Hints for improving the art of restoring suspended animation, also for administering dephlogisticated air in certain diseases, and particularly in the present epidemic, termed influenza, proposed (in a letter to Dr. Hawes) / by A. Fothergill.

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INFLUENZA.

PROPOSED

(IN A LETTER TO DR. HAWES)

BY

A. FOTHERGILL, M.D.

MEMBER OF THE ROYAL COLLEGE OF PHYSICIANS, AND F.R.S.

Salus Populi Suprema lex.

M.DCC.LXXXII.

HINTS, &c.

SIR,

IT is not without Diffidence that I addreſs you on a new Subject, which you have ſo cloſely inveſtigated, and which has lately engaged the Attention of ſome very eminent Phyſicians. However, as you do me the Honour to requeſt my Opinion, I ſhall freely communicate ſuch Obſervations as have occurred, not doubting of their being received with your wonted Candor.

The Cauſe which you have ſo zealouſly eſpouſed is the Cauſe of HUMANITY, *which*, therefore, claims the united aid of your Brethren of the Faculty. Happy ſhould I be could I ſuggeſt any Hints that may promote your humane Deſigns, or ſtart

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any Ideas that may aſſiſt you in improving the Art of reſtoring ſuſpended Animation. In this Point of view, how pleaſing is the Taſk to take up the Pen; and in Compliance with your obliging invitation, to expatiate on ſo important, ſo engaging a Topick!

The Humane Society, which owes its exiſtence in a great meaſure to your unwearied Exertions, has been eſtabliſhed only about eight Years, and it appears from the laſt Report, that "within that Period in 845 Accidents, that have come under their Notice, 136 Patients have been reſtored from *apparent* Death. Among whom were ſeveral unhappy Creatures who had committed the horrid Crime of Suicide, though they are *now* perfectly reconciled to Life, and public Utility." Theſe ſtriking and well atteſted facts prove to a demonſtration

tion the practibility of recovering many of thoſe who to all appearance are dead, and at the ſame time aſcertain a very affecting and humiliating truth, viz. that thouſands might have been reſtored, and have remained to this moment a bleſſing to their connections and to the world, had ſuch inſtitutions been earlier eſtabliſhed! It is impoſſible for ſuſceptible minds to contemplate ſuch affecting inſtances without experiencing the tendereſt emotions of ſympathy. What tranſport then muſt it afford every compaſſionate boſom, to be inſtrumental in recalling a helpleſs fellow-creature from an untimely grave!—To witneſs the heart-felt paſſions of hope, fear, ſurprize and joy, which alternately agitate the human frame on ſuch intereſting occaſions! To mark the lively traits of gratitude painted in the countenances and deportment of the mothers, ſiſters, brothers, &c. of the re-

ſtored object! What epicure could ever yet boaſt ſo refined, ſo exquiſite a luxury as the benevolent deliverer muſt experience from ſuch a ſcene!—a ſcene far beyond what any pen has yet been able to deſcribe —any pencil to expreſs!—This humane Inſtitution therefore, has one peculiar excellence, which ſeems to have been generally overlooked, which is to call forth in the moſt forcible manner the fineſt feelings, and moſt endearing affections of the human ſoul—Affections which ennoble the Species, and exalt even humanity!

If ſuch has already been the ſucceſs of this new undertaking, under all the diſadvantages of popular prejudice, the ſcarcity of ſuitable apparatus, the diſtance oftentimes from ſkilful medical aid, and ſtill more, the want of proper RECEIVING HOUSES, what may not be expected

pected when theſe are eſtabliſhed in their proper diſtricts, and when this inſtitution, as in other countries, becomes an object of the national police? When the learned of the Faculty, convinced of its utility, ſhall unite in their endeavours to ſupply the remaining deficiencies, and to cultivate the important art of reſtoring Animation, with the ſame zeal that they apply themſelves to other branches of ſcience, may we not then hope, that ſimilar inſtitutions will be eſtabliſhed in various parts of the Empire, under the auſpices of a BRITISH KING, and BRITISH PARLIAMENT, extending their directions and encouragements for means attempting the reſtoration of their unfortunate fellow-creatures, from every ſpecies of apparent death? At this critical juncture, that we have to cope with the combined force of France and Spain, joined to that of the

United Provinces, every tie of honour and humanity calls for our utmoſt exertions to preſerve the lives of our countrymen.

In peruſing the reports of theſe laudable Inſtitutions, it cannot but ſtrike every attentive reader, that life is extinguiſhed *cæteris paribus*, in ſome caſes much ſooner than in others. A ſubmerſion for a ſhorter ſpace than five minutes, has proved fatal in ſome perſons, while others have remained under water half an hour or upwards, and yet have been completely reſtored. When inebriation precedes the accident, it is no wonder that the chance of recovery is proportionably diminiſhed, becauſe this ſtate produces a ſurcharge of the veſſels of the brain, which ſtrongly diſpoſes to ſtupor, or apoplexy. But excluſive of this, and where other circumſtances ſeem to be exactly ſimilar, whence this difference in the event?

event? Does it proceed from any peculiarity in the ſtructure or irritability of the vital organs? or is it not rather owing to different degrees of horror, with which the mind happens to be impreſſed in the act of drowning? Sudden terror overwhelms certain perſons, and is alone ſufficient to produce a total *ſuſpenſion* of their vital functions. Is it not reaſonable, therefore, to ſuppoſe, that in theſe trying ſituations of human nature, the terrific idea not only diſarms the mind at once, but alſo at the ſame inſtant arreſts the vital principle, and thence deprives the miſerable being of every poſſible chance of recovery by art? But as it is impoſſible to pronounce, concerning ſuch unfortunate caſes, *a priori*, the *humane* medical aſſiſtants ought not to be diſcouraged from reſolutely purſuing the neceſſary means during the full ſpace allotted by the Society. Let them remember that

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ſcarce a year paſſes that does not ſupply ſome inſtance of reſuſcitation, which, before the commencement of theſe inſtitutions, would have been conſidered as totally impracticable. In ſuch apparently deſperate ſituations, ſuppoſe but one in twenty reſtored, what conſiderate perſon would think the undertaking unneceſſary, were himſelf, or his boſom friend that one? I have long concurred with you, Sir, in earneſtly hoping that a certain criterion between poſitive and apparent death, beſides that of putrefaction, may be ſoon diſcovered. For want of this, the benevolent efforts of the faculty have ſometimes been unneceſſarily prolonged, and unjuſtly ridiculed, under the imputation of attempting impoſſibilities. The popular idea, that life quits the body, in an aërial form, at the inſtant reſpiration ceaſes, has introduced *dangerous* errors. And it is painful to reflect, that the mere

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ſemblance of death, has too often been miſtaken for the reality, in which ſtate the helpleſs victim has been conſigned to the grave! Theſe unfortunate events ſhould awaken caution, and repreſs that inconſiderate hurry, which you ſo juſtly cenſure, of laying out the dead, and precipitating the funeral ceremonies. * We now know that the vital power, or in other words, the irritability of the ſyſtem, is an innate property of the living ſolids, and is not of ſo volatile or fugitive a nature, as to quit them on the immediate ſuſpenſion of the action of the heart and lungs. On the contrary, after it ſeems to have deſerted the external parts, a remnant ſtill tenaciouſly maintains its reſidence in the principal vital organs† a conſiderable time after motion and ſenſation have ceaſed,

* In your Addreſs on Premature Death, and 19 Lect. on Animation.

† See the learned Baron HALLER, ſur les parties ſenſibles & irritabiles.

ceaſed, and perhaps never totally forſakes them while they retain the ſmalleſt degree of heat. Hence the vital principle, like that of electricity (to which it ſeems to bear ſtrong affinity) often remains in a dormant ſtate, without betraying any ſigns of its preſence, till it happens to be rouſed by the proper modes of excitation.

Hence neither the clay-cold hand, the ſtiffneſs of the limbs, the dilatation of the pupil, nor even the cadaverous countenance are, ſeparately conſidered, infallible teſts of its total extinction. Nay, PUTREFACTION itſelf is but an equivocal ſign of abſolute death, in the laſt ſtage of the confluent ſmall-pox, putrid fevers, or ſea ſcurvy, when a ſyncope ſupervenes. One mark of the extinction of life, which generally preſents itſelf, and which cannot fail to attract the notice of every accurate obſerver, is a

peculiar

peculiar *glaſſineſs* of the eye, when this is accompanied with coldneſs and flaccidity of the ſkin, it will ſeldom deceive us; another ſign which deſerves our particular attention is, when air blown into the mouth paſſes without interruption through the whole alimentary canal. Is not this a ſtrong preſumptive proof of the internal ſphincters having loſt their irritability, and of life being totally exhauſted? How far theſe, or an aſſemblage of theſe phenomena may be found ſufficient, on future occaſions, to ſupply a *certain criterion* of poſitive death, may deſerve the conſideration of thoſe ingenious Gentlemen who may undertake to anſwer your important Prize-Queſtion.

As the accidents from drowning are by far the moſt frequent, ſo have the reſtorations been moſt numerous, and have there-

fore very juſtly attracted the attention of the Faculty. Yet we are by no means to conclude, that the art of reſtoring animation has, even in theſe caſes, arrived at its *ne plus ultra*, or that ſucceeding ages will not be able to ſtrike out new modes which at preſent are totally unknown. It is extremely to be regretted, that, on theſe occaſions, diſſections have been ſo very rarely practiſed. If you concur with me in this ſentiment, you will, I make no doubt, in your next courſe of lectures remind your pupils of the conſequence of an accurate inſpection of the brain, and other vital organs, whenever any doubt or obſcurity occurs. This would often afford the moſt ſatisfactory means of clearing up difficulties, correcting errors, and, finally, leading to more ſucceſsful methods of treatment. Although the directions propoſed by the different Societies appear to be very

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judicious, and evidently the reſult of deep reflection, yet in caſes of ſuch extreme urgency, which demand the moſt active and vigorous meaſures, it may perhaps be allowable reſpectfully to enquire, whether the preſent ſtate of philoſophy may not enable us to diſcover other methods which may bid fair to become yet more ſpeedy, certain, and efficacious.

In all caſes of ſuſpended animation, the grand intention ought to be, to excite the latent principle of irritability, on which the motion of the vital organs immediately depends. Although this principle remains a conſiderable time after the lungs are quieſcent, yet it can never be reſtored to its activity till that organ is again put in motion. But experience ſhews that this can be often effected by blowing air into the windpipe: and that renewing pulmo-

nary action is one great ſtep towards reſtoring the energy of the heart, the brain, and arterial ſyſtem; and, conſequently, of the other ſubordinate ſprings of the animal machine.

" I have frequently obſerved, ſays your worthy Colleague, the heart and arteries to beat ſtrong while this proceſs was carried on in children *ſtill-born*, but that all pulſation has ceaſed upon diſcontinuing this in order to try other experiments, which has returned upon repeating the operation*." From this, and other weighty arguments, I concur with the ingenious writer, that inflating the lungs is, probably, one of the moſt efficacious methods of reſtoring animation, but that air contaminated by having been already reſpired, or that

* Memoirs of the Society at Amſterdam, by Dr. Cogan, 1773.

even

even common atmoſpheric air is beſt adapted for this purpoſe, may now be juſtly doubted. The former is known to be highly noxious to breathing animals, and the latter is commonly debaſed by an admixture of *phlogiſton*, and other heterogeneous matters. To obtain that ſubtile principle from the common maſs, which is the true *pabulum vitæ*, and which has ſo long eluded the ſearch of Phyſiologiſts, is the great *deſideratum* in the preſent caſe. This, I conceive to be no other than that pure fluid, which now paſſes under the term of DEPHLOGISTICATED AIR, and which ſo greatly ſurpaſſes that of the common atmoſphere. In conſequence of its ſuperior purity, it ſupports the flame of a burning taper with a degree of ſplendor and brilliancy, altogether incredible to thoſe who have not been preſent at the experiment. When it is reſpired, inſtead of common air, its com-

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parative excellence is no leſs ſenſibly felt in communicating freſh life and vigor to the ſyſtem. It is moreover the grand corrector, which nature ſo liberally diſpenſes from every part of the vegetable kingdom, to purify the atmoſphere, that is ſo liable to be contaminated by noxious exhalations ariſing from burning bodies and an infinite variety of animal and vegetable ſubſtances continually verging to putrefaction. Without this providential proviſion, populous cities would perhaps ſcarcely be inhabitable.

As the means of exciting flame, and ſupporting reſpiration are ſo intimately allied, does it not prove that dephlogiſticated air is peculiarly adapted for reſtoring the vital ſpark when nearly extinguiſhed? With this vivifying principle, therefore, might not the collapſed lungs of ſuch unfortunate perſons be more properly inflated? But to

inflate

inflate the lungs (eſpecially of drowned perſons) completely, requires no inconſiderable ſhare of ſkill, and dexterity. For the ſtrong conſtriction which ſeizes the aperture of the windpipe, in the act of drowning (and which I conceive to be the immediate cauſe of the ſuſpenſion of reſpiration) diſpoſes the air blown into the mouth or noſtrils, to paſs into the gullet inſtead of the lungs. To overcome this difficulty, the epiglottis muſt be elevated, and a bent ſyphon introduced into the windpipe, as recommended by that expert anatomiſt profeſſor, Monro. Into the orifice of the ſyphon the nozzle of a ſmall pair of bellows ought to be accurately inſerted. A large bladder containing dephlogiſticated air, ſecured by a ſtop-cock, and communicating with the valve of the bellows, completes the apparatus. In conducting the operation, the air is to be thrown into the lungs,

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and, by the alternate preſſure of an aſſiſtant, is to be made to paſs and repaſs, ſo as to imitate natural reſpiration*. Previous to the operation, the air may be warmed by immerſing the bladder in water, of the temperature of animal heat. This proceſs being accompliſhed with due care, and expedition, a quantity of this warm invigorating air might next be injected into the inteſtines, perhaps with more propriety than the narcotic fumes of tobacco, ſo ſtrongly recommended by ſome very eminent writers, and which ſeem to be too implicitly relied on by moſt practitioners. The ſickneſs, and univerſal languor which theſe fumes uſually produce on other occaſions, when they penetrate beyond the valve of the colon, but ill ſuits with the idea of reſtoring animation. So that it may be juſtly doubted, whether theſe effects of

* Several more bladders of air, ſecured by ſtop-cocks, ought to be had in readineſs.

this

this noted remedy do not more than counterbalance its ſtimulating power. May not the ſame objection be urged againſt the operation of emetics in theſe caſes?

Should the preſent propoſal of adminiſtering dephlogiſticated air; grounded on its acknowledged ſuperiority in ſupporting flame, and its ſalutary influence on reſpiring animals; be eſteemed not unworthy your attention and that of the Humane Society, it is hoped the *novelty* of the idea will prove no juſt obſtacle to its undergoing a fair and candid trial.

Amongſt the various ſtimulants propoſed by the Faculty, it ſeems wonderful that the moſt powerful one in nature ſhould have hitherto, in a great meaſure, been overlooked; I need ſcarcely add, that I mean the ELECTRICAL SHOCK. Other ſtimulants are ſlow in their operation, and as they

can only affect the heart by ſympathy, their action is limited and ſuperficial, but electricity is capable of inſtantly pervading the inmoſt receſſes of the animal frame, and therefore has long appeared to me to be peculiarly adapted to rouze the dormant powers*.

The curious experiments of the ingenious Dr. Abildgard are too applicable to the preſent ſubject to be paſſed over in ſilence. He relates, that after fowls were apparently ſtruck dead by violent ſhocks paſſed through their *heads*, and rendered irrecoverable by

* Eight years have elapſed ſince this conjecture was firſt hinted to an ingenious philoſophical friend, who entirely concurred in the idea. But notwithſtanding it met with his approbation, and even that of the Humane Society, electricity does not appear to have been tried in more than two caſes of this nature. The reſult in both inſtances, however, proved much in its favor.———See the Society's Report for the Year 1775, page 77.

other

other ſtimulants, were ſoon re-animated by gentle ſhocks paſſed through the *heart and lungs**. If he was thus able to deprive animals of all ſenſe and motion, and alternately reſtore them at pleaſure, by the dexterous management of this ſubtile fluid, may we not hope, that by ſuitable improvements, electricity may one day be rendered one of the moſt powerful modes of reſuſcitation? In the interim, why ought thoſe unfortunate perſons, whoſe powers are ſuſpended by lightning (which is only a higher ſpecies of electricity) be given over for loſt, whenever ſo appoſite a remedy is at hand? But as this, like other potent remedies, may prove ſalutary, or deſtructive, according as it is adminiſtered, it is very neceſſary to caution the humane aſſiſtant to uſe this enlivening fire very gently at firſt,

* Societatis Med. Havnienſis collectanea, Vol. 2.

beginning with the ſlighteſt ſhocks, and gradually proceeding to make the electrical circuit paſs more briſkly in different directions through the region of the heart, the lungs, and ſpinal marrow*. For it is reaſonable to believe, that more happy and permanent effects may be expected from thus gently awakening the torpid powers by moderate concuſſions, than by too violently attempting to rouze them at once.

I muſt further add, Sir, that at that critical period, when ſlight twitchings or gaſpings mark the firſt dawn of returning life, inſtead of *increaſing*, it will be prudent to *diminiſh*, the electrical current, leſt the vital ſpark be again extinguiſhed.

* Perhaps we might alſo add through the brain.—For altho' a very ſevere ſhock might be dangerous, it does not follow from the above experiments, that, that organ may not in this, as in other caſes, ſafely receive gentle ſtreams of electricity with great advantage.

This caution ſeems alſo applicable to ſtrong friction, and ſtimulants when abuſed*. May not an over-officious zeal in the proſecution of rough unſcientific means, be a probable cauſe of the fatal apoplexy, or peripneumony which ſometimes ſupervenes a promiſing recovery?

In caſes where the natural heat of the body, in conſequence of remaining ſome time under water, or expoſure to extreme cold, is apparently extinguiſhed, and the preceding methods fail of ſucceſs, it may be very neceſſary to apply artificial heat, to as large a ſurface of the body as poſſible. The ſpeedieſt method of effecting this in a ſteady uniform manner, is by placing the object in a ſweating chair, or warm bath, gradually heated to 100° of Farenheit's ther-

* Nor has it eſcaped you in your Lectures on Animation.

mometer,

mometer, accompanied by diligent friction during its operation.

Animal heat probably depends on elementary fire imbibed from the atmoſphere, in the act of reſpiration. The quantity daily received and emitted, is ſo modified by the powers of life, as to be duly proportioned to the ſtate of the œconomy, and never to exceed certain limits.

Hence may be explained that ſingularly curious proviſion, by which the human body is enabled, through all the viciſſitudes of climate, to counteract the extremes of heat and cold, ſo as to preſerve nearly an equal degree of temperature under the equator, as near the pole*. As the principle of heat and irritability are coeval,

* Viz. between 96 and 98 degrees of Fahrenheit's thermometer, at leaſt during a healthy ſtate.

ſo do they reciprocally keep pace with each other to the extreme period of life. As they ſeem mutually to derive their energy from the action of the lungs, it is no wonder, when the motion of that organ is ſuſpended, they ſhould equally languiſh, and that when the freſh ſupply is totally cut off, they ſhould ſoon be deſtroyed, and the body return to the common temperature of the ſurrounding medium. Till the native heat therefore can be renewed, all attempts to excite the vital principle will probably prove fruitleſs.

To aſcertain the comparative merit of the new modes of recovery which have been enumerated, and to determine the order in which they ought to be applied, muſt be left to accurate obſervation and experience. Where the heat of the body is not much impaired, they may be tried in

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the order in which they have been mentioned; but where that is nearly aboliſhed, artificial heat ought probably to precede them, and every other means. If the ſole application of *dephlogiſticated air*, *electricity*, or *heat*, thoſe three powerful agents in nature, ſhould, on fair trial, evince their ſuperior energy in exciting the ſecret ſprings of life, might they not ſuperſede various inferior means, and render the art at once more ſimple, and more efficacious? For it ought ever to be had in remembrance, that during the trial of inactive or inadequate means, the object every moment approaches nearer and nearer to that irrecoverable ſtate, which muſt for ever baffle all the efforts of nature and of art! In the interim, it is by no means propoſed to diſpenſe with any of the ordinary means that have really proved ſucceſsful, as they may ſtill, on ſome emergencies, continue

to be uſeful auxiliaries. As the ſuſpenſion of life may be produced by a variety of cauſes, ſo the mode of treatment ought to be varied according to the nature of the caſe.

Thus, in drowning, the application of heat is generally beneficial, while perſons ſuffocated by the fumes of charcoal require to be expoſed to cold air, and cold water, and are liable to relapſe if brought into a warm room. It is found requiſite to rub the frozen with ſnow, as the ſudden application of heat proves deſtructive. Dephlogiſticated air ſeems to be peculiarly adapted to the recovery of thoſe who are overcome by mephitic vapours, as electricity does to thoſe who are ſtruck by lightning.

Bleeding has been found hurtful in moſt of the preceding caſes, while it appears to be uſeful and even indiſpenſably neceſſary in others*.

Many other ſtimulating means propoſed by practitioners, as emetics, ſternutatories, and warm cordials, may ſtill have their uſe where the above plan cannot be properly conducted, for want of judicious medical aſſiſtance. Concerning theſe particulars, however, a variety of remarks might be here ſuggeſted; but to enter into a full diſcuſſion of them, together with

* Concerning this operation, Authors ſeem to be much divided, and of late many have declared againſt it. Yet, in caſes of intoxication, contuſions of the head, apoplexy, or ſtrangulation, where the red bloated countenance, ſuffuſion of the eyes, and other ſymptoms, indicate the veſſels of the brain to be ſurcharged, the neceſſity of bleeding in the temporal artery, or jugular vein, will, it is preſumed, be generally acknowledged.

the neceſſary cautions peculiar to each, and to point out to what extent the preſent plan might be applied on various other emergencies, would far exceed my preſent bounds; nor could they indeed be aſcertained but by attentive obſervation, and minute enquiry into the laws of the animated machine. There is, however, yet one ſpecies of ſuſpended animation, to which I could earneſtly wiſh to draw your particular attention, I mean that *death-like ſyncope*, which proceeds from great effuſions of blood—a ſituation which evidently requires peculiar diſcernment and delicacy in the treatment. Our gallant ſoldiers and ſeamen, who at this awful period are thus laviſh of their lives in defence of their country, claim our moſt compaſſionate regards. Certain wounds of the larger blood veſſels muſt inevitably prove mortal, but there is reaſon to ſuppoſe that the men

ſometimes ſink under ſudden loſs of blood, in conſequence of being too haſtily abandoned, or improperly treated.

The hurry and confuſion which accompany the tumultuous ſcenes of war, and eſpecially during engagements, but ill ſuit with the watchful care and management neceſſary for their reſtoration: and it is to be feared, that on ſuch melancholy occaſions, where the ſemblance of death is ſo very liable to be taken for the reality, the dead, and even thoſe who are only *apparently* ſo, too often undergo one common fate! And by this means the feeble ſpark of life, which might have been revived, is for ever extinguiſhed! The common mode of recalling them from theſe faintings by pouring down ſpirituous liquors, and heating cordials, ſerves but to renew the fatal diſcharge, and to haſten their death. The application

plication of heat, of electricity, and moſt other ſtimulants, would probably produce the ſame deſtructive tendency. Might not dephlogiſticated air, artificially cooled, ſupply the innocent, yet animating cordial here wanted?

To conclude: ſhould the preſent Hints prove acceptable to you, and your ingenious Colleagues of the Humane Society, they are entirely at your diſpoſal, hoping that, through your joint endeavours, they may in time be improved, and that every ſtep we advance farther in this new and almoſt unbeaten path of ſcience, will enable us with more certainty to preſerve life, and to leſſen the ſum of human miſery; which is the ardent wiſh of,

SIR,

Your obedient,

And very reſpectful ſervant,

A. FOTHERGILL.

Harpur-Street, Red-Lion-Square,
June 7, 1782.

POSTSCRIPT.

On further reflexion upon this ſubject, it has ſince occurred to me, that dephlogiſticated air, which ſo nearly reſembles natural air perfectly diveſted of all impurities, may be applied to many other very important purpoſes, eſpecially as it may be obtained in almoſt any quantity, from a variety of ſubſtances, and that with very little trouble or expence*.

Numerous are the inſtances wherein dephlogiſticated air promiſes to become not only

* Such as nitre, the calces of metals, and the leaves of almoſt every green vegetable, whether poiſonous or ſalutary, but with this ſtriking peculiarity, that the leaves muſt be expoſed to the rays of the ſun during the proceſs, becauſe in the abſence of that luminary, inſtead of *dephlogiſticated* they yield a *noxious* air, as appears from the diſcoveries of thoſe excellent philoſophers, Dr. Prieſtly, and Dr. Ingenhouſz.

only a powerful corrector of impure air, but alſo an efficacious remedy againſt various diſeaſes. Permit me only to mention a few.

Firſt, As a Corrector.

Experiments prove that it ſupports flame, and animal life four or five times longer

May not this curious phenomenon, which has been conſidered as inexplicable, be in ſome meaſure accounted for thus? A certain *determinate* quantity of phlogiſton, as well as of dephlogiſticated air appears to be neceſſary to vegetation. It is now well known that plants, as well as animals, *ſleep* in the night ſeaſon, during which ſtate their leaves *collapſe*, and their whole external habit is *viſibly altered*. May not the redundant part of the phlogiſton received into their œconomy, over and above what was neceſſary for their nouriſhment, be *now* evacuated as excrementitious, and ſomewhat analogous to the alvine diſcharge in animals? And may not the returning rays of light in the day, act as a ſtimulus on the collapſed air veſſels, in order to excite them to diſcharge the ſuperfluous dephlogiſticated air by inſenſible perſpiration? May not this alſo help us to explain, why plants raiſed in a dark room, where the ſun's rays are never permitted to enter, ſoon loſe their natural colour, odour and other ſenſible qualities?

than

than common air, and even meliorates the latter when contaminated, ſo as to render it again pure, and reſpirable. Therefore, might not an apparatus be readily contrived for impregnating, at pleaſure, the impure air of all crowded Aſſemblies, as Courts of Judicature, Hoſpitals, and Priſons, with this ſalutary Corrector, and thereby rendering them manſions of health, inſtead of being (as they too commonly are) receptacles of contagion?

Secondly, As a Remedy.

Its antiſeptic and exhilarating quality, joined to its extreme purity, promiſe the moſt beneficial effects, both as a prophylactic, and as a remedy in all diſeaſes which proceed from noxious miaſmata, animal effluvia, or putridity, as the peſtilence, malignant fevers, putrid ſore throat, marine ſcurvy, &c.

Par-

Particularly alſo in thoſe diſeaſes of the lungs, which demand that the patient ſhould conſtantly breathe a remarkably pure air, as aſthmas, catarrhs, and conſumptions. In all which caſes, the good quality of the air is ſo univerſally acknowledged to be of ſuch high importance, that people often remove to remote places ſolely on this account. But what country can boaſt ſo ſalubrious an atmoſphere, as what every perſon may thus produce artificially in his own chamber?

The preſent epidemic catarrh, commonly termed INFLUENZA, probably ariſes from ſome noxious quality of the air received into the lungs in the act of reſpiration. Therefore, might not this wholeſome fluid, if drawn into the wind pipe,

the organ immediately affected, (by means of a ſuitable inhaling veſſel) bid fair to become a powerful corrector of the morbid cauſe? Or, at all events, might not the frequent reſpiring ſo pure a medium, prove an uſeful auxiliary to the general method of cure, employed by the faculty?

"On breathing dephlogiſticated air through a glaſs ſyphon (ſays the celebrated Diſcoverer)* the feeling of it to my lungs was not ſenſibly different from that of common air, but I fancied that my breaſt felt peculiarly light and eaſy for ſome time afterwards. Who can tell, but that in time, this air may become a faſhionable luxury? Hitherto, only two mice and myſelf have had the privilege of breathing it." He juſtly infers, that "though it might be very uſeful as a *medicine*, it might not be ſo pro-

* Dr. Prieſtley on air, Vol. 2, p. 101.

per

per for us in the uſual healthy ſtate of the body: for as a candle burns out much faſter in it, than in common air, ſo we might, as may be ſaid, *live out too faſt*, and the animal powers be too ſoon exhauſted by conſtantly reſpiring this pure kind of air." Is it not ſtrange that ſo intereſting a diſcovery has not more awakened the curioſity of Medical Profeſſors!

* * * * * *

*** Since I ſent you the preceding pages, I have the pleaſure to find that ſo ingenious a philoſopher as Mr. CAVALLO, has in a new work*, not only countenanced the introduction of dephlogiſticated air as a medicine, but has actually propoſed an apparatus for conveying it into the lungs in reſpiration, which, with a little improve-

* Treatiſe on air, &c. p. 566.

ment*, may render its exhibition very eaſy and familiar. The cheapeſt way to obtain a large quantity of it, is by ſimple deflagration of nitre; a ſingle pound of which, expoſed to intenſe heat, in an earthen retort, yields at a medium, 12,000 cubic inches of this elaſtic fluid—a quantity more than ſufficient for a perſon to breathe for the full ſpace of 48 hours; eſpecially if it reſts on a ſurface of lime water, which, by abſorbing the fixed air that accompanies the operation, renders the dephlogiſticated air 30 times longer reſpirable than it otherwiſe would be, agreeable to the obſervation of the learned ABBE FONTANA. The next advantageous method of procuring dephlogiſticated air, is by extracting it

* On deſcribing the proceſs to Mr. Evans, an expert inſtrument maker, in Old Change, Cheapſide, he has undertaken to complete the apparatus, with ſuch additions as may be wanted in the different modes of application.

from

from red lead by means of vitriolic acid, and the heat of a ſmall lamp.

In order to purify the air of crouded rooms, might not an appendage be added to the common ſtoves for evolving the dephlogiſticated air, from theſe ſubſtances, and throwing it into the room as faſt as it is produced? The Pennſylvanian ſtove* already excels in throwing out warm ſtreams of freſh atmoſpheric air, and might eaſily be adapted to the above intention.

In the interim, ſhould you, Sir, or any of your ingenious Colleagues, incline to try the virtues of a *new remedy*, (which at preſent I muſt candidly confeſs reſts wholly on theory) it is needleſs to add, that ſhould the reſult prove favourable to your wiſhes, I ſhall be happy to ſhare the ſatisfaction it will afford you, by an early communication of the particulars to

Your's, once more,

A. F.

* As improved by Mr. James Sharp.

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