i. of the ſublimate to a pint of ſpirits. At the end of three or four weeks, the greateſt part of the ſore looked better, had leſs of a granulated ſubſtance, and ſeemed to be growing well; but in other parts it appeared rather to ſpread. As he was going to the country, I gave him a quart of the medicine for internal uſe, and a ſtronger ſolution for external application; but ſince that time I have heard nothing of him. The ſore which this man had, was

of the kind called *herpes exedens*, *nome*, *noli me tangere*, or *ulcus depaſcens* *.

It

* Dr Whytt, in a letter dated 30th of April 1757, informed Dr Pringle, "That the ſame patient having been "with him two days before, he had been ſurpriſed to ſee "ſuch a change on the ſore for the better. That the rug-"ged malignant appearance was quite gone; and that in-"ſtead of *ichor*, the ſore afforded a thick, white, and well "concocted matter; had the colour of the moſt benign ul-"cer; and was contracted to leſs than half its former di-"menſions. That the patient having returned to the in-"ternal uſe of the ſolution, had taken another quart, at "the rate of a ſpoonful morning and evening. That the "medicine did not bring on a ſpitting, nor was attended "with any other inconvenience. That, at the ſame time, "he continued to waſh the ſore, twice a day, with the "ſtrong ſolution: And that, in order to obtain a complete "cure, the patient was directed to continue the medi-"cine for ſix weeks or two months longer, if the part was "not healed before that time."

Dr Whytt added, in a ſubſequent letter, "The man "who had the cancerous ſore, or *noli me tangere*, on the "*os unguis* of the right ſide of the noſe, grew much better "by the internal uſe of the ſublimate; but as he lived at "too great a diſtance from Edinburgh, he could not be "ſupplied with a freſh quantity, when he had exhauſted "that which he carried with him. However, by waſhing "the ſore daily with the ſtronger ſolution, he had conti-"nued a twelvemonth without growing worſe."

It would ſeem from this laſt caſe, compared with the others, that the ſolution has greater effects in curing theſe malignant ulcerations, when taken inwardly, than when uſed only as a topical medicine: from which one would be apt to conclude, that ſuch ſores do not intirely depend on a morbid ſtate of the part affected, but alſo on ſome fault in the blood, which being corrected by the ſublimate, the ulcers are ſoon healed.

The two caſes referred to by Dr Whytt, taken from the regiſter of the Royal Infirmary.

CASE I.

Edinburgh, Nov. 21. 1757. William Kermoth, aged 28 years, had ſeveral ulcers of a carcinomatous nature, on his cheek, noſe, and upper lip. The ulcer on the upper lip had eat quite through,

through, and the parts all about it were hard, and conſiderably ſwelled. That on the cheek, run up on the ſide of the noſe, very near as far as the internal *canthus* of the eye; a ſpreading inflammation, and thick hard ſcabs, were obſervable all round the ulcers; and they diſcharged a thick whitiſh matter in ſmall quantity, but of an offenſive ſmell. He ſaid they were occaſioned by his falling under ſome heavy load, by which he hurt his face.

At firſt, an emollient cataplaſm was applied to his cheek; and he took the *decoct. tamarind. cum trip. ſenn.* for a purge. Then he was put into a courſe of the ſolution of the ſublimate, taking one ſpoonful morning and evening, with the *decoct. lignor. Pharm. Edinb. lib.* ii. daily. For the firſt three days, theſe medicines griped him, and occaſioned a pain in his ſtomach; upon which they were intermitted, and he took, at bed-time, a bolus of twenty-five grains of rhubarb, with ſixteen drops of *laudan.* which removing

the

the gripes, he went on with the ſolution for about three weeks, when a ſwelling was obſerved on his right noſtril, and upper lip. His medicine was again intermitted, and took a bolus of jalap with calomel. The ſwelling going off in three days, the ſolution was renewed, and continued for about twenty-ſix days longer. By this time, the ulcer was almoſt intirely healed; but ſome hardneſs and ſwelling ſtill remaining upon the lip, the medicine was again interrupted, and, for ſix weeks, the patient was ordered the *pil. mercurial. laxant. Pharm. Edinb.* in the doſe of *drach. ſs.* every other night; after which, he ſeemed to be perfectly cured: For the ulcer ſkinned over, and nothing but a little hardneſs remained upon the ſide of the lip. He had no ſpitting during the long uſe of theſe mercurials.

CASE

CASE II.

EDINBURGH, September 12. 1756. Peter Moriſon, aged 56 years, about five years before his admiſſion, had a *cachectic* * ulcer upon the inner ancle of the left leg, which was apparently cured, but broke out again a few weeks after, and was never thoroughly healed; though, when he came into the Infirmary, the ſore was contracted, ſuperficial, and ſcarce diſcharged any matter. The whole leg was conſiderably ſwelled, eſpecially towards night; the parts around were hard and itchy, but never painful. He had alſo ſome aſthmatic complaints.

AFTER the patient was admitted, and was uſing ſome medicines for his aſthma, a common cauſtic was applied to the ſore.

When

* By a *cachectic* ulcer, is meant, one of thoſe ill-conditioned ſores with livid edges, commonly, but improperly, called ſcorbutic.

When the eſchar was thrown off, an ulcer appeared, about four inches in length, and two in breadth, with the edges blue and callous. By the conſtant uſe of fomentations, the ſwelling of the leg was conſiderably diminiſhed; but though he took mercurial purges, had the edges of the ulcer frequently ſcarified, dreſſed with *ung. Arcæi*, and waſhed with the tincture of myrrh, yet it continued in much the ſame condition. He took vomits of *ipecacuanha*, ſquill-mixtures, tar-water, and was bliſtered for his aſthmatic diſorder, but without ſucceſs.

About the 12th of February 1757, he began to take Van Swieten's ſolution of ſublimate, to *unc. ſs.* morning and evening, which agreed very well with him, made him ſweat plentifully, and conſiderably increaſed the quantity of his urine. By thirty days uſe of the medicine, the ſore healed up, though the ſkin remained tender; but the cough, difficulty

culty in breathing, and pain in the breaſt, continued.

Extract of a Letter, dated Edinburgh, Nov. 10. 1757.

THE ſolution of corroſive ſublimate lately diſſolved, in a ſhort time, a glandular knot, which roſe on the under part of the lower jaw, after cutting off a cancerous lip. Mr George Cleghorn, of Dublin, writes to me, that this medicine has been very ſucceſsful in venereal caſes; but he mentions an obſervation, which is new to me, *viz.* that in patients who are under no confinement, and walk abroad, the mouth is ſeldom affected; and the evacuation by the ſkin and kidneys, is much leſs than in thoſe who keep the houſe. He adds however, that the former are longer in being cured than the latter.

Extract

Extract of a Letter, dated Edinburgh, Jan. 27. 1759.

SINCE I wrote to you laſt, I received the incloſed account of the effects of the ſublimate in the caſe of Margaret Bruce, whom I ſaw at Cramond in November laſt; at which time I examined all the parts that had been once ſore, but were then perfectly healed by the uſe of that medicine, given her by Mr Spotiſwood, ſurgeon of that place. Although that gentleman's account of the cure would have been ſatisfactory enough, yet I had the truth of it confirmed by the Reverend Mr Gilbert Hamilton, miniſter of the pariſh; who, after reading the caſe drawn up by Mr Spotiſwood, delivered it to me. As this is one of the ſtrongeſt inſtances of the efficacy of the ſublimate, in curing thoſe obſtinate ulcers of the phagedænic kind, I thought it would be agreeable to you, to have the whole account

as it was delivered to me, with Mr Spotiſwood's letter on that occaſion.

Copy of Mr Spotiſwood's Letter to Dr Whytt; dated Cramond, Dec. 9. 1758.

SIR,

IN compliance with your requeſt, I have ſent you, incloſed, an account of the effects of the ſublimate in the caſe of Margaret Bruce, in which they were more remarkable than in any that I have yet ſeen.

I ſhall take this opportunity to acquaint you, that I have another patient, who, ſince the 17th of Auguſt laſt, has uſed fifty-ſix grains of that medicine. Before he began, he had a very ſordid ulcer in his noſe, by which the whole *ſeptum narium* was eat away; the noſe was ſwelled and painful, with a redneſs and inflammation externally. He had not taken

ken ſeven grains, before he was eaſed of the pain, and the ſore had a better appearance. I waſhed the parts with *aq. calcis* and *mel. roſar.* and dreſſed the ulcer with dry lint. By continuing this courſe, the diſcharge was leſſened, a ſtop was put to the corroſion, and the ulcer was cleanſed: But the external parts inflamed and ſuppurated, firſt on one ſide of the noſe, then on the other; and the two ulcers joining, moſt of the naſal bones came away. How this caſe may end, I cannot foreſee; but this I think remarkable, whenever the ſublimate is intermitted, the parts become more painful, diſcharge a greater quantity, and produce ſome bad *fungi*; but upon repeating that medicine, the appearances ſoon grow better. This man, by trade a miller, has ſcarce loſt an hour's work, or one meal, during the uſe of the mercurial. He took it when at harveſt-work, and is ſtill taking it, notwithſtanding the coldneſs of the ſeaſon. He complains

of

of being qualmiſh after each doſe. It acts as a laxative; but as for other evacuations, either by ſweet, urine, or *ſaliva*, they are ſcarce more than natural. He has a wife and ſeveral children all healthy; and I can ſee no reaſon to ſuſpect any venereal taint.

I am, SIR, *&c.*

R. SPOTISWOOD.

The Caſe of Margaret Bruce, referred to in the above Letter.

MARGARET BRUCE, a young woman of this pariſh, of mean condition, enjoyed a good ſtate of health, till the 18th year of her age, when ſhe was ſeized with convulſions of the epileptic kind, and other ailments. In January 1755, when ſhe was twenty-two, ſhe complained of violent pains in her right leg, attended with a hardneſs and ſwelling but without

without any appearance of matter, or inflammation. After ſeveral fruitleſs applications, I laid a bliſter along the *fibula*, which ſeemed to be the principal ſeat of the pain; but the bliſtered part, inſtead of healing, degenerated into a foul ulcer, which I could never bring to a good digeſtion; for it continually produced a whitiſh ſlough, which, if removed, was ſure to return in two days.

In the month of May following, my patient was ſent to the Royal Infirmary at Edinburgh, where ſhe ſtaid five months; and, during that time, had the ſore regularly dreſſed, and all means uſed to cure it. Among other attempts, the whole ulcerated part was deſtroyed by a cauſtic, and forty peas put into the cavity: She took many purges with calomel, the mercurial pills of the Edinburgh Diſpenſatory, and a decoction of the woods. But none of theſe medicines had any other effect than to make her void ſeveral worms; ſo

that

that ſhe was diſmiſſed about the middle of October not cured.

In the end of February 1756, ſhe was again ſent to the Infirmary, where ſhe continued upwards of three months, and was ordered ſome mercurial laxative pills, which affecting her mouth, ſhe ſpit, for ſome time, three pounds a day. She had an iſſue put in the inſide of the lame leg, which gradually widening, came at laſt to hold thirty peas. She was diſmiſſed again in the beginning of June, in a better condition, but ſtill far from being cured.

After this, ſhe uſed various other remedies, and, among others, ſea-water, for a conſiderable time, but without any benefit. At laſt obſerving, that none of all theſe methods promiſed a cure, I luckily thought of the ſublimate, as having had ſome experience of its good effects in ſimilar caſes. But, previous to the account of its ſucceſs here, it may be proper to deſcribe more particularly the ſtate

in

in which the patient was, when ſhe began to uſe this medicine.

THE oldeſt ſore, which broke out in January 1755, about three inches above the *malleolus externus*, upon the *fibula* of the right leg, was not broader than a crown piece, but had large callous edges, and the muſcular parts beyond them felt hard: This ulcer was round and foul at the bottom, without any great diſcharge; the *fungus*, which aroſe from it, though frequently cut away, was renewed in a few days.

THE iſſue, made at the ordinary place, on the inſide of the ſame leg, by the number of peas, and length of time, had fallen much lower, and had degenerated into a ſordid ulcer, of the ſhape of the figure 8, and with the ſame kind of indurations around it as in the other.

ABOUT May 1756, a glandular tumour, very painful, was formed at the upper part, and upon the inſide, of the thigh of the ſame ſide, which was ſometimes larger

larger and more uneaſy than at other times.

In October 1757, a ſore broke out upon the breaſt of the ſame ſide: This was ſuperficial, without any hardneſs about it, but always foul, and could not be healed.

In June 1758, two new ulcers broke out upon the ſame leg, which, though ſmall, were alſo always foul, and could not be cicatrized.

Around theſe ſores, and indeed almoſt all over the leg, the ſkin was of a blackiſh colour, with ſcurfs and ſcales, which ſoap and water could not remove. The whole leg was ſwelled, and felt hard; the patient complained of pains ſtriking through it; ſhe could not extend it, (tho' the tendons were not contracted), but went on crutches, with the limb ſuſpended, ſince May 1756. Notwithſtanding all theſe ailments, the want of exerciſe, and her low circumſtances, (for ſhe was maintained by the pariſh), the patient kept up her

fleſh,

fleſh, and was otherwiſe in better health than could have been expected.

Upon the 14th of September laſt, I began the ſublimate in this manner. I diſſolved ſeven grains in eight ounces of ſpring-water, and gave morning and evening a ſpoonful of this ſolution. The whole was taken in eight days. After three days intermiſſion, the ſame quantity was renewed, and continued for ſeven days longer, when the *menſes* coming at the uſual time, I forbore giving her the remaining ounce, till ſhe was in a proper condition to take it; and, on that account, ſhe was five days without any medicine. She vomited after the two firſt doſes; and all the reſt occaſioned a *nauſea* and ſickneſs, with a burning heat from her ſtomach to her throat, but no vomiting. She had few ſtools, till the third day after taking the ſolution; but, from that time, ſhe had more or leſs of a purging; ſome days, ſix or ſeven motions, on others, not half that number. She ſometimes com-

plained of ſharp gripings, but more generally of a rumbling in the bowels. After the ſecond doſe, a copious ſweat broke out, particularly on the ſore leg, which was never known to perſpire before. From the fourth day after ſhe began the ſolution, ſhe ſpit about three or four pounds a day; but although ſhe complained of a pain in her teeth, her tongue, and *fauces*, yet the ſwelling of thoſe parts was much leſs than what is obſerved in a ſalivation raiſed by calomel, and her breath was much leſs offenſive. In five days after ſhe began the courſe, ſhe made twice her uſual quantity of water, which was of a deep colour, and depoſited a large ſediment.

ALL theſe evacuations, *viz.* the ſtools, the profuſe ſweats, the increaſed quantity of urine, and the ſpitting, not only continued while ſhe was uſing the medicine, but for a fortnight after.

THE effects it had upon the ulcers were no leſs remarkable. In four days from her

her beginning, the two ſores that had broke out laſt upon her leg, and that on her breaſt, were perfectly healed; the other two ulcers on the leg looked cleaner, the callous edges, and hardneſſes round them were diminiſhed, the blackneſs of the ſkin diſappeared, the muſcles felt ſofter, the glandular tumour was leſs, and the patient ſaid, ſhe had not been ſo eaſy and free from pain ſince the firſt breaking out of her ſores. In ſhort, in eleven days from the uſe of the ſublimate, the two remaining ulcers were perfectly healed, and all the dreſſings removed: After which, the ſkin, where the ſores had been, caſt off ſeveral different cruſts or coats, and the cure was compleated.

THE patient was much weakened by her great evacuations; but ſhe has now recovered a good degree of ſtrength, the ſkin is whole, the leg without ſwelling or pain, and ſhe walks without any ſupport.

To The Medical Library
University of Glasgow
from the author

PRACTICAL OBSERVATIONS

ON THE

INTERMITTENT FEVER OF PERU.

SUBMITTED TO THE

MEDICAL FACULTY OF THE UNIVERSITY OF GLASGOW.

BY

MATHIE HAMILTON,

LICENTIATE OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW;
FORMERLY
SURGEON TO THE POTOSI, PAZ, AND PERUVIAN MINING COMPANY;
HONORARY MEMBER OF THE GLASGOW UNIVERSITY
MEDICO-CHIRURGICO SOCIETY, &c.

"Nullum se cognovisse remedium, quin solo tempestivo usu tale fieret."—*Boerhaave.*

GLASGOW: JAMES HEDDERWICK & SON,
PRINTERS TO THE QUEEN.
1842.

INTRODUCTORY REMARKS.

While in Peru, I had ample opportunities for observing Intermittent Fever, in all the types of that singular disease. I left London for Peru in 1825; and, during several years, was engaged in extensive practice, both civil and military; for, besides attending the English and other foreign residents in the towns of Tacna and Arica, I was much employed by the Spanish American population, and for a considerable period had to take charge of large bodies of troops, and the military hospital in Tacna: which city is the capital of the province, and distant 40 miles from the seaport town of Arica. After residing chiefly at Tacna, during some years, and having visited Europe, I returned to Peru, and was again engaged in practice in Tacna, during the years 1833–34–35. When opportunity offered, I crossed the Andes, and visited some of the more notable localities in that extraordinary portion of the globe: one journey included a circuit of nearly 2,000 miles, in which the cities of Oruro, Potosi, Chuquisaca, and Arequipa, were seen, and other places where Intermittent Fever prevails. It may also be stated, that, so far as is known, I was the first practitioner who recommended the use of oleum ricini to the native population in the province of Tacna or Arica. This may seem more worthy of notice, now it is known that the Palma Christi grows in the valley of Asapa, near Arica. Prior to my arrival in Peru,

the sulphate of quinine was either unknown among the people in the province of Tacna, or it had been given in a few cases only by a casual visitor. The price which was paid for quinine in Peru, about that time, was enormous. In 1827, what I took from London being exhausted, some was purchased from a vessel then at Arica, for which I paid 25 silver dollars, or above five pounds sterling per ounce; and in March 1828, the wholesale price of the sulphate of quinine, in Lima, "very much adulterated," was twice its weight in gold, being 34 dollars per ounce: but when in Lima, in 1836, I was then offered there sulphate of quinine at *three* dollars an ounce.

In such a country as Peru, it is hardly possible to obtain correct statistical information on any subject; the vast extent of territory and scattered population—its condition, as relates to education, insulation, and other circumstances, all combine to frustrate the attempts of the statist or philanthropist, who endeavours to meliorate or remove existing evils. Though Peru and Bolivia include an extent of country equal to above nine hundred thousand square miles, being more than ten times the whole island of Great Britain, yet the whole population is within three millions, or little more than that of Scotland at the present time. The average number of deaths annually in Peru, is much greater than is experienced in the temperate climes of Europe; for though, in the former, the prudential or preventive checks to population, which have been noted by Malthus, are almost inoperative, yet some of his positive checks are terribly effective; for in that vast region, which is the scene of the following Essay, the yearly deaths are understood to be not less than six per cent. of the whole population. This rate of mortality is known to be that of Lima, the capital of the state, for there, one out of every seventeen dies annually; and there is every reason to believe, that in most other districts along the coast, it is not any less, being three times that of London, and four times that of some rural districts in Britain. Various attempts

were made to obtain statistical reports on a number of interesting topics, but in vain; one only was given to me, which is a list of births, deaths, and marriages, for the year 1834, in a parish in S. Peru, in a comparatively healthy locality, the population of which was within 6,000:—

Births, . .	Spaniards Baptised, . .	62	
	Other Classes, . . .	293	
			355
Deaths, . .	Adults, ...	199	
	Infants, ...	124	
			323
Marriages, ...		42	

All who died under 7 years were classed as infants; but there is reason to believe, that the above report did not include the whole number of infants *buried*, for the rate of infantile mortality, among the lower classes in Peru, is very great—a result of bad management as relates to ingesta, want of cleanliness, &c. and they seldom desire any medical advice in infantile cases.

The properly qualified physician, who attempts to practise among the native population in Peru, must soon discover that he does not recline on a bed of roses. It is not only disease, often in some of its most appalling forms, which he has to encounter; neither is it journeys of 100 miles or more, and the consequent toilsome days and sleepless nights which, of course, are incident to practice in such a country: these are not the most annoying circumstances which must be grappled with by every one who would faithfully discharge his professional duties in Southern Peru.

It is necessary to contend with ignorance and deeply-rooted prejudice, on the one hand—with individual and class interests, on the other; all of which are combined, and brought to bear in active co-operation against any one who would innovate on the established modes of attempting to relieve suffering humanity.

Among Peruvians, there are many peculiar notions, or aphorisms, connected with the practice of medicine; a few of which it may be well to notice, both because

they have a noted influence on a large portion of those who practise the healing art in that region, and also, because there is reason to believe that the points of medical faith referred to, have a direct and powerful tendency to augment the annual mortality-bill in Peru, and thus inflict irreparable evil on the community.

A few only of these aphorisms will be here stated, such as, "son iritantes los purgantes," *purgatives are irritants;* "veneno es el mercurio," *mercury is poison;* "la sangre es la vida," *the blood is the life;* "el enfermo evacua porque sana, y no sana porque evacua," *the alvine discharge from the patient is the result, and not the cause, of his convalescence.*

Such are the sort of opinions entertained, not only among the people, but also by many of those gentlemen who take charge of the public health in Peru; who, without any want of charity, may be supposed to have derived such opinions more from tradition and musty records of olden times, than from observations made in the chambers of the sick, or the study of modern writers on the theory and practice of medicine.

In Peru, it is not expected that medical men should perform the operations of sanguineous depletion, or of dental surgery. Barbers are the operators in such cases; and if, in a case of emergency, a medical man does his duty, by operating instanter, he may lose caste among the vulgar, who will say, "el no es medico, barbéro no mas," *he is only a barber!* Neither is it understood that a practitioner should dispense medicines; and in the present state of chemical and pharmaceutical knowledge there, the occasional consequences may easily be imagined. These remarks are not speculative, neither are they indited with any unkindly feeling; it is merely touching a subject which is fraught with most important results to Peruvian society.

Both climate and prejudice prevent *post mortem* inquiries; so that if those authors who are celebrated for their works on morbid anatomy, had lived in Peru, such works could not have been given to the world.

CAUSES

OF

INTERMITTENT FEVER IN PERU.

Neither the design nor the limits of this Essay will admit of a prolix inquiry into the remote, predisposing, and proximate causes of this division of the order Febres; but it is necessary briefly to notice some facts illustrative of the subject.

Though the coast of Peru, extending above 20 degrees of latitude, is within the torrid zone, yet the temperature is much lower than might be expected, more especially on the coast of Southern Peru, which is more immediately under consideration. Throughout the whole of that vast region, included between the mountains of the Western Cordillera on the one hand, and the Pacific Ocean on the other, Fahrenheit's thermometer is seldom seen so high as 90 in the shade. The average temperature of day and night, for several years, at Tacna, was 64. That city is in about 18 degrees south latitude, and stands in the desert between the Andes and the sea. The cause of such moderate heat, is the trade wind and the proximity of the Andes, many of whose summits are covered with perennial snow and ice; while the region under review is shaded from the beams of a tropical sun by dense clouds, which, during the greater part of the year,

envelope an immense tract of country in which Intermittent Fever prevails. Throughout that territory, there are a number of straths, or valleys, which extend from the mountains, more or less, towards the sea. Some of those valleys are beds of rivers, or torrents from the Andes, and are the only localities inhabited on the coast of Peru, that region being almost a continuous sandy desert; for in those vast solitudes between the valleys, there is no water, vegetation, nor inhabitants, neither is there beast, bird, reptile, nor insect, to be seen, nor anything which exhibits the principle of life; but the valleys where there is water, teem with life—there vegetation is exuberant; and at all seasons, vegetable matter is more or less in a state of decomposition.*

The vegetable malaria seems to be more concentrated and deadly at some localities than others; for the valleys of Moquegua, Tambo, and other places, which are inland, at a distance from the sea and above it, are peculiarly destructive of health. Thus it appears, that the pestiferous atmosphere of those places, cannot be a result of the decomposition of sea water, and the production of sulphurated hydrogen from that source, as is *supposed* to be the case on the west coast of Africa. Though drainage has proved useful on the Peruvian coast, as at Pisco and Arica, yet it appears, that a marshy soil is not requisite for the formation of the remote cause of Intermittent Fever.

The valley of Tambo, at the place where the river is commonly crossed, on the rout to Arequipa, is, with reason, dreaded by travellers, particularly during the months of Autumn. The writer was one of a party of eight men, who were obliged to remain a day and two nights at that fatal spot, in March 1828, seven of whom were attacked by Intermittent Fever at various dates, of from three days to three weeks, after leaving Tambo. There was no marsh at that place; but there were a number of cuts from the river

* Vide Note A.

for the conveyance of water to the sugar plantations in the vicinity. The soil at the halting station, appeared to consist of the decomposed vegetable matter of ages; and at some parts, slime was turned up by the horses' feet, which emitted a horrid, sickening stench, worse than that of animal matter in a state of putrefaction, and like to induce syncopy in the rider. After sunrise, when on the rout from the place, a thick white haze was seen floating on the ground, to the height of several fathoms from the earth's surface; which haze probably contained the volatile vegetable matter, or exciting but hidden cause of Intermittent Fever, which was conveyed into the system through the medium of the gastric, or respiratory, or other organs of those subjected to its operation.

Both Remittent and Intermittent Fevers are endemic in some of the profound valleys (quebradas) among the Andes, at considerable elevations above the level of the sea, where heat and moisture are such as to exhibit vegetation and putrefaction of the same. I have seen ague in the profound valley of the Pilcomyio, and also in that of the Cachimyio. Both these rivers originate among the mountains of the eastern or great internal Cordillera of the Andes of Bolivia, near Potosi, and are sources of a branch of the great river Plate. Intermittent Fever, of a malignant type, is very prevalent in the province of Larecaga, on the banks of the Tipuani, at the part so much celebrated for the gold found in its channel. That river runs along the eastern slope of the Eastern Andes, and, uniting with the Beni, ultimately joins the great river Amazon. The gold washings are 400 miles inland from the Pacific Ocean; and a numerous population being resident there, Intermittent Fever and Dysentery are very fatal, notwithstanding its elevation.

Intermittent Fever is not endemic on any part of the immense region, or table-land, which lies between the Eastern and Western Cordilleras of the Andes in Bolivia. There, the climate is too rigorous; little vegetation of any sort is seen; and in some places

where barley is reared, it does not grain;* but cases of ephemeral ague may be seen. I have witnessed such cases in the cities of Oruro, Potosi, and Chuquisaca. The former place is 12,400 feet, and the house in which I lived in Potosi (Achavel's, in la calle de Comercio) is 13,500 feet above the sea; and in it I have seen Intermittent Fever. In such localities, the disease appears in those only who have had ague before, and have been at places where vegetable miasms exist. These attacks of ephemeral ague are induced by the depressing passions, bursts of anger, error in diet, or, in fine, by whatever has the effect of diminishing the energy of the nervous system. It is probable that the remote cause of Intermittent Fever is often created, both in streets and within doors, on the coast, or wherever vegetable matter is allowed to accumulate and putrify. In such circumstances, and in the absence of sanitory police, it is the duty of medical men, or any one who is aware of the evil, to denounce it, and recommend its removal.

Ague is not often seen among the crews of the numerous vessels which now frequent the coast of Peru. They generally sleep on board, and thus escape the malady. Were the poison of miasmata susceptible of being conveyed by wind to even a fraction of the distance mentioned by a late writer on malaria,† we should see its effects more frequently on board the vessels which remain at anchor in the roadstead of Arica, where they, in some cases, are during months within half-a-mile of the land; but perhaps the want of moisture in the air is the cause why miasmata, on this coast, are not more transportable by the land breeze. Europeans, on their first arrival in Peru, are not so liable to Intermittent Fever, as they are after a residence of some time in the country. Prior to the poison taking effect, it seems that a weakening process must have been going on, that the energies of the system must have been diminished, before the effects

* *Vide* Note B. † *Vide* M'Culloch.

of the malaria are developed. It appears to operate more readily on those persons who are predisposed by exhaustion, fatigue in travelling, defective nutrition, the depressing passions, or any sort of intemperance. The disease is most apt to attack those who travel along the coast of that region, who have to endure excessive fatigue and privation both from want of good food, and bad water; also, sleeping on the ground, and other circumstances, which predispose the system for the reception of the poison; and, unfortunately, it is experienced at the only places where travellers can in most cases halt during the night. Troops are peculiarly exposed to the remote cause of Intermittent Fever in Peru: they have to travel on foot, in that debilitating climate, carrying arms, &c. and often sleeping on the ground, which is most injurious, and, if possible, ought always to be avoided. Troops, more especially after defeat, or when baffled in military operations, have exhibited Intermittent Fever and Dysentery in their most aggravated forms.

It may not be expedient here to enlarge on the proximate cause of Intermittent Fever. Whether it consists in a morbid state of the capillaries, or is an affection of the nerves, by the operation of the poison of malaria on the respiratory system, supposed to come from the medulla spinalis, and of those which govern the circulation, that is, the ganglionic, or great sympathetic, may best appear by merely noting the symptoms of the disease.

Symptoms of Intermittent Fever in Peru.

The symptoms of this branch of the class Pyrexiæ, as seen in Peru, are exceedingly varied in different individuals—a result of idiosyncrasy and other circumstances; for though those who suffer from ague there, generally exhibit the cold, the hot, and the sweating stages of the disease, yet these are much modified by a variety of causes, which will appear more fully in the sequel. The intelligent practitioner

there, will soon know that he should act with caution in announcing his diagnosis, especially among the common people; for many cases of sickness, which at first seem slight, soon assume a very different aspect; and if he rashly answers in the negative, to the query that may be put to him at *first*, by the patient or others, "hay terciana?"—is it ague? he is apt to be considered by them, "un ignorante, que no sabe-nada,"—an ignoramus, who knows nothing.

Intermittent Fever there, is often accompanied with a diseased state of the hypatic system, either functional or organic, or both. It is seldom that in a case of ague there, the biliary vessels are in a healthy condition: there is a want of tone in the body generally, and, during the cold stage, there is defective secretion and excretion.

Many of the more ordinary ailments which, in the temperate zone, excite little apprehension, often terminate, in Peru, in severe ague. A common catarrh or pectoral affection, an attack of indigestion or a torpid state of the bowels, and other such like accidents, are often followed by Intermittent Fever. It also frequently happens, that the febrile affection, concomitant on acute inflammatory attacks, assumes the intermittent form, instead of the usual febrile type of the disease.

The symptoms of tertian ague are not, in general, so severe in old cases as in those of recent date; but the cases of quartan ague seen in South Peru, are often both of long duration and terribly severe.

The single tertion is most frequently experienced, and in many cases is exceedingly afflictive, not unfrequently assuming the quotidion form, and presenting a putrid type. It is worthy of notice, that the disease is generally met with under a much milder form in the north of Peru, and even in the latitude of Lima, which is in 12 degrees, than it is 5 or 6 degrees farther south: it is a saying among the people there, "muy mortal es la terciana de Tambo,"—*the ague of Tambo is very fatal.* Men are most subject

to ague in Peru, for obvious reasons; but both sexes, and of all ages, fall under it.

When one who has never had the disease is exposed to the remote cause, while on a journey, though it may appear ultimately that he has caught the distemper, yet the symptoms are seldom developed while the excitement necessarily attendant on travelling by horse or mule, in those regions, continues: it is not till after the system is in a state of quietude, when the malady becomes unmasked, and is exhibited in a form without dubiety.

The patient may have complained, for some days, of nausea and loss of appetite and a confined state of the bowels. Those are generally the first symptoms of the disease, after exposure to the remote cause. A peculiar sensation in the præcordia is felt; and in some cases, but not in all, there is a dull pain in the cerebral region, repugnance to locomotion, with occasional yawning and stretching of the body; and now the patient feels alarmed. When an attack of ague is expected, it is the custom there for persons who have suffered from it, or who may have learned from others, to look at the finger nails, which are of a blue or livid hue before an attack; they also touch the nose with the back of the hand, to ascertain that the former is preternaturally cold, which are sure symptoms of an approaching paroxysm. A sensation of cold now creeps over the body. This is felt more especially in the spinal region; and in the commencement of the cold stage, there is often a feeling of something like vermicular motion in the spinal column. At this period of the attack, the patient, in some cases, is affected with severe vomiting; but this symptom appears most frequently in those who have not had ague before. The cold now increases all over the external surface, and the patient is generally in the supine position; the fingers feeling cold, are turned into the palm of the hand, which is clenched; and for a time he endeavours to retain his teeth fixed, but is soon compelled to submit to the violent involuntary

motion of the lower jaw. The pulse, at the beginning of the attack, is quicker than usual, but yields, or rather it shrinks, to touch; and during the more advanced and severe period of the cold fit, it in many cases is scarcely, if at all, to be felt at the wrist. The skin presents a cold, dry, rough surface; the lips are pale, eyes sunk, and the breath is cold; the tongue, which rarely can be seen during the shivering, feels cold in the mouth, and is void of taste; its nervous papillæ seem to have lost their function, and the features are shrunk, so as, in some cases, completely to change the countenance, while the chattering of the teeth, and the convulsive movements of the body, are most distressing. The state of the respiratory organs, during the cold stage of a severe attack, is a phenomenon which merits the notice of the physiologist, and is an important feature of the disease. When the shivering begins, the patient feels a constricting pain in the region of the thorax, which gradually gets worse with the increased difficulty of breathing, which, in some cases, is almost totally obstructed. Every inspiration causes acute pain, so that the patient endeavours to hold his breath. The inspirations are exceedingly small and rapid; and when respiration is most impeded, there is excruciating pain felt in the region of the spinal canal. In some cases this pain was severe, as if caustic had been applied to the dorsal and lumber regions; and at this period of the paroxysm, the urine has been involuntarily ejected from the bladder.

The dyspnœa and anxiety, with a feeble, short, dry cough, which during the cold fit are often experienced, cause great distress to the patient, and in some cases threaten a speedy termination to his sufferings; but gradually he feels less pain on inspiration, which is not so cramped; the circulation is again effective in the extreme vessels; and the urine is now voided, of a limpid appearance, but not in great quantity, while the other symptoms of this stage of the disease finally disappear. The duration and symptoms of the cold stage

depend much on various circumstances, such as age, the means at command for rendering proper aid, &c. Where the fit is allowed to run its course without assistance to the patient, it varies from half-an-hour to three hours or more.

This notice of the symptoms which are experienced in the cold stage of Intermittent Fever in Peru, is only an attempt to give a general idea of what has been observed. Though all these symptoms are not exhibited in every case, yet cases are seen, in which both the intensity and duration of the paroxysm exceeds what has been stated. A patient with ague, caught in Peru, has been seen on the deck of a vessel, and exposed, at his request, to the sun's rays at meridian, when about under the equator. In that position, with only the head shaded, he often remained several hours; and though heavily covered with clothes, suffered intensely from cold, dyspnœa, cough without expectoration, and pain in thorax and spinal region, feeling at times as if the thoracic and abdominal viscera had been drawn towards the spinal column; and when the shivering permitted, craved for hot drink to alleviate his sufferings from cold.

This patient was ill with ague several months after being on board. The case ultimately assumed the quotidian type, and seemed to yield to an alterative course of pill, hydrarg. and the continued use of a strong decoction of coffee, which was taken hot and without sugar.

Hot Stage.

The symptoms of the hot fit are so uniform in their appearance, and so well known, it may not be necessary to notice them in detail. Almost all the functions which had been in a manner dormant during the cold fit, are now in active operation; and that activity seems to increase with the increased energies of the respiratory organs. One symptom, which must strike every one who sees it, is the immense secretion and

developement of heat, which is exhibited, during a longer or shorter period, subsequent to the cold stage. Whence all this evolution of caloric? Can it be, that the blood, during the cold stage, having retained or accumulated its carbon, that accumulation is now given out, and, in accordance with a well-known law in chemistry, a corresponding heat is evolved in the system? Whatever may be the cause, the effect is of great consequence to the patient, who soon exhibits strong febrile symptoms, and the cerebral system is more or less affected. It is a notable circumstance, that, while during the cold stage the intellectual functions remain clear and collected, a marked difference now appears, for in very many cases delirium supervenes; and in almost every one in which the febrile symptoms are fully developed, the intellect is more or less obscured for a time. The first symptoms of the hot fit are, that the respiration becomes easier, and the pulse slowly increases in strength; the skin grows warm, but is still dry; the lips resume their natural appearance, and the countenance brightens. When the circulation has been re-established, the patient complains of pain in head and thirst, and desires cold drink, of which, if permitted, he would take more than it is proper to allow: there is now a copious flow of urine, which is highly coloured, and a brown-coloured sediment is precipitated.

The hot stage continues a longer or shorter time, according to circumstances, such as, proper medical treatment or otherwise—due attention to the patient by nurses; and, of course, much depends on the attack being of a mild or virulent nature.

Sweating Stage.

The hot fit disappears in that which follows, so gradually, that the patient is often not aware of perspiration on his face, till informed of the good news by those in attendance, and the now rapid diminution of the febrile symptoms.

The skin becomes cool; thirst is much lessened; the pulse is more natural, and the cerebral organ is now free of pain. The urine is voided in great quantity, and a copious alvine discharge is sometimes experienced, which is a favourable symptom; and, in some cases, the disease terminates in diarrhœa biliosa. The perspiration occasionally is excessive, and the smell is exceedingly offensive. The sweating stage continues, in some cases, during many hours—particularly so in the quartan type; and the patient often exhibits great prostration of strength at the termination of the fit, and requires to be assiduously watched: but in many cases he is able to attend to his ordinary business until the period of another paroxysm, which ought, if possible, to be prevented, and the morbid concatenation broken by proper treatment,—which will now be considered.

Treatment of Intermittent Fever in Peru.

Intermittent Fever in Peru, is presented in such a variety of forms, as to require from the physician the most vigilant attention, that he may be able to adapt his practice to the varied aspects in which the disease is exhibited to view.

The people of the country are exceedingly uniform in their treatment of patients in ague. There is, in most cases, no discrimination of pathological phenomena—a result of their unacquaintance with that mode of curation which is based on a competent knowledge of anatomical and physiological science.

When Intermittent Fever is developed in any one, the first thing commonly had recourse to, is the "*jeringa*" syringe, in the use of which, Peruvian females are adepts: they also are good nurses; the want of their humane assistance has been often felt in a military hospital. "*Lavativa* and *ayuda*" are household words in Peru; either of which terms is used for enema. These ayudas, or helps, are composed of simple materials, such as decoction of mal-

lows, with soap, oil, &c. The syringe used for adults is large and effective, and much faith is put in this method of acting on the primæ viæ. Where nothing is known about the valve of the colon, it is supposed that when an ayuda is administered, it must act directly on the digestive organs. After the bowels have been acted on in this manner, the patient is kept in bed, and, during the cold fit, heat in some form is applied to the inferior extremities, and warm drink is given, which is most eagerly sought by the patient.

While the hot stage is in progress, the treatment is reversed; for now cold liquid is most grateful, which is often water, with lemon or orange juice, and, what is most of all desired by the sick, a piece of ice in the cup; which, slowly imparting its frigorific effect, is much relished by the patient, during the burning heat and tormenting thirst now experienced. The quantity of cold drink which, in these circumstances, some patients would take, is very great, and should be regulated by those in attendance.

When the perspiration appears, it is the custom to give "*agua de sebada*," barley-water, or some other mild diluent not colder than the temperature of the air, and made agreeable to taste, with toast, or vegetable acid and sugar, or "*cremor*," supertartris potassœ. When the paroxysm is over, the patient is generally allowed some light food, such as "*caldo de pollio*," chicken-soup, arrow-root, &c. In the intervals between the attacks, the bark is given, and the most common form in which it is administered, is that called "la tintura de la quina," which is an infusion of cinchona, and in some cases a tepid infusion, or decoction of the same, is given in the form of enema.

When a person is taken ill, the prime indication is to prevent, if possible, the recurrence of the cold fit. To effect this, various means have been used; one is an emetic, at the time when the shivering is expected to begin—another is, to give opium; and, if time admits, quinine should be given—which is decidedly the better remedy, inasmuch as it generally cures the dis-

ease ultimately, and when taken in the form about to be noticed, it often, in a signal manner, broke the morbid concatenation which had been formed in the system; while such means as opium, emetics, &c. are merely palliatives, to give time for the administration of the cinchona in some form.

The quinine appeared to be more effective when combined with the muriate of ammonia and tincture of ginger, than when taken alone. This unchemical mixture was successful in some cases in which the bark, in powder, infusion, and decoction, and also the quinine by itself had failed. Whether it resulted from the mixture acting more efficiently as an antiseptic or a stimulant, or that it operated more immediately on diseased tissues or organs, the modus operandi is not known; but under its action, a number of obstinate cases, which had baffled other means, were cured.

RECIPE:—Sulphatis Quininæ, grana duodecem; Ammoniæ Muriatis, grana decem; Tincturæ Zingiberis, uncium; Aquæ, uncias septem. Misce et fiat mistura.

Of this mixture, two ounces should be taken at a time, one every half-hour, *commencing* two hours before the time when the cold fit is expected. If it is not rejected from the stomach, the anticipated paroxysm is generally prevented, and if it does occur, it is very slight. The quinine, with infusion of quassia, and an aromatic, is, in many cases, a most efficient remedy; but patients often object to it on account of its "*gusto*;" they say that quinine is "malo," but with quassia, it is "malissimo." In some cases, it is expedient to give the syrupus quininæ, especially to children.

Sulphus magnesiæ, along with quinine, may be given with advantage where it is wished to act gently on the primæ viæ. Quinine, in pills, should not be given to prevent a paroxysm of ague; for besides being a long time in the stomach, even when retained by that organ, they are often not digested, and are eliminated from the alimentary canal entire. The quinine maintained its popularity in Peru during a

short period only. During some time, it was sold at a great price, and was much adulterated, which, together with the belief, that in many cases it induces severe cephalic symptoms, such as tinnitus aurium, headach, deafness, and general restlessness,—these have had the effect of making it much less used than at first. The cinchona, in powder, is seldom used in Peru. That which is brought from Europe is said to be adulterated; and in Peru it is not convenient to reduce the bark to a powder sufficiently fine to be used with success in Intermittent Fever. Besides, the gastric organs are, in most cases, so exceedingly irritable, that the powder in any form is inadmissible. Therefore, the cinchona, in decoction or infusion, is generally used; and, when combined with a vegetable acid, of which there are various at command, it is more acceptable to most patients, and agrees better with the stomach, than the powder. The infusion may often, with benefit, be united with acidum sulphuricum; and, in some cases, where there is reason to believe that there is acidity in the stomach, magnesia, or the carbonate of potass, are excellent adjuvants; the latter being less irritating to a weak stomach than the subcarbonate.

In Peru, the cinchona should never be given along with milk to a patient with Intermittent Fever; nor should milk in any form be taken by one who is in a state of convalescence from that disease. Peruvians, even in health, view with horror such a mixture as that of milk or cream with strawberries, or any acid or subacid fruit; and any medical man who sanctions the use of "leche sobre el acido," would be considered "muy salvage"—*a very savage*. Though the decoction of bark is often used by the natives, the infusion is better, as the boiling drives off the aromatic principle, which seems to be useful. The *kind* used should always be the *red table-bark*, if it can be obtained, "*cinchona oblongifolia*," which grows on the eastern frontier of the department of La Paz. After the disease has been removed, it is requisite to per-

severe in using the quinine, or bark, in some form, during a considerable time. Relapses often occur, in consequence of not adopting precautions, some of which will be given in the sequel.

When an emetic is given to prevent a paroxysm, it should be administered at the moment when the cold stage threatens. In some cases it is effectual. Epecacuanha, or what is still better, as being more speedy in action, sulphas zinci, may ward off an attack; which is an important object gained, as it both saves strength and allows an opportunity for the adoption of those measures which are necessary for the favourable termination of the case.

Tartar emetic should never be given to patients under ague in South Peru, for it has a most injurious effect, inasmuch as it increases the nausea and irritability of the gastric organs, which are peculiarly characteristic of the disease, blisters to the epigastrium, fomentations, &c. often being of no avail.

When opium is taken for the purpose of warding off an attack, it should be given at the time, or rather a little previous to the accession, of the expected cold fit. It should not be given in substance, but in tincture, as in that form it is more prompt in action on the system. A full dose should be administered in hot water, as anything cold taken into the mouth at that juncture, may induce the evil which it is intended to avert. The opium, if retained in the stomach, frequently is effective.

During the cold stage, it was in some cases useful to operate on the spinal column by means of friction; but there are cases in which it would be dangerous to put the patient in the proper position for the operation, such is the degree of weakness exhibited. Care should be taken that the heat applied to the inferior extremities is not such as to scald or burn the parts; for in some cases, the state of collapse is such as to deaden the sensibility of the extremities.

When the hot fit has been formed, the iced drink is not only eagerly taken by the patient, but it has a

most soothing effect on the system generally, and seems to act as a sedative on the præcordia, alleviating the oppression there experienced; and it is also useful in accelerating diaphoresis, so much desired. The fever, in this stage, is often excessively severe; and in some cases, furious delirium supervenes. In such cases, the symptoms should be narrowly watched; and if the patient be of a robust or plethoric habit, and the pulse full and hard, vibrating to touch, blood should be abstracted, either from the arm or topically. But it should be kept in mind, that the disease may soon assume an atonic type, and that the abstraction of blood, in the Intermittent Fever of South Peru, is the exception, and not the rule, for conducting the cure of the disease.

When the febrile symptoms run high, with much pain in head and delirium, it is generally sufficient to apply cooling lotions to the forehead; and in the absence of more scientific means, cloths, rung out of iced water, or otherwise cold, is an excellent remedy. By such means, the relief given to the patient is truly gratifying, and the heat thus subducted is enormous.

The appearance of diaphoresis should be watched, and the cold drink withdrawn at the proper time, otherwise, the recurrence of the cold fit would be incurred; for a double attack is often a result of bad management on the part of the patient himself, or of those in attendance on him. During the sweating stage, it is desirable, if circumstances admit, to change the bed-clothes, taking care not to check perspiration. It has been ascertained that sheets made of cotton are better than linen ones in such an emergency. When perspiration has ceased, or nearly so, there is often an inclination for food; but great care should be taken not to allow any animal substance, such as flesh of any kind: the ordinary chicken-soup of the country, with toasted bread if desired, or sago, arrow-root, &c. is quite enough. Many a relapse is induced, and case protracted, by improper diet. When the patient is convalescent, then he may be permitted to take a

moderate allowance of fish, of which a variety of excellent quality are to be found all along the coast—particularly the corvinitas and casonsitas, "*Sciænula Sparulus*," and many others—which are both pleasant to taste and easily digested.

Fruits, on the coast of Peru, are numerous, of excellent quality and delicious flavour; but for patients suffering under Intermittent Fever, there are few which the physician should recommend—or rather, it is his duty to prohibit the most of these fine fruits to such patients, as they value health.

It is not necessary to mention all; but some of those to be obtained at Tacna may be named. There are grapes in variety; olives; paltas (*Laurus Persea*); sweet and sour oranges; sour and sweet lemons; mellons, of different sorts; limes; quinces; pears and apples; tunas, or Indian figs; ceruelas; bananas and plantains; citrons, and peaches of various kinds; the granadilla, or fruit of the passion-flower; nectorines; lucumas; figs of different sorts; and the chirimoya is brought from Asapa, a few leagues off,—it is a most rich and luscious fruit *(Anona Reticulata)*. But to those who are ill with ague in Peru, or who are convalescent from that disease, chirimoyas and melons, grapes, bananas, and other fine fruits, are most noxious. There are also pomegranates, and other fruits, at Tacna; strawberries of great size, and other fruits, are brought in a preserved state from Cochabamba; and pine-apples are sent down from La Paz.

For the convalescent from ague, none of all these fruits is better than the *sweet lemon;* it quenches thirst, and is peculiarly grateful. The vegetable acids are invaluable in such a climate, for combination with the diluents used, and especially with the infusion of bark. It is essential to attend to the condition of the hypatic system, along with other means. Small doses of submur. hydrarg. are exceedingly useful in exciting healthy action in the alvine canal. If such treatment is not adopted, in many cases, quinine or cinchona, in any form, will be given in vain; cases may not only

be protracted, but patients exhibit those symptoms of general dropsy which are often met with in Peru. In some cases, it is of consequence to remove mental anxiety, and to recommend a change of climate.

Bilious Remittent Fever is frequently seen in Southern Peru; and when it does not prove immediately fatal, it often terminates in the intermittent type of tertian, or quotidian; and, in some cases, it ultimately exhibits a decidedly septic diathesis in "*el fiebre perniciosa*" of the Peruvian.

The remittent type is generally severe there, and requires prompt and active treatment. The utter worthlessness of the "*medicine expectante,*" when applied in some cases of acute diseases, is well illustrated in Bilious Remittent Fever, as seen in Peru.

There is observed, in such cases, symptoms of the system being surcharged with bile; the pulse is full, hard, and bounding to touch; skin hot; tongue furred; severe pain in head, and often delirium; the urine is highly coloured, or, in the language of the country, "*muy incindido;*" obstinate constipation is generally a concomitant, and in many cases, vomiting is a distressing symptom of the disease. In such cases, neither the dogmas of the humoral pathology, the practice of Galen, nor the theories and practice of some modern professors, should influence the attendant physician. Blood should be taken from the system; not *two ounces*, which is a favourite quantity in Peru, but to a considerable extent; more or less according to age, habit of body, and other circumstances. The blood abstracted in such cases, often exhibits a yellow appearance, from the return of bile into the circulation. The bowels must be acted on with effect. After the larger intestines have been unloaded in the usual manner, by means of enemas, and gastric irritation soothed by the usual resources of art, means should be exercised to emulge the biliary vessels; for if the hypatic system and smaller intestines are not relieved from their vitiated charge, within forty-eight hours from the supervention of the above-noted symptoms, death generally ensues.

The submurias hydrarg. should be given, but not in large doses—five grains at a time is enough,—and afterwards oleum ricini, which, with the previous depletion, and warm bath, if it can be procured, is often attended with the wished-for result. If necessary, the cathartic may be repeated, or varied, as may be expedient, taking care not to induce hypercarthsis. The operation of the medicine removes an enormous quantity of feculent matter; in all, extremely offensive in appearance, &c. and in some cases, black almost as pitch. The quantity and appearance of these dejections has in some instances induced the beholders to discard their prejudices, to reverse their favourite adage, and to admit that "*el enfermo sana porque evacua.*" When the febrile paroxysm is abated, and the symptoms generally are such as to render expedient the administration of the quinine, or cinchona, it should be given without delay. By such means, it often happened that the patient, within a short period, exhibited perfect convalescence.

Peruvians often designate as tertian fever, various ailments in which the consecutive stages of Intermittent Fever are not observed. "*Terciana*" is a sort of family phrase in many parts of Peru; and in consequence of its frequent misapplication, it is the duty of the physician, in every case, to take and weigh evidence; otherwise, he may be led astray in the treatment.

Though cases are often thus misnamed by the patient or his friends, yet there are various affections to which residents there are subject, which, though they do not present all the symptoms observed in regular Intermittent Fever, yet require somewhat similar treatment, in so far as relates to the use of quinine or cinchona. *Terciana en la cabeza* (tertian in the head), a kind of hemicrania, with intermissions; *terciana boba* (or silly tertian), which is merely a slight febrile affection, returning at irregular intervals, but without the usual symptoms of ague; *terciana en el estomago* (tertian in the stomach), where the

gastric irritation concomitant on ague, is severe; *terciana en el ojo* (tertian in one eye); *terciana syncopal* (fainting or dumb tertian);—all these types of the disease are best treated by inducing healthy action in the alvine canal, and the use of quinine or bark. Terciana en el ojo, or tertian in one eye, is often a tedious malady. The treatment of it should always be conducted on *general principles.* When such a case is treated as only a local affection, signal failure is sure to follow. The eye is subject to paroxysms of pain at irregular intervals; and in some cases, especially where the patient exhibits a strumous diathesis, it becomes blood-shot, the relaxed vessels giving entrance to the red globules; and when seen by one who is not acquainted with the disease, it may be mistaken for acute ophthalmia. An instructive case was that of an English gentleman, a merchant at Tacna, who, in 1828, suffered from terciana in el ojo; his business being important, and not having patience under the usual treatment, a consultation on the case was held at Arica, off which port a man-of-war was stationed. The result of the consultation was, depletion from the arm; the temporal artery on the affected side was opened, and bled copiously; the vessels of the eye were divided, cataplasms and collyria were used, with other antiphlogistic means; but all in vain; the case was very protracted; but the patient recovered under the use of quinine, which was taken in a solution of sulphus magnesia, during a long period.* "Terciana syncopal," or fainting tertian, is a type of the disease, which came under observation, chiefly in Moquegua, during a short residence there. That city is distant 120 miles from Tacna, and 40 miles from the sea. It has a population of 10,000, and is situated in one of the most insalubrious localities in Peru. The valley is extremely fertile; vast quantities of grapes are reared; sugar also is grown, with fruits and vegetables in profusion. The place is watered by a river of some

* He is still in Peru.

magnitude, which is used for the plantations, by means of irrigation, with much ingenuity. But both the town and its vicinity are exceedingly unhealthy; and the rate of mortality, in all seasons, is great, and in some it is dreadfully so. There is reason to believe that the town might be made less deadly, by the enforcement of police regulations for the removal of offensive matters from streets and *corals* (court-yards); but, up to 1836, police there was none. One case of terciana syncopal may be noticed, which occurred in Moquegua in April 1835: it was that of a negro, aged forty, who managed an estate for a gentleman who lived in the town. This patient was in the field, as usual, in the morning, when he fell on the ground, and was conveyed on a mule to his master's house in town. When first seen after his arrival, he was more like a corpse than a living man; the pulse at the wrist was scarcely felt; skin cold and dry to touch; little or no shivering; and he could not articulate; but his vision and hearing seemed to be sound. On inquiring at the attendants, it appeared that there had not been any discharge, either from the bladder or rectum, since the attack.

The first thing done, was to put the patient into a warm bath, which seemed to operate like a charm, for the breathing became free, the pulse rose, and speech returned. It was now ascertained, that during several days prior to the attack, there had not been any movement from the alvine canal. Copious enemas were given, and several doses of cathartics, consisting of submurias hydrarg. cum pulvis rhei, and afterwards olium ricini. By these means, an enormous quantity of vitiated bile and other matters were voided; and, with quinine in the infusion of quassia, and good nursing, he was well within ten days from the time of attack. In this case there was no recurrence of the paroxysm. The patient, after being taken out of the warm bath, exhibited the hot and sweating stages; but being of a docile disposition, and willing to submit to the necessary treatment, he took freely of the quinine and quassia, and other me-

dicines which were given. It was stated, that such cases there are generally fatal, and that those who are so taken ill, are given up for lost. In this case, it appeared as if the warm bath and the efficient operation on the primæ viæ, were the more immediate means by which it had a favourable issue. This black man was of great value to his owner, for he was a slave; but he presented a physiognomy and a facial angle, which would have been admired even by Camper himself.*

All these types of Intermittent generally yield to cinchona in some form; but it must be noted, that cases occasionally appear, in which neither quinine nor bark can be made available, because there are individuals so constituted as to reject the cinchona, however it may be given. In these circumstances, it is incumbent on the physician to try something else. Coffee, in the form of infusion or decoction, has, in some cases, proved efficacious in the Intermittent Fever of Peru. One case which excited much notice at the time, in the locality where it occurred, was that of an English lady at Arica, in 1826. The cold fits were excessively severe, and vomiting accompanied every paroxysm. Both quinine and bark, in every known form, were administered during the intervals of attack, but were rejected by the stomach. No symptoms of gastritis were present; and as the patient was *enciente*, there was imminent danger from a continuation of the paroxysms, as the concentration of blood in the larger vessels, and pressure on the contents of the abdomen, are often excessive during the cold stage. A strong infusion of coffee was given a little before the expected cold fit. It was taken hot as could be swallowed, and was always retained. The type was single tertion, which was completely removed without any other medicine than the coffee and mild aperients. This patient lived in Peru during twelve years afterwards, without another attack of ague.†—

* No slaves have been imported into Peru during the last 20 years.

† She is now in England.

Coffee of superior quality grows in the department of La Paz.

In South Peru, many cases of chronic ague are seen, in which Intermittent Fever has been allowed to run its course, or has been badly treated. In such cases, dropsical affections, enlarged spleen, and indurated liver, come under observation. The treatment of such cases should be conducted with great caution, as in general the system has been much reduced. Mercurial inunction, emetics, and tonic regimen, attending to the state of the alvine canal, together with the use of the quinine or bark,—these seem to be of use in treating such cases, which are often very obstinate. Emetics seem to have the effect of exciting the absorbents to take up the effused matter, which is reconveyed into the circulation. The warm bath is also a useful adjunct; and by perseverance in such means, patients sometimes recover. Blood taken from the system in such cases, shows a deficiency both of fibrine and crassamentum: and sanguineous depletion should not be adopted, though it is a favourite operation in the hands of some native practitioners. Gentlemen who do not bleed nor use any antiphlogistic means in the treatment of pleuritis and other similar diseases, are exceedingly enamoured with "sangrias cortas," in numerous cases where patients are suffering from the sanguineous fluid being both deficient in quantity and deteriorated in quality. There is reason to believe that these "sangrias cortas," or *little bleedings*, effect more mischief in Peru, than all the evils which have been ascribed to Pandora's box.

Surely that man has much to answer for, who, with or without any medical education or knowledge of diseases, enters the chambers of the sick, armed with lancet or cupping instruments, and that he may appear to be doing something, or for the purpose of obtaining a paltry *fee*, abstracts *blood* from those who are in need of very different treatment.

Those attacks of ephemeral ague which are seen

in the elevated regions of Peru, are dangerous, and should be closely watched; for on those sublime heights there is a marked tendency in diseases to exhibit a sthenic type; both serous and mucous tissues very often presenting acute inflammation, which, if not promptly checked by timous depletion, generally has a fatal termination.

There, the cerebral and thoracic regions are peculiarly subject to inflammatory attacks; and it has been observed, that while diseases in those elevated districts never assume nor terminate in an Intermittent type, as is seen on the coast, yet a severe attack of acute inflammation is in some cases experienced subsequent to a fit of ephemeral ague. In such cases, no time is to be lost. The patient should be placed in the perpendicular posture, and bled from a large orifice, ad deliquium animi quamprimum. People in these mountainous countries endure the abstraction of blood better than those on the coast: altogether, the former are a more hardy race.

The scope of this essay does not admit a discussion of the question,—Are the vessels of an inflamed part in a state of contraction or dilatation? But experience proves that the most effective mode of checking an attack of acute inflammation, such as pneumonia, is to induce syncopy. Where that is effected in proper time, with other necessary treatment, it rarely happens that the case terminates in purulent infiltration and death.

It is of the utmost importance to discriminate between a sudden attack of inflammation, and the severe pain and constriction in the organs of respiration, which are experienced by almost every one who, for the first time, ascends to Bolivia from the coast, and who attempts to climb on foot when at a great elevation, either on the mountains, or some of the streets in Potosi, such as that which leads from the mint-house to the palace or cathedral in the Plaza. In the latter case, the pain in thorax and difficulty in breathing are removed by remaining a short time stationary.*

* *Vide* Note C.

Neither the use of arsenic, nor bleeding in the cold stage of Intermittent Fever, came under observation. Though many cases are very severe, yet the disease, if not complicated, seldom proves fatal under proper treatment; and as arsenic is apt to accumulate in the system, for that and other reasons it was not given; neither was it considered expedient to bleed during the cold fit. He must be a very bold man, who, in private practice in Peru, will carry into execution the experiment on a scale sufficiently extensive to warrant him thereon to found a system.

For the prevention of Intermittent Fever in Peru, attention to a few simple rules may be useful. The most important is, to avoid those localities noted for the existence of malaria; and when that cannot be done, residents should remain within doors in the morning till at least an hour after sunrise, avoiding unnecessary exposure to the dew of evening, and *never sleeping on the ground during night.* As a farther prophylactic against ague there, coffee for breakfast is better than tea or chocolate; and generous diet is of great importance. Beef, bread, wine, and water, of good quality, are very conducive to the preservation of health in Peru. Also, the hypatic and cuticular systems should if possible be maintained in healthy action, and all intemperance should be avoided.

Since the termination of the late fatal expedition to the Niger, some writers have suggested, that, had the bodies of those engaged in it been anointed with oil, the catastrophe might have been averted. An inference has also been drawn from what is recorded as having happened during the plague in London in 1665, and at Malta in 1804; but it should be noted, that the deaths on the Niger resulted from a disease not communicable by *touch,* but from fever, the remote or exciting cause of which is believed to be *malaria,* which may, and probably does affect the system through the medium of the sensorium, or the gastric or respiratory organs; so that it must be exceedingly danger-

ous to risk another expedition to explore the banks of the Niger, trusting to the inunction of the body with oil, or any such application.

Experience proves beyond a doubt, that in Peru, the malaria is more apt to affect those whose persons are in a filthy or greasy condition, than those whose habits or circumstances are such as to admit of personal cleanliness and a frequent change of apparel.

In conclusion, it may be remarked, that though residents in Peru are peculiarly exposed to Intermittent Fever, yet the beneficence of the great Author of nature, is richly displayed in the varied and efficient means which are there provided for alleviating and curing the malady; and though a wide field is presented for the exercise of the industry and ingenuity of man in the proper application of such means, yet, with all the experience and improved modes of application of the present time, it may still be allowable to adopt the words of the celebrated Leyden professor—"Nullum se cognovisse remedium, quin solo tempestivo usu tale fieret."

NOTES.

Note A.

I have known eight excellent crops of alfalfa (lucerne), obtained annually from the same spot, and that too, without the use of guano or manure of any sort.

In such cases, the soil consists of disintegrated volcanic rocks, with a portion of soda, and the irrigation, which is attended to most assiduously, is effected by means of water from the Andes, which, during a part of the year, is chiefly melted snow containing ammonia; these, with the solar heat in such a region, will explain to the chemical agriculturist this extreme fertility.

Note B.

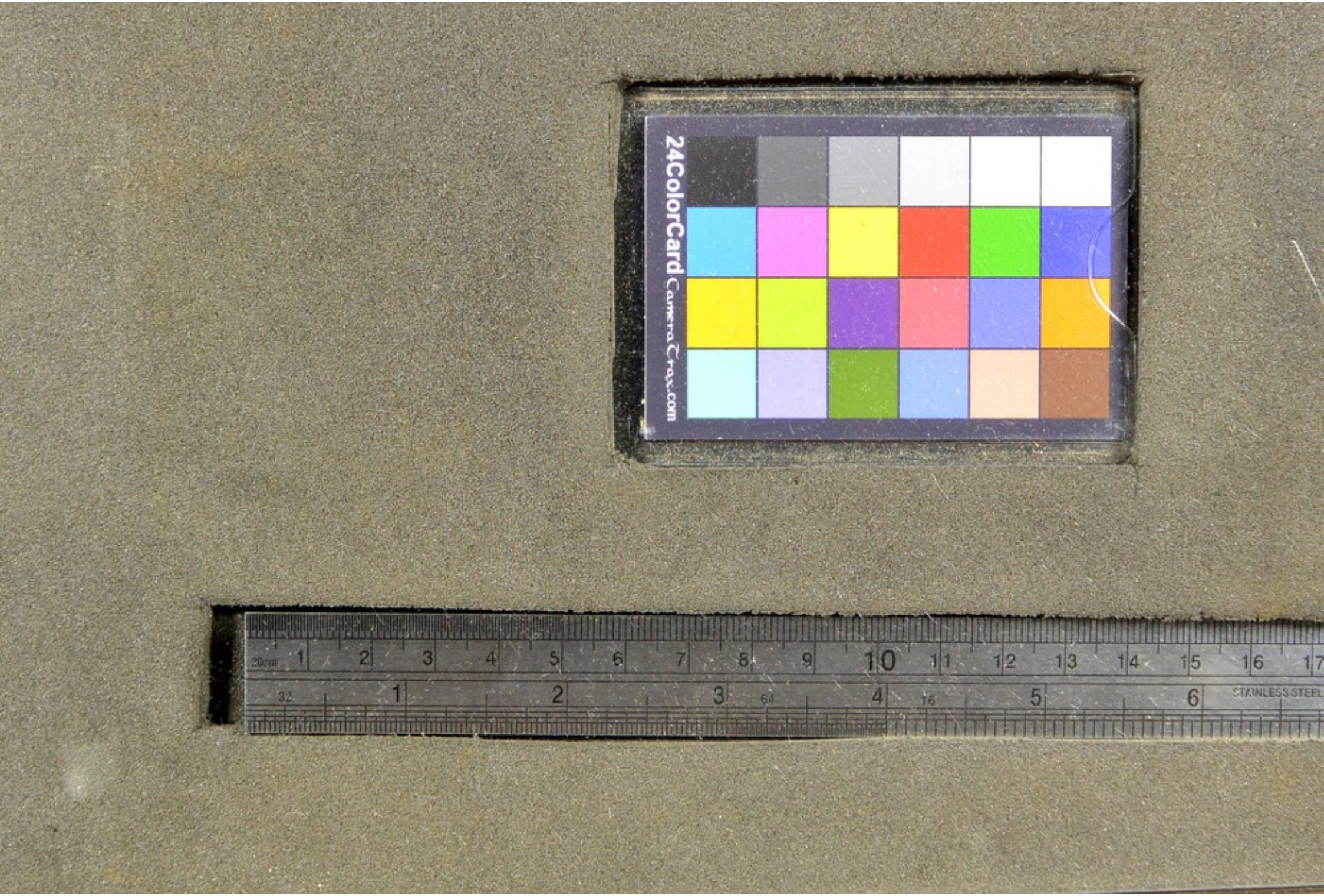
This icy region of the Andes, which forms the western boundary of the pampas of Buenos Ayres throughout their whole extent, may be the *Antarctic* Circle referred to by Baron Humboldt, and quoted in Mr. Alison's celebrated History of Europe. It is true that the Baron Humboldt never was in South Peru, nor in Bolivia, neither did he ever see the pampas of Buenos Ayres, but the Baron is not such a tyro in geography, as to state to the world, that the pampas (plains) of Buenos Ayres extend to the Antartic Circle in a literal sense. It may be supposed, that Baron Humboldt was only availing himself of the privilege which is given to poets and modern philosophers, *i. e.* exercise of the imagination; and surely such a philosopher as the Baron Humboldt, may be allowed 10 or more degrees of latitude for the exercise of *his* imagination.

Note C.

Those gentlemen who lately ascended in a balloon in England, to an unprecedented elevation, were pleased to draw a most unphilosophical conclusion from what they experienced on that occasion. They concluded, that because while in the car of the balloon, they could respire without pain, that the statements of travellers, who, when *climbing on foot* at great heights, have felt both pain in the lungs, and impeded respiration, that such statements are not correct. Before such an inference is drawn, all such sceptics should take a trip to Potosi, *via* Arica, on the coast of the Pacific Ocean, by which route, it is necessary, prior to arriving on the table-land of Bolivia, to attain an elevation of nearly sixteen thousand feet above the level of the ocean; and if they attempt to *climb on foot*, when near the crest of the Cordillera, they will soon be convinced that the balloon arguments are not more logical than those of the Welshman, by which he endeavoured to prove that Macedon and Monmouth are one and the same country.

Hedderwick & Son, Printers to the Queen.

549
10


24ColorCard CameraCraze.com
20cm 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
32 1 2 3 64 4 16 5 6
STAINLESS STEEL