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A

TREATISE

concerning the

INFLUENCE

of the

SUN and MOON

upon

HUMAN BODIES,

and

the DISEASES thereby produced.

BY

RICHARD MEAD,

Fellow of the Royal Colleges of Phyſicians at *London* and *Edinburgh*, and of the Royal Society, and Phyſician to His Majeſty.

Tranſlated from the *Latin*, under the Author's Inſpection, By *THOMAS STACK*, M. D. F. R. S.

Rationalem puto medicinam eſſe debere; inſtrui vero ab evidentibus cauſis, obſcuris omnibus non a cogitatione artificis, ſed ab ipſa arte rejectis. Celſ. in Præfat.

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ADVERTISEMENT.

HAVING reſolved, at the inſtance of ſome friends, to give a ſecond edition of this ſmall Treatiſe, I thought it incumbent on me, to read it over attentively; in order to make ſuch additions and improvements, as above forty years experience might have ſuggeſted to me ſince its firſt publication. Accordingly, in this review, I have explained ſome mathematical matters in a clearer manner than I had formerly done; and I have illuſtrated and confirmed the medicinal part by ſeveral additional obſervations and caſes, which may prove uſeful in the practice of phyſic. And indeed, that a due conſideration of this ſubject is extenſively

uſeful to a phyſician, will appear with ſufficient evidence, from the various kinds of diſeaſes, the courſes and returns of which I have herein ſhewn to depend on the different poſitions and revolutions of the Sun and Moon. Now, though a previous acquaintance with the *Mathematical principles of natural philoſophy* be requiſite for comprehending this ſubject in its full extent; yet as thoſe, who are little affected by geometrical demonſtrations, may poſſibly be convinced by a number of facts, I ſhall not, with reſpect to this little work, inſiſt on that ſaying of *Plato*:

ΟΥΔΕΙΣ ΑΓΕΩΜΕΤΡΗΤΟΣ ΕΙΣΙΤΩ.

Let none unſkilled in geometry enter here.

London,
July 1. 1746.

PREFACE

PREFACE.

AS *the ſtudy of phyſic has in all ages undergone various changes, according to the different opinions of philoſophers; I have often wondered, how it comes to paſs, that, notwithſtanding the conſiderable advances made in the ſtudy of nature by the moderns, eſpecially in the laſt century, this uſeful art has not received thoſe benefits, which might reaſonably be expected from a ſurer method of reaſoning, than men were formerly acquainted with. That ſome of the moderns, particularly* Galilei, Kepler, Torricelli, *and*

and Sir Iſaac Newton, *have made vaſt improvements in natural philoſophy, by joining mathematical reaſonings to their inquiries into nature, is well known to the learned world: and yet medicine ſtill deals ſo much in conjecture, that it hardly deſerves the name of a ſcience. Whether this be owing to the nature of the art, as being incapable of ſure principles; or rather, to the artiſts, who having got into a wrong track, will not take the pains to return into the right road; may poſſibly be a matter of inquiry on ſome other occaſion. In the mean time, in order to prove, how beneficial the ſtudy of geometry muſt be to phyſicians, as well for inveſtigating the cauſes of diſeaſes, as for finding proper remedies for them; I have attempted to explain a very difficult queſtion,* concerning the courſes and returns of ſome diſtem-

pers;

pers; *the nature of which is ſuch, that it cannot be thoroughly well handled by any other means.*

THUS *I am neceſſitated, in this diſquiſition, to enter into a few more minute calculations, than a medical ſubject might ſeem to require. Wherefore the reader ought to have ſome knowledge of Sir* Iſaac Newton's *philoſophy; or at leaſt, underſtand the learned and ſagacious Dr.* Halley's Theory of the Tides, *upon the principles of that great philoſopher, as publiſhed in the* Philoſophical Tranſactions. *And thoſe, who have no taſte for mathematical ſtudies, may, if they pleaſe, paſs over this part of the work. For my part, I never expect to acquire reputation by algebraical calculations, thoroughly ſenſible of the mediocrity of my genius in that branch of learning. But I*

flatter

flatter myſelf, that theſe ſheets will be found to contain ſome hiſtories and inſtructions, from which even thoſe, who deſpiſe all reaſoning in phyſic, and rely on experience alone, will reap benefit in practice: which indeed is the main deſign of this little Treatiſe.

THE *field is large, in which we run our career; nor are the innumerable evils, with which we are daily ſurrounded, to be remedied by any one method. The two great pillars of medicine are experience and reaſon; and he that has no confidence in the latter, at leaſt bids the fairer towards relieving the ſick, in proportion to his ſtock of the former. But yet the buſineſs of our profeſſion requires the joint aſſiſtance of both; becauſe a rational theory will teach a man to apply his*

his experimental knowledge to the various caſes that occur.

FOR *although a very few remedies, found out by chance, and confirmed by uſe, might poſſibly have been ſufficient for curing the diſorders of men in the earlieſt times, who, we are told, led ſober and active lives; yet in ſucceeding ages, when their conſtitutions had been injured by ſloth and luxury, they ſtood in need of different methods of cure: inaſmuch as it now became neceſſary to inquire, not only into the cauſe of the diſtemper, but alſo how its nature and uſual appearance had been changed in this or that individual. Hence that ſaying of* Hippocrates (*a*): the phyſician ſhould have an eye

(*a*) Epidem. lib. i.

to things common and peculiar: *becauſe, as* Celſus *rightly obſerves,* there are caſes, in which the ſame diſorder puts on a different appearance from that, which it uſually has; and the diſcovery of the cauſe is ſometimes the cure of the diſtemper (*b*).

And *it is probable, that the only reaſon, why the profeſſion of phyſic* lay buried in total darkneſs *for near five hundred years, that is, from the* Trojan *to the* Peloponneſian *war, as* Pliny *has recorded* (*c*); *was, that, whereas new diſeaſes ſtarted up from time to time, and thoſe, who had nothing but experience to make them phyſicians, were unequal to theſe new difficulties; the philoſophers en-*

(*b*) In præfat.

(*c*) Lib. xxix. in procem.

engroſſed the art, which was found to be lame and infirm without the knowledge of nature. Thus Celſus *ſays of that ſame ſpace of time, that* the ſcience of phyſic was accounted a part of philoſophy; ſo that the curing of diſeaſes, and the contemplation of nature, took their riſe from the ſame perſons (*d*).

Now, *as it is of conſequence to the ſubject in hand, ſo it is eaſy to prove, that thoſe philoſophers, who laid the firſt foundations of our art, were really famous geometricians. And firſt, the moſt eminent among the ſages of antiquity was* Pythagoras, *who had acquired ſuch high reputation for his ſkill in phyſic, that it was*

(*d*) Loco citato.

commonly ſaid, that he travelled, not ſo much for the ſake of inſtructing people, as of curing them (*e*). *But the progreſs made by him in mathematical ſtudies alſo was extraordinary. Witneſs his two noble diſcoveries*; *the one*, Of the ſquare deſcribed upon the ſide ſubtending the right angle in a right-angled triangle, being equal to both the ſquares deſcribed upon the ſides containing the right angle; *the other*, Of the area of the parabola, *which*, *according to* Proclus (*f*), *he firſt demonſtrated. For the firſt of theſe problems*, Athenæus (*g*) *and* Diogenes Laertius (*h*), *upon the authority of* Apollodorus *the arithmetician*, *ſay*, *that*

(*e*) Aelian. var. Hiſt. lib. iv. cap. 17.
(*f*) Lib. iv. ad primum Euclid.
(*g*) Lib. x. pag. 418.
(*h*) In vita Pythagoræ, lib. viii. ſegm. 12.

that he offered a hecatomb in ſacrifice. But Plutarch (*i*), *after citing a verſe of* Apollodorus, *leaves it doubtful for which of the two he made that offering.*

EMPEDOCLES *was his diſciple in* Italy, *a perſon of a vaſt genius, who, having penetrated into nature's inmoſt receſſes, performed ſuch great things in our profeſſion, as were not to be expected from a bare experimental knowledge of phyſic. For when his native city* Agrigentum *was infected with a dreadful plague, he ſoon found out the cauſe; and thereupon,* by ſtopping up ſome openings in the mountains, thro' which unwholſome winds iſſuing brought the contagion, he averted the evil

(*i*) Quod ne vivere jucunde quiſquam poſſit, qui ſectam ſequatur Epicuri.

vil (*k*). *He rendered the ſame ſervice to the* Selinuntians: for when they were ſeized with a plague from the corruption and ſtench of the ſtagnating waters of a river, which ſurrounded the city; he ordered two neighbouring rivers to be conveyed into it: by which means, having made a current, and cleanſed the channel, the waters gradually grew ſweet, and the plague ceaſed (*l*). *Now theſe facts are the more worthy of being recorded; becauſe the ancients were generally of opinion, that peſtilence proceeded from the anger of the gods, and therefore was not to be cured by natural remedies: whereas in both theſe caſes, the remedies were pointed out by mechanical*

(*k*) Idem, de curioſitate, & Lib. contra Coloten.

(*l*) Vid. Diog. Laert. lib. viii. ſegm. 70.

mechanical reaſoning; and that calamities of this kind are owing to ſuch cauſes, is confirmed by a great number of obſervations publiſhed by various authors.

DEMOCRITUS, *who is thought by ſome to have been* Hippocrates's *maſter, was equally famous for geometry and phyſic. For he is ſaid to have written, among other things,* Of the contact of the circle and ſphere; Of geometry; Of incommenſurable lines: *as alſo* Of the nature of man; Of the humors; *and* Of plagues (*m*).

BY *thoſe great men, and others like them, was this profeſſion carried on to the time of* Hippocrates; *who, as* Celſus *ſays,* was the firſt that

(*m*) Idem in vita Democriti, lib. ix. ſegm. 46 & 47.

that ſeparated this art from philoſophy (*n*). *For he, plainly perceiving, that the ſuperſtition of the common people, the impudence and vain pretences of quacks, and the pride and vanity of the ſophiſts, were mighty obſtacles to the improvement of the art; propoſed to himſelf in all his writings, to guard againſt thoſe impediments and difficulties. And accordingly, in his valuable book* De morbo ſacro, *he teaches how to obviate falſe religious notions: and is very copious in detecting the frauds and fallacies of thoſe men, who covered their ignorance with a veil of piety, making profeſſion of charming away thoſe diſeaſes, which they could not cure by medicines. In his books* De arte, De decoro, De præ-

(*n*) In præfatione.

præceptionibus, *he diſputes, not only againſt thoſe, who denied that phyſic was an art, and therefore had no regard to any thing but experience; but alſo againſt thoſe, who practiſed upon a wrong plan. And becauſe the divine old man is made a tool by contending parties for their reſpective notions; I cannot avoid obſerving, that mechanical reaſoning is every where approved and recommended in thoſe treatiſes by that great parent of medicine. For he ſays:* I praiſe reaſoning, when it is grounded on ſuch principles as fall under our ſenſes, or are proved by experiments; and draws concluſions from manifeſt premiſes. But if it is carried on by unjuſt deductions, and is built upon fictitious opinions, it occaſions great trouble and difficulties (o). *And*

(o) Lib. de præcept.

this ſentiment is illuſtrated and confirmed in his book De priſca medicina: *where after ſaying, that* moſt phyſicians are very like unſkilful pilots, whoſe ignorance of their art is not diſcovered, while the veſſels ſail in good weather before the wind; but if a ſtorm ariſe, then it ſoon appears, that their blunders were the cauſe of the ſhipwrecks, which happen: *he tells us, that* our chief care ſhould be to learn the properties of things, not by imagining or contriving, but by finding out the powers, which they are endowed with, and exerciſe on our bodies; in which inquiry great regard muſt be paid, both to the qualities of the humors, and to the figures of the parts: ſome of which from a wide beginning run into a narrow apex, others are more and

more

more expanded; ſome are ſmooth and cylindrical; ſome denſe or firm, others in fine thin and lax. *This is the wiſdom, which ought to accompany the ſtudy of medicine; by means of which he ſays, the* artiſt becomes equal to the gods *(p)*.

But *I ſhall enlarge no farther at preſent on this theme. However it manifeſtly appears from what has been hitherto ſaid, that* Hippocrates *gave the name of* ſophiſts (*q*) *to thoſe, who argued on fictitious principles; and that of* real phyſicians (*r*) *to thoſe, who reaſon from the laws of nature, and a knowledge of the animal fabric. Which I obſerve for the ſake of thoſe, who, as if there was no difference be-*

(*p*) Lib. de decoro.
(*q*) Σοφιςὰς.
(*r*) Ἐργῳ ἰητρὲς.

tween the groundleſs hypotheſes of philoſophers, and the certain concluſions of geometricians, hold this moſt uſeful ſcience in contempt, and even turn it into ridicule before the ignorant multitude. But ſurely theſe apply themſelves both to philoſophy and phyſic, without having any genius to either; for want of which they cannot diſcern the wide diſtance between ſophiſtical opinions and geometrical reaſonings. For he, who builds an hypotheſis, follows plauſibility, and thinks it ſufficient, if he can account for appearances from his principles: whereas mechanical theory deals in demonſtrations, which the able geometrician deduces either from the figures of bodies, or from the known laws of motion, by neceſſary conſequences.

EXAMPLES *will ſet this matter in a clearer light.* Des Cartes *compiled a ſet of* ſuſpicions and conjectures on the gravity of bodies, *and yet made no proficiency thereby in the knowledge of nature: but ſir* Iſaac Newton, *by purſuing its laws in a geometrical manner, without any regard to the cauſe, laid open to our contemplation the real fabric of the world. Doctor* Willis *invented an* idea of ſoporiferous diſeaſes; *from which we learn, that the author had words at will, but knew nothing of the nature of thoſe diſeaſes: whereas* Bellini, *by bringing their hiſtory and ſymptoms under mechanical reaſonings, paved the way to the knowledge and cure of thoſe great evils. But enough of this ſubject.*

WHEN

WHEN *I had communicated my intention of publiſhing this piece to my friend the celebrated dr.* Pitcairne, *he not only applauded my deſign, but, of his great humanity, readily ſent me ſome* hiſtories of periodical diſeaſes *out of his large ſtock. Thoſe I have ranged in their proper places, as conſiderable ornaments to my little book, not without a ſenſe of pleaſure, in ſeeing my opinion confirmed by the teſtimony of ſo great a maſter in theſe ſtudies; and the rather, becauſe it was proper to produce the obſervations of others, as well as my own, in ſupport of this new theory. And I may not conceal in this place, that our diſſertation diſplays, not a little, the wiſdom, goodneſs, and wonderful contrivance of*

the

the omnipotent Creator of the world; who, while he made ample provision for all living things, eſtabliſhed this difference between brutes and rational creatures; that whereas thoſe enjoy the common gifts of nature, he has permitted us, beſides, to inveſtigate their properties and uſes, and to contemplate the labyrinth of his divine works.

LASTLY, *I have but lightly touched upon the cure of the caſes related in this treatiſe; becauſe I intend, whenever I find ſufficient leiſure, to publiſh the moſt remarkable obſervations, which I have already, or may hereafter make on moſt diſeaſes.*

London,
A. D. 1704.

A

TREATISE

concerning the

INFLUENCE

of the

SUN and MOON

upon

HUMAN BODIES, &c.

CHAP. I.

That the ſun and moon cauſe various alterations in the human body, according to their different poſitions with reſpect to the earth.

IT was the general opinion of the ancient phyſicians, that ſome diſeaſes are entirely owing to the influence of the celeſtial

bodies, and that the paroxyſms and periods of others are regulated by the action of the moon in particular: wherefore the earlieſt hiſtories of Epidemics, which have been handed down to us, are full of the motions and powers of thoſe luminous orbs. Upon this principle it is, that *Hippocrates* adviſes his ſon *Theſſalus to the ſtudy of numbers and geometry* (*a*): becauſe, ſays he, *the riſing and ſetting of the ſtars have a great effect on diſtempers* (*b*).

But when in courſe of time medicine began to be accommodated to the reaſonings of philoſophers; no body being able to account for the manner of this celeſtial action, and the rule of obſervation being gradually laid aſide, it

(*a*) *Epiſt. ad Theſſalum.* (*b*) *De aëre, aquis, et locis.*

it was allowed no farther ſhare in affecting our health, than what might be imputed to the changes in the manifeſt conſtitution of the air: excepting perhaps ſomething of truth, which ſtill remains diſguiſed and blended with the jargon of judicial aſtrology.

In order therefore to ſet this obſcure and difficult matter in a little clearer light, I ſhall in the firſt place endeavour to ſhew, that the ſun and moon, regarding their nearneſs and direction to the earth only, beſides the effects of heat, moiſture, *&c.* thereby cauſed in our atmoſphere, muſt at certain times make ſome alterations in animal bodies; then enumerate ſome hiſtories and obſervations of ſuch changes, and inquire of what uſe ſuch thoughts as theſe may be in the practice of phyſic.

It is a conſtant obſervation of thoſe, who have written the hiſtory of the *winds*, that the moſt windy ſeaſons of the year are the times about the vernal and autumnal equinox. Every body likewiſe knows, that in the moſt quiet weather there is generally ſome breeze at mid-day and mid-night, as alſo at full ſea, that is, always about the time when the ſun or moon arrives at the meridian, either over or under our hemiſphere. Seamen and country people reckon upon this, and order their affairs accordingly. And the changes of the weather, as to winds or calms, eſpecially about the new and full moon, are too well known to require any authority to confirm ſuch remarks. Thoſe, who deſire a fuller account of theſe obſervations, may ſee it in *J. Goad's aſtro-*

meteorologia

meteorologia (*c*). Theſe things being matters of fact, and in a manner regular and univerſal, it may very well ſeem ſtrange, that philoſophers have not been more accurate in their inquiries into the reaſon of ſuch appearances. True indeed it is, that the origin of winds is various and incertain; but however, ſo conſtant and uniform an effect muſt undoubtedly be owing to one neceſſary cauſe.

It has been, now a conſiderable time ſince, ſufficiently made out, that our atmoſphere is a thin elaſtic fluid, one part of which gravitates upon another, and whoſe preſſure is communicated every way in a ſphere to any given part thereof. From hence it follows, that if by any external cauſe the gravity of any

(*c*) *London*, 1690. 4°.

any one part ſhould be diminiſhed, the more heavy air would ruſh in from all ſides around this part, to reſtore the equilibrium, which muſt of neceſſity be preſerved in all fluids. Now this violent running in of the heavier air would certainly produce a wind, which is no more than a ſtrong motion of the air in ſome determined direction. If therefore we can find any general cauſe, that would, at theſe ſtated ſeaſons, which we have mentioned, diminiſh the weight or preſſure of the atmoſphere; we ſhall have the genuine reaſon of theſe periodical winds, and the neceſſary conſequences thereof.

The flux and reflux of the ſea was a phænomenon too viſible, too regular, and too much conducing to the ſubſiſtance of mankind, and all other animals, to be neglected by

by thoſe, who applied themſelves to the ſtudy of nature: however all their attempts to explain this admirable contrivance of infinite wiſdom were unſucceſsful, till ſir *Iſaac Newton* revealed to the world juſter *principles*; and by a truer philoſophy, than was formerly known, ſhewed us how, by the united or divided forces of the ſun and moon, which are increaſed and leſſened by ſeveral circumſtances, all the varieties of the tides are to be accounted for. And ſince all the changes, we have enumerated in the atmoſphere, do fall out at the ſame times, when thoſe happen in the ocean; and likewiſe whereas both the waters of the ſea, and the air of our earth, are fluids ſubject, in a great meaſure, to the ſame laws of motion; it is plain, that the rule of our great philoſopher takes place here, *viz. that natural*

tural effects of the ſame kind are to be attributed, as much as poſſible, to the ſame cauſes (*d*).

WHAT difference that known property of the air, which is not in water, makes in the caſe, I ſhall ſhew anon. Setting aſide the conſideration of that for the preſent, it is certain, that as the ſea is, ſo muſt our air, twice every twenty five hours, be raiſed upwards to a conſiderable height, by the attraction of the moon coming to the meridian; ſo that inſtead of a *ſpherical*, it muſt form itſelf into a *ſpheroidal* figure, whoſe longeſt diameter, being produced, would paſs thro' the moon. That the like raiſing muſt follow, as often as the ſun is in the meridian of any place, either above or below the horizon;

(*d*) *Newton. Princip. pag.* 387.

horizon; and that the moon's power of producing this effect exceeds that of the ſun, in the proportion of 4 ½ to 1 nearly. Moreover, that this elevation is *greateſt* upon the new and full moons, becauſe both ſun and moon do then conſpire in their attraction; *leaſt* on the quarters, in that they then drawing different ways, it is only the difference of their actions that produces the effect; laſtly, that this intumeſcence will be of a *middle degree*, at the time between the quarters, and new and full moon. The different diſtances of the moon in her *perigæum* and *apogæum*, likewiſe increaſe or diminiſh this power. Beſides, the ſun's leſſer diſtance from the earth in winter is the reaſon, that the greateſt and leaſt attraction of the air upwards more frequently happens a little before the vernal, and

after the autumnal equinox. And in places, where the moon declines from the equator, the attraction is greater and leſſer alternately, on account of the diurnal rotation of the earth on its axis.

WHATEVER has been ſaid on this head, is no more than applying, what ſir *Iſaac Newton* has demonſtrated of the ſea, to our atmoſphere; and it is needleſs to ſhew, how neceſſarily thoſe appearances, juſt now mentioned of winds, at the ſtated times, muſt happen hereupon. It will be of more uſe to conſider the proportion of the forces of the two luminaries upon the *air*, to that which they have upon the watersof our globe; that it may the more plainly appear, what influence the alterations hereby made muſt have upon the animal body.

SIR

Sir *Isaac Newton* has demonſtrated, (*e*) that the force of the ſun to move the ſea, is to the force of gravity, as 1 to 12868200. Let this be

$$S : G :: 1 : n. \quad \text{Hence, } S = \frac{G}{n}.$$

And that the force of the moon to raiſe the ſea is to gravity, as 1 to 2871400. Let this be

$$L : G :: 1 : s. \quad \text{Hence, } L = \frac{G}{s}.$$

And ſince the centrifugal force of the parts of the earth, ariſing from its diurnal motion, is to gravity, as 1 to 289; let this be

$$C : G :: 1 : e. \quad \text{Then } C = \frac{G}{e}.$$

(*e*) *Princip. Lib. iii. Prop.* 36. & 37.

Hence,

$$\text{S} + \text{L} : \text{C} :: \frac{\text{G}}{n} + \frac{\text{G}}{s} : \frac{\text{G}}{e} :: \frac{\text{I}}{n} + \frac{\text{I}}{s} : \frac{\text{I}}{e} ::$$

$$1 : \frac{sn}{s + n \times e} :: 1 : 8123.$$

THE ſame philoſopher has taught us, that the centrifugal force raiſes the water at the equator above the water at the poles, to the height of 85472 feet (*f*). Wherefore if that force, which is as 8123, raiſes the ocean to 85472 feet; the united forces of the ſun and moon, which are as 1, will raiſe the ſame to 10 $\frac{1}{2}$ feet:

$$\text{for } \frac{85472}{8123} = 10\ \tfrac{1}{2} \text{ nearly.}$$

Now,

(*f*) *Ibid. Lib. iii. Prop.* 37.

Now, we know that the more eaſily the water can obey the attraction, with the more force are the tides moved: but ſince, as the ſagacious dr. *Halley* has determin'd it, our atmoſphere is extended to forty four miles, whereas the middle depth of the ocean is but about half a mile; it is plain, that the air, revolving in a ſphere about a hundred times larger than that of the ocean, even ſuppoſing the whole terreſtrial globe covered with water, will have a proportionably greater agitation. Beſides rocks, ſhelves, and the inequality of ſhoars are a great ſtop to the acceſs and receſs of the ſea: but nothing repels the riſing air, which is alſo of ſuch thinneſs and fluidity, that it is eaſily driven, and runs every way.

Nor ought we to omit, that it is the univerſal law of bodies attracted, that the force of attraction is reciprocally as the ſquares of their diſtances; ſo that the action of the ſun and moon will be greater upon the air, than upon the water, upon the account of its nearneſs. But the conſideration of the elaſticity is ſtill of greater moment here; of which this is the nature, that it is reciprocally as the preſſure: ſo that the incumbent weight being diminiſhed by the attraction, the air underneath will upon this ſcore be mightily expanded. True it is indeed, that this preſſure diminiſhes gradually, in ſuch ſort, that it is of no moment beyond a certain diſtance from the earth: but yet a ſmall alteration therein produces a very conſiderable effect; becauſe there-

by

by our ambient air the more readily yields to the attractive faculty.

THESE and ſuch like cauſes will make the tides in the air from the moon's attraction, to be much greater than thoſe of the ocean. Nor is it neceſſary to our purpoſe to determine, by nice calculations, their particular forces: it is ſufficient to have proved, that theſe motions muſt both be univerſal, and alſo return at certain intervals.

Now, ſince the raiſing of the water of the ocean to ten feet and a half, produces torrents of ſuch a prodigious force; we may eaſily conceive what tempeſts of winds, if not otherwiſe checked, the elevation of the air much higher, perhaps above a mile, will neceſſarily cauſe. And there is no doubt to be made, but that the ſame infinitely

nitely wiſe being, who contrived the flux and reflux of the ſea, to ſecure that vaſt collection of waters from ſtagnation and corruption, which would inevitably deſtroy all the animals and vegetables on this globe; has ordered this ebb and flood of the air of our atmoſphere, with the like good deſign; that is, to preſerve the ſweet freſhneſs, and briſk temper of this fluid, ſo neceſſary to life; and keep it, by a kind of continual circulation, from deadneſs and ſtinking. We daily feel the benefits of this wonderful contrivance; but I cannot find, that the manner of it has been hitherto accounted for. And yet no ſubject better deſerved the ſerious conſideration of phyſicians: ſince it has been obſerved, that people recover ſpeedily from waſting chronical diſeaſes in clear open air;

and

and that the beſt conſtitutions are very liable to ſickneſs in moiſt cloſe places.

THIS reaſoning is liable to only one objection, that I know of, which is this: that the appearances, we have mentioned, cannot be owing to the cauſes now aſſigned; ſince by calculation from them, the mercury muſt at new and full moon ſubſide in the barometer to a certain degree; which yet barometrical writers do not obſerve to happen. *Ramazzini* in particular expreſſes his ſurprize on this head, thinking it reaſonable to ſuppoſe, that *as the tides in the ocean are obſerved to be greater at thoſe times, than at any other time of the moon, on account of the influence, which this planet is thought to have on the ſea; ſo likewiſe ſome remarkable change ought to appear in the gra-*

vity of the atmoſphere. But yet, ſays he, *nothing of this kind has happened, worth mentioning: for through the whole courſe of this year there was little or no difference in the height of the mercury at the new and full moons, with reſpect to the preceding and ſubſequent days; nor indeed during all the times of its darkneſs (g).*

In anſwer to which, it may not be amiſs to inquire into the cauſe of the riſe and fall of the quickſilver in the barometer, which does not ſeem to have been cleared up by writers on this ſubject. Firſt then it is certain, that this heavy fluid is raiſed by the preſſure of the incumbent air, and that the preſſure of this element is in proportion to its gravity: which as it is the

(g) *Ephemerid. baromet. Mutinens. ann.* 1694. *p.* xix.

the greater, the more air is contained in the column directly impending on the quickſilver; whatſoever increaſes or diminiſhes this quantity of air, will make the quickſilver riſe or fall in the tube. Hence it is, that winds occaſion very conſiderable changes in the weather-glaſs; according as they rarefy or condenſe the air in this column. Thus between the tropics, where the trade-winds reign, which are moderate gales, conſtantly blowing from the ſame quarter for ſeveral months together, the variations of the barometer are very inconſiderable, as dr. *Halley* has obſerved (*b*); whereas in northern latitudes they are conſiderable, and indeed more ſo than in ſouthern latitudes: becauſe ſtorms are more common in the

(*b*) *Phil. tranſ.* N° 181. *p.* 111.

former, than in the latter; and at thoſe times, which are moſt ſubject to winds, the mercury varies almoſt every hour: as *Ramazzini* has obſerved about the equinoxes. *For about theſe*, he ſays, *I have obſerved remarkable variations, and eſpecially at the autumnal equinox, when the quickſilver roſe and fell ſeveral lines in one day; whereas in the ſolſtices it kept the ſame ſtation as the foregoing days (i).* But yet, let the air be raiſed ever ſo high at the new and full moon, it cannot poſſibly happen, that the mercury ſhould conſtantly ſubſide in all places at thoſe times: becauſe ſuch is the known property of winds, that thoſe, which carry off and rarefy the air in one place, crowd it in, and condenſe it in another.

THIS

(i) *Lib. citat. pag. xxx.*

THIS matter thus far explained, it will not be improper to ſubjoin the ſolution of a difficult queſtion, which has raiſed great contention among philoſophers: *viz.* whereas water is more than eight hundred times heavier than air, how does it happen, that the latter, when replete with watery vapors, depreſſes the mercury in the barometer; ſo that its fall is an indication of rain? Now this phænomenon ſeems to me to be chiefly owing to the following cauſes. Water is ſo entirely void of elaſticity, that no force can compreſs it into a narrower compaſs; and at the ſame time, a boiling heat divides it into ſuch minute particles, as to make it occupy fourteen thouſand times more ſpace, than it naturally takes up (*k*). This vapor, more than

(*k*) *See Deſaguliers's courſe of experimental philoſophy, vol. ii. lect. x.*

than ſixteen times thinner than our air, is ſo ſubtile, that it is eaſily retained by the particles of the air, and unites with them, much in the ſame manner, as the very ſmall parts of metals, diſſolved in ſome acid liquors, are ſuſpended by them. For it is well known, that the more minutely bodies are divided, the more ſurface they acquire in reſpect to their bulk. Beſides, the air, which we breathe, contains a vaſt number of particles heavier than water, I mean the exhalations from minerals, animals and vegetables, and in a word from all the productions of the earth. But perhaps what is of greateſt moment in this caſe, is the quality of the particles exhaled from the earth, which are chiefly ſulphureous. For it has been found by experiments, that the

fumes

fumes from ſulphur are ſo contrary to elaſticity, that they quite deſtroy it (*l*). Now, ſir *Iſaac Newton* has ſhewn, that almoſt all bodies contain ſulphur: and the phænomena of lightning and thunder ſhew, that the atmoſphere is full of it. Wherefore theſe reaſons ſufficiently prove, that moiſt air has leſs power to act than dry air. When theſe very ſubtile watery vapors, by their attractive and repulſive qualities, have run into one another, and formed drops; they thereby become heavier than air, and fall to the earth in the form of rain: and then the air, freed from theſe vapors, acts with greater force, and raiſes the mercury in the barometer.

BUT

(*l*) *See* Hales's *ſtatical eſſays, vol.* 1. *p.* 230. *and* 299.

BUT to return; the winds are produced by ſo many different cauſes, that a perſon would find himſelf greatly miſtaken, who would attempt to account for them all upon any one principle.

WHEREFORE to thoſe already explained, we may add that conſtant cauſe of the motion of the air, I mean the heat of the ſun. For as dr. *Halley* (*m*) has demonſtrated, that the trade-winds, which reign between the tropics, owe their riſe to it; ſo it is moſt certain, that it may occaſion various motions of the air in every part of the terraqueous globe. Moreover, we know that there ſometimes happen violent tempeſts in the upper regions of the air, while we enjoy a calm below; and that the ridges of

(*m*) *Phil. tranſ.* N° 183.

of mountains check the propagation of the winds in many places: ſo that it is no wonder, that the phænomena of the changes of the air, which we have aſcribed to the action of the moon, are not always conſtant and uniform. Now the chief cauſes of uncertain and irregular winds are theſe. Firſt, elaſtic vapors forced from the bowels of the earth, by ſubterraneous heats, and condenſed by what cauſe ſoever in the atmoſphere. Secondly, a mixture of *effluvia* of different qualities in the air, may, by rarefactions and fermentations, produce winds, and other effects, like thoſe reſulting from the combination of ſome chemical liquors. And that ſuch things happen, we are aſſured from the nature of thunder, lightning, and meteors. Thirdly, from the eruptions of *volcano's*, and earthquakes in diſ-

tant places, winds may be propagated to remoter countries. Laſtly, the divided or united forces of the other planets, and of comets, may variouſly diſturb the action of the ſun and moon.

THESE things being premiſed, it will not be difficult to ſhew, that theſe changes in our atmoſphere at high water, new and full moon, the equinoxes, *&c.* muſt occaſion ſome alterations in all animal bodies; and that from the following conſiderations.

FIRST, all living creatures require air of a determined gravity, to perform reſpiration eaſily, and with advantage: for it is by its weight chiefly, that this fluid inſinuates itſelf into the lungs. Now the gravity, as we have proved, being leſſened at theſe ſeaſons, a

ſmaller

ſmaller quantity than uſual will inſinuate itſelf; and this muſt be of ſmaller force to comminute the blood, and forward its paſſage into the left ventricle of the heart: whence a ſlower circulation enſues, and the ſecretion of the nervous fluid is diminiſhed.

SECONDLY, this effect will be the more ſure, in that the elaſticity of the atmoſphere is likewiſe diminiſhed. Air proper for reſpiration muſt be, not only heavy, but alſo elaſtic, to a certain degree: for as this is by its weight forced into the cavity of the *thorax* in inſpiration, ſo the muſcles of the *thorax* and *abdomen* preſs it into the moſt minute ramifications of the *bronchia* in expiration; where the bending force being ſomewhat taken off, and ſpringy bodies, when unbended, exerting

their power every way, in proportion to their preſſures; the parts of the air puſh againſt all the ſides of the *veſiculæ*, and promote the paſſage of the blood. Therefore the ſame things, which cauſe any alterations in this property of the air, will more or leſs diſturb the animal motions. We have a convincing inſtance of all this, in thoſe who go to the top of high mountains: for the air is there ſo pure (as they call it) that is, thin, and wants ſo much of its gravity and elaſticity, that they cannot take in a ſufficient quantity of it to inflate the lungs, and therefore breathe with very great difficulty.

Lastly, all the fluids in animals have in them a mixture of elaſtic *aura*, which, when ſet at liberty, ſhews its energy, and cauſes thoſe inteſtine motions, we obſerve

obſerve in the blood and ſpirits; the exceſs of which is checked by the external ambient air, while thoſe juices are contained in their proper veſſels. Now when the preſſure of the atmoſphere upon the ſurface of our body is diminiſhed, the inward air in the veſſels muſt neceſſarily be inabled to exert its force, in proportion to the leſſening of the gravity and elaſticity of the outward: hereupon the juices begin to ferment, change the union and coheſion of their parts, and ſtretch the veſſels to ſuch a degree, as ſometimes to burſt the ſmalleſt of them. This is very plain in living creatures put into the receiver, exhauſted by the air-pump; which always firſt pant for breath, and then ſwell, as the air is more and more drawn out: their lungs at the ſame time contracting themſelves, and falling ſo toge-

together, as to be hardly diſcernible, eſpecially in the leſſer animals (*n*).

CONCERNING the weight of the atmoſphere on a human body, and its difference of preſſure at different times, let this eſtimate ſuffice. We will lay it down as certain, that this weight and preſſure may be computed from the force, with which the air raiſes the quickſilver in the barometer. The ſurface of a man's body, of a middle ſize, is fifteen ſquare feet, or 2160 inches. The weight of a cubic inch of quickſilver is 8,101, *&c.* ounces averdupois. Wherefore the preſſure of the air on every ſquare inch of the human body, in the ratio of the weight of the quickſilver in the barometer, will ſtand thus. A column of quickſilver, an

(*n*) *Eſperienze dell' accademia del cimento*, p. 118.

an inch ſquare, can in *England* be raiſed in the barometer to 30 inches and $\frac{8}{10}$, by the air when heavieſt; and it will ſubſide to 28 inches, when the air is lighteſt. Conſequently, the air, when heavieſt, will preſs on every inch of the ſurface of the human body, with the weight of 15 pounds and 9 ounces; when lighteſt, with that of 14 pounds 2 ounces averdupois. Thus the whole body, in the heavieſt air, ſuſtains a weight of about 33684 pounds; in the lighteſt, of 30622 pounds 5 ounces. Whence the difference of preſſure at different times is 3062 pounds nearly. True it is, that the internal air of the human body makes a reſiſtance to that weight: but yet ſuch change of preſſure muſt neceſſarily have conſiderable effects; eſpecially when this internal air, through ſome de-

fect in the animal fluids, with which it is mixed, is increaſed or diminiſhed in its natural properties.

BEFORE we proceed to other matters, it may be worth the while to take notice of two things: firſt, that effects, depending on ſuch cauſes as theſe, muſt of neceſſity be moſt viſible in weak bodies, and morbid conſtitutions, when other circumſtances concur to their taking place; while ſtrong bodies and ſound conſtitutions are little affected by them. For this reaſon, whatever miſchiefs do hence follow, cannot in the leaſt diſparage the wiſe contrivance of infinite power, in ordering theſe tides of our atmoſphere. The author of nature has certainly made all things to the greateſt advantage, that could be, for the whole

whole ſyſtem of animals on our globe, altho' ſuch a diſpoſition might in ſome caſes prove prejudicial to a few. The poſition and diſtance of the ſun are ſo adjuſted, as to give, in the moſt beneficial manner poſſible, heat and light to the earth: yet this notwithſtanding, the exceſſive ſummer heats in ſome countries may be attended with bad conſequences; in others, the winter colds may be ſo intenſe, that tender bodies cannot bear them; and in all ſeaſons and climates, changes of weather may give birth to diſeaſes. The whole however, we muſt own, is moſt carefully provided for. Beſides, as moſt of theſe laſt mentioned inconveniencies are by eaſy ſhifts to be avoided; ſo there are ſuch powerful checks put to this aerial flux and reflux, ſo many ways of abating the damages accruing from

it now and then; that theſe are of no account, in compariſon of the mighty benefits hence ariſing, in which the race of mankind dóes univerſally ſhare.

SECONDLY, that the other planets have likewiſe their peculiar influences; which, tho' inferior to thoſe of the ſun and moon, yet contribute various ways towards increaſing or diminiſhing the action of theſe on human bodies. And theſe united forces are of ſuch conſequence, that violent and occult diſeaſes, with which whole nations are ſeized, may be certainly attributed to them. And the θεῖον τι or *ſomewhat divine* of *Hippocrates* (o), which he recommends to have regard to in diſeaſes, is moſt probably nothing more

(o) *Prognoſtic.* 1.

more than the ſtate of our atmoſphere, occaſioned by the influence of the planets, or ſome other uncommon and unknown natural cauſe; as I have more amply explained on another occaſion (*p*).

(*p*) *See* Account of poiſons, *eſſay vi. pag.* 300. *of the fourth edit.*

CHAP. II.

Of the diſeaſes, and ſymptoms, which derive their origin from the abovementioned cauſes.

I NOW proceed to examine what particular functions of animal bodies are diſturbed by theſe periodical rarefactions of the fluids in their proper veſſels: and here I ſhall not ground my opinion on my own obſervation alone, but likewiſe take in the aſſiſtance of other medical writers. For there are no hiſtories in phyſic, which we may more ſafely take upon the credit of the authors, who relate them, than ſuch as we are now going to mention. In ſome caſes a point may perhaps be ſtrained, to ſerve a darling hypotheſis, which the writer has

taken up; but here we are much more likely to have pure matter of fact: becauſe hitherto no one has pretended, that the appearances of this kind are within the reach of any ſcheme of philoſophy.

And firſt it appears evident to me, that the moon's influence is neceſſarily greater on the nervous fluid or animal ſpirits, than on the blood, or any other fluid of the animal body. For as that fluid is compoſed of extremely minute, and (as I have ſhewn elſewhere (*q*)) elaſtic parts; it muſt be the more eaſily ſuſceptible of the power of any external cauſe whatever. Wherefore the moon's action will chiefly regard thoſe diſeaſes, which are occaſioned by the vitiation of thoſe ſpirits.

Or

(*q*) *See Introduction to a mechanical account of poiſons, 4th edit.*

Of this claſs none ſeem more remarkable than *epileptic diſeaſes*, which, beſides the other difficulties, with which they are attended, have this alſo ſurprizing, that in ſome the fits do conſtantly return every new and full moon. *The moon*, ſays *Galen* (*r*) *governs the periods of epileptic caſes*. Upon this ſcore, they, who were thus affected, were by the greek writers ſometimes called Σεληνιακοὶ (*s*), and in the hiſtories of the goſpel Σεληνιαζόμενοι (*t*), and by ſome of the *Latins* afterwards, *Lunatici* (*u*).

And indeed, I myſelf remember, when I was phyſician to St. *Thomas*'s hoſpital during the time of queen *Anne*'s wars with *France*, that

(*r*) *De diebus criticis, lib. iii.*

(*s*) *Alexand. Tralliian. lib. i. c.* 25.

(*t*) *Matth. c. xvii. v.* 15.

(*u*) *Apuleius de virtutibus herbar. cap.* 9. & 65.

that ſeveral of the ſailors of our fleets were brought thither, and put under my care for this diſtemper: moſt of whom were new men, who had contracted the diſeaſe by frights, either in ſea-engagements, or in ſtorms. But the moon's influence was ſo viſible on the generality of them at the new and full, that I have often predicted the times of the fits with tolerable certainty. And *T. Bartholin* tells a ſtory of an *epileptic girl, who had ſpots in her face, which varied both in colour and magnitude, according to the time of the moon. So great,* ſays he, *is the correſpondence between our bodies and the heavens (x).*

MOREOVER, the learned dr. *Pitcairne* has aſſured me, that he attended a patient of thirty years of age,

(x) *Hiſtor. anatom. centur. ii. hiſt.* 72.

age, of a thin habit and ſomewhat melancholic conſtitution of body; who, nine years before, after a conſiderable hemorrhage from the noſe, complained of ſome humor ſuddenly riſing from his right hand to the top of his ſhoulder, and then fell ſenſeleſs on the ground. Upon his recovery from the fit, he felt ſo great a numbneſs in that hand, that he could not ſtir his fingers: and his right arm was violently toſſed forward and backward, againſt his will, for the ſpace of four minutes; during which time he loſt the uſe of his tongue. And this diſorder returned periodically twice every year, in *March* and *September*, that is at the new moon, near the vernal and autumnal equinoxes. The moſt remarkable particulars of this caſe were theſe. Firſt, the paroxyſm came on more frequently

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in the night, than in the day time. Secondly, neither his feet, nor left arm, were ever affected by the diſorder. Thirdly, the ſtupor, which conſtantly remained ſince the firſt ſeizure of the diſorder, did never after deprive him of his ſenſes: for he could walk or ride, even when it was at the worſt. Fourthly, while the humor was moving up his hand, he could ſtill uſe his fingers: but when it had got up to the arm, then were they deprived of feeling and motion: afterwards upon its ſeizing the right ſide of the head, it occaſioned violent convulſive motions of the arm for three or four minutes. Fifthly, at thoſe times when the fit was wont to return, he was ſometimes ſeized with the numbneſs twice or thrice in an hour; at other times not above once in two or three days. Sixthly, the

diſeaſe was augmented by warm bathing: for after it, the paroxyſms were more violent than uſual. Laſtly, his memory was remarkably affected about the time of the paroxyſm.

THE ſame gentleman informed me likewiſe, that he knew ſeveral women, who were ſubject to epileptic ſymptoms at the new and full moon; eſpecially pregnant women, and thoſe who ſtop'd childing early, and whoſe menſtrual purgations left them before the uſual time. Theſe were frequently ſeized by the fit, in their ſleep, and ſometimes in the day time alſo. And he remember'd to have cured two young women, whoſe fits followed the change of the moon; but they were of that kind of epileptic fits, which are commonly called St. *Vitus*'s *dance*.

Their

Their geſtures were very odd and incertain, and ſomewhat like dancing: and they were deprived of ſpeech, during the paroxyſm. In fine, other phyſicians had tried in vain to cure theſe diſorders by *Sydenham*'s method (*x*), for want of attending to their monthly periodical returns.

But no greater conſent in ſuch caſes was perhaps ever obſerved, than what I ſaw many years ſince in a child about five years old; in which the convulſions were ſo ſtrong and frequent, that life was almoſt deſpaired of, and by evacuations and other medicines very difficultly ſaved. The girl, who was of a luſty full habit of body, continued well for a few days; but wa at full moon again ſeized with a moſt violent fit: after

(*x*) *In Schedula monitoria.*

which, the diſeaſe kept its periods conſtant and regular with the tides. She lay always ſpeechleſs during the whole time of flood, and recovered upon the ebb. The father, who lived by the *Thames* ſide, and did buſineſs upon the river, obſerved theſe returns to be ſo punctual; that not only coming home, he knew how the child was before he ſaw it, but in the night has riſen to his employ; being warned by her cries, when coming out of the fit, of the turning of the water. This continued fourteen days, that is, to the next great change of the moon; and then a dry ſcab on the crown of the head, (the effect of an epiſpaſtic plaiſter, with which I had covered the whole *Occiput* in the beginning of the illneſs) broke; and from the ſore, tho' there had been no ſenſible diſcharge this way for above a fortnight,

night, ran a conſiderable quantity of limpid ſerum. Upon which, the fits returning no more, I took great care to promote this new evacuation by proper applications, with deſired ſucceſs, for ſome time; and when it ceaſed, beſides three or four purges with *mercurius dulcis*, &c. directed to be taken about the new and full of the moon, I ordered an iſſue in the neck, which being thought troubleſome, was made in the arm. The patient however grew up to woman's eſtate, without ever after feeling any attacks of thoſe frightful ſymptoms.

WHETHER or no it be through want of due heed and inquiry, that we have not, in all the collections of hiſtories and caſes, any inſtance of the like nature ſo particular as this is, I will not take upon me to

aſſert

aſſert: but to me it ſeems probable, that when due attention ſhall be given to theſe cauſes, various examples will occur of the ſame kind of ſympathy. In the mean time I cannot think it ſtrange, that ſome of the ancients, as *Aretæus* has recorded (*y*), attributed this diſeaſe entirely to the moon; and were of opinion, that the deity of that planet inflicted this kind of puniſhment on wicked people for their crimes, and therefore called it the *ſacred diſeaſe*.

And it may not be improper to remark in this place, that the *raving fits* of mad people, which keep lunar periods, are generally accompanied with epileptic ſymptoms: which was atteſted to me as a conſtant obſervation by the late learned dr. *Tyſon*, formerly phyſician

(*y*) *De diuturnis morbis, lib. i. c. 4.*

cian to *Bethleem hoſpital*, who upon that account uſually called ſuch patients *epileptic mad.*

THE *vertigo* is nearly related to the epilepſy according to *Galen* (*z*), and therefore it was by the ancients called the *little epilepſy*, as *Cælius Aurelianus* relates (*a*). This at leaſt is certain, that both theſe diſeaſes are frequently obſerved to obey the lunar influence: which is confirmed by ſeveral caſes, that fell under the obſervation of dr. *Pitcairne.*

Hyſterical diſorders do likewiſe partake of the ſame nature; and therefore a juſt regard to thoſe periods will contribute to happier ſucceſs in the cure. One of *Pitcairne*'s caſes is that of a young married woman, of a fat habit of body, and red-

(*z*) *In aphor. Hippoc. comment. iii. aph.* 17.

(*a*) *De morb. chron. lib. i. cap.* 2.

red-haired, who never had her monthly evacuations in a proper quantity. She had for four years paſt complained of a troubleſome weight or preſſure on the crown of the head, and of a cold humor at the ſame time trickling down to her ſhoulders, with great giddineſs and choaking: ſhe alſo threw up a ſharp ſlimy humor from off her ſtomach, had a pain and ſqueezing about her heart, with a difficulty of breathing in the morning at upriſing; and theſe ſymptoms returned conſtantly every new and full moon.

Carolus Piſo, an accurate writer of medical obſervations, relates two caſes to this purpoſe; the firſt of a lady of quality, *whoſe left cheek and part of the neck were wont to ſwell very ſenſibly, about the new moon; and this ſymptom*

was

was conſtantly attended with an hyſterical ſuffocation (b). The ſecond was of a girl, *who, about each full moon of the ſpring ſeaſon, was ſeized with ſuch obſtinate hyſterical ſymptoms, that they continued the whole third quarter. The firſt day ſhe was convulſed, then ſhe was ſeized with a loſs of ſpeech, and fell into a deep ſleep, which laſted two days: and the remaining four days ſhe ſpent in doing inſignificant things, crying out for help, or in ſhort in a ſlight delirium, without a wink of ſleep (c).*

PHYSICIANS have recorded ſeveral remarkable inſtances of *periodical palſies.* The ſame *Piſo* gives the following. An aged man was ſeized with a ſleepineſs and great laſſitude, which was fol-

(b) *De morbis a ſeroſa colluvie, obſ.* 27.

(c) *Obſ.* 28.

lowed by a dead palſy, ſtupor, loſs of memory, and ſome degree of folly, with a fever. *Theſe complaints returned regularly every new moon for two years; the ſymptoms gradually leſſening, and the laſt fits had but a faint reſemblance with thoſe, he ſuffered in the begining (d).*

Tulpius, a very candid and judicious writer, relates a ſingular caſe of a ſhaking palſy, with which a maiden of a pale complection, and phlegmatic habit of body, was afflicted during the ſpace of three years, not conſtantly indeed, but with intermiſſions; each fit laſting near two hours, accompanied with a hoarſeneſs and ſuppreſſion of voice. *The paroxyſms manifeſtly agreed, ſometimes with the tides, ſometimes with the moon,*

(d) *Obſ.* 16.

moon, and ſometimes with the ſun: for according to the change of theſe, the returns were ſometimes earlier, ſometimes later (*e*).

THE ancients obſerved, and every one knows, how great a ſhare the moon has in forwarding thoſe evacuations of the weaker ſex, which have their name from the conſtant regularity they keep in their returns. And there is no queſtion to be made, but the correſpondency, which we here obſerve, would be greater ſtill, and even univerſal; did not the infinite varieties in particular conſtitutions, climates, manner of life, and many accidents, one way or other concur to make a difference. It is very obſervable, that in countries neareſt to the *equator*, where we have proved the lunar action

(*e*) *Obſerv. med. lib.* 1. *cap.* 12.

to be ſtrongeſt, theſe monthly ſecretions are in much greater quantity, than in thoſe near the poles, where this force is weakeſt. This *Hippocrates* (*f*) takes notice of, with reſpect to places far north, and gives it as one reaſon, why the women in *Scythia* are not very fruitful.

The caſe being thus with females, it is no wonder, if we ſometimes meet with periodical hemorrhages anſwering to the times of the moon in males alſo. For as a greater quantity of blood, in proportion to the bulk in *one* ſex, is the reaſon of its diſcharging itſelf through proper ducts, at certain intervals, when the preſſure of the external air being diminiſhed, the internal *aura* can exert its elaſticity; ſo in the *other*, if

(*f*) *De aëre, aquis, & locis.*

if at any time there happens to be a ſuperabundancy of the ſame fluid, together with a weak tone of the fibres; it is plain that the veſſels will be moſt eaſily burſt, when the reſiſtance of the atmoſphere is leaſt. And this more eſpecially, if any accidental hurt, or rarefying force has firſt given occaſion to the other cauſes to take effect.

I HAVE known a young gentleman of a tender frame of body, but otherwiſe healthy, who having once, by over-reaching, ſtrained the parts about the breaſt, fell thereupon into a ſpitting of blood; which for a year and half conſtantly returned every new moon, and decreaſing gradually, continued always four or five days: the fits being more or leſs conſiderable, according as his management about

that time contributed to a greater or leſſer fullneſs of the veſſels.

Doctor *Pitcairne*'s own caſe is remarkable, both in regard to the diſeaſe and its concomitant circumſtances. In the year 1687. being at a country ſeat near *Edinburgh* in *February*, on a fairer day than uſual at that ſeaſon, and the ſun looking reddiſh; he was ſeized, at nine in the morning, the very hour of the new moon, with a ſudden bleeding at the noſe, after an uncommon faintneſs. And the next day on his return to town, he found that the barometer was lower at that very hour, than either he, or his friend dr. *Gregory*, who kept the journal of the weather, had ever obſerved it: and that another friend of his, mr. *Cockburn*, profeſſor of philoſophy, had died ſuddenly at the ſame hour by an eruption

ruption of blood from the lungs; and alſo five or ſix others of his patients were ſeized with different hemorrhages.

We have two notable inſtances of the like nature in our *Philoſophical tranſactions*; the one related by dr. *Muſgrave* (*g*) of a perſon, who, from his infancy to the twenty-fourth year of his age, had every full moon an eruption of blood on the right ſide of the nail of his left thumb; at firſt to three or four ounces, and after his ſixteenth year, to half a pound each time; which when, by ſearing the part with a hot iron, it ſtopped, he fell into a ſpitting of blood, and by frequent bleeding, &c. was very difficultly ſaved from a conſumption. The other (*h*) is a ſtory of an inn-keeper in *Ireland*, who from the

(*g*) *No.* 272. | (*h*) *No.* 171.

the forty-third year of his life, to the fifty-fifth (in which it killed him) ſuffered a periodical evacuation at the point of the fore-finger of his right-hand; and whenever they endeavoured to ſtanch the blood, it raiſed moſt exquiſite tortures in his arm. And altho' the fits here kept not their returns ſo certain as in the forementioned caſe, (it may be either from the irregular way of living of the patient, or the mighty change every effuſion made in his habit of body, the quantity ſeldom amounting to leſs than four pounds at a time) yet there is this remarkable circumſtance in the relation, that the firſt appearance of this *hemorrhage* was at Eaſter, that is, the next full moon after the vernal *equinox:* which is one of the two ſeaſons of the year, at which we

have

have proved the attraction of the air, or diminution of its preſſure, to be greater than at any other time whatſoever.

But we are beſides this to conſider, that the ſtatic chair, and nice obſervation taught *Sanctorius*, *(i)* that *men do increaſe a pound or two in their weight every month, which overplus is diſcharged at the month's end, by a criſis of copious, or thick turbid urine.* It is not therefore at all ſtrange, that we ſhould once a month be liable to the returns of ſuch diſtempers, as depend upon a fullneſs of the veſſels; that theſe ſhould take place at thoſe times eſpecially, when the ambient air is leaſt able to repreſs the turgency; and that tho' new and full moon are both of equal force, yet that ſometimes one, and

(*i*) *Medicin. ſtatic.* ſect. 1. aph. 65.

ſometimes the other only ſhould influence the periods, according as this or that happens to fall in with the inward repletion.

THE *Fluor albus* is a diſeaſe equally common and difficult of cure. Of this diſeaſe dr. *Pitcairne* has obſerved a caſe, which laſted four years: wherein the returns came regularly at every new moon, and the diſcharge conſtantly laſted eight days.

ULCERS are liable to various accidents, which render ſome of them of incertain prognoſtic: and yet even in theſe the afflux of humors is ſometimes manifeſtly altered by this power. *Baglivi* (*k*) was acquainted with a learned young man at *Rome*, who laboured under a *fiſtula* in the *abdomen*, penetrating

(*k*) *De experiment. circa ſanguin. Operum pag.* 449.

ing to the *colon*; which diſcharged ſo plentifully in the increaſe, and ſo ſparingly in the decreaſe of the moon, that he could make a very true judgment of the periods and quadratures of that planet, from the different quantity of the matter that came from him. This reminds me of the caſe of a young man, who after impure coition firſt felt a pain in his back, and a weakneſs and liſtleſlneſs to walk in his thighs for four days. After this, appeared an ulcer in the *glans penis*, which ran with fetid matter. This flux ſtop'd ſpontaneouſly in about a week; but returned next new moon, and continued ſo to ſtop and return for ſome months; till he was put into a proper courſe of medicine, whereby he was perfectly cured.

NEPHRITIC paroxyſms have frequently been obſerved to obey the lunar attraction. *Tulpius (l)* relates the caſe of mr. *Henry Ainſworth*, an *Engliſh* miniſter at *Amſterdam*, who had a fit of the gravel and ſuppreſſion of urine every full moon; of which he found no relief till the moon decreaſed, unleſs by bleeding at the arm. After his death two large ſtones were taken out of his bladder, and the *pelvis* of the left kidney was enlarged to that degree by the quantity of urine ſo often ſtop'd there, as to contain almoſt as much as the bladder itſelf. He likewiſe ſaw a caſe of a *capillorum mictus*, which returned periodically every fortnight, with great difficulty of urine, and ſuch uneaſineſs in the patient's

(l) *Obſervat. lib. ii. c. 43.*

patient's body, that he could ſcarcely keep in bed (*m*).

THERE is a fact almoſt contrary to theſe related by *T. Bartholin*; who being called to a conſultation on the caſe of *M. Bullichius*, the chief magiſtrate of *Copenhagen*, found that for ſome years paſt he had been afflicted with a periodical *diabetes ſpuria*, which returned every month with pain after a ſevere nephritic fit, at or near the full moon; when he made twelve quarts or twenty-four pounds of water, though he had not drank a pint (*n*).

I WAS preſent, many years ſince, at the diſſection of a child about five years old, who died of the frequent returns of *nephritic* fits,

(*m*) *Ibid. cap.* 52.
(*n*) *Acta medic. et philoſ. Hafniens. Vol. i, Obſ.* 5.

fits, attended with vomitings and a *diarrhœa*. The kidneys and ureters were quite ſtuffed with a ſlimy calculous matter, and it was very inſtructive to ſee the different degrees of concretion in the ſeveral parts of it, from a clear limpid water to a milky liquor, which ſhot into branchy cryſtals, and theſe coaleſcing became a hard friable ſubſtance. Dr. *Groenvelt*, who had attended the boy in his illneſs, obſerved him to be ſeized with his pains at every full moon for ſeveral months together, which generally ended with the voiding of a ſmall ſtone or two.

To theſe nephritic caſes I ſhall add one more, which fell under my own notice. A young lady, fourteen years of age, of a good complection, was from her infancy afflicted with this odd diſorder. A

day or two before the full moon ſhe waxed pale, weak, dejected and melancholy; and then unwittingly diſcharged a large quantity of urine in her ſleep. And this diſcharge continued five or ſix nights together: after which it ceaſed, and then her colour and chearful temper returned. The beſt ſtrengthening medicines were of no avail, until proper evacuations were thought of and made two or three days before the return of the paroxyſm: which prevented the lunar influence.

THAT the fits of the *aſthma* are frequently periodical, and under the influence of the moon, and alſo of the weather, *Van Helmont* takes notice from his own experience (*o*). And ſir *John Floyer*, who has given us a more particular hiſtory

(*o*) *Aſthma & Tuſſ.* §. 22.

hiſtory of this diſeaſe than any other author, obſerves, that *the fits uſually return once in a fortnight, and frequently happen near the change of the moon* (*p*).

A MORE uncommon effect of this attractive power is related by the learned *Kerckringius*. He knew a young gentlewoman, whoſe beauty depended upon the lunar force, inſomuch that at full moon ſhe was plump and very handſome; but in the decreaſe of the planet ſo wan and ill-favoured, that ſhe was aſham'd to go abroad; till the return of the new moon gradually gave fullneſs to her face, and attraction to her charms (*q*). If this ſeems ſtrange, it is indeed no more than an influence of the ſame kind with that, which the moon has

(*p*) *Treatiſe of the aſthma, p.* 17.

(*q*) *Obſervat. anatomic.* 92.

has always been obſerved to have upon ſhell-fiſh, and ſome other living creatures. For as the old *Latin* poet *Lucilius* ſays:

Luna alit oſtrea, et implet echinos, muribu' fibras
Et pecui addit --- (r)

And after him *Manilius*:

Si ſubmerſa fretis, concharum et carcere clauſa,
Ad lunæ motum variant animalia corpus (s).

THE knowledge of *criſes in acute diſeaſes* is attended with great difficulties: wherefore it may be very well worth the pains to inquire, what ſhare ſuch an alteration in the weight and preſſure of the atmoſphere may have in them.

(r) *Apud* A. Gellium, *lib. xx. c.* 8.

(s) *Aſtronomic. lib. ii. verſ.* 93.

The ancients made great account of critical days, and regulated their practice in fevers according to the expectation they had from them. This part of phyſic is grown now into diſuſe, quite ſlighted, and even ridiculed; and that I ſuppoſe chiefly for theſe two reaſons. For in the firſt place, the earlieſt obſervations of this kind, which were drawn into rules, being made in hot eaſtern countries; when theſe came to be applied to the diſtempers of the colder northern regions, without allowance given for the difference of the climate, they were oftentimes found not to anſwer. And ſecondly, fevers of old were treated with few medicines, and chiefly managed by very ſlender diet: the motions of nature were carefully watched, and no violence offered to interrupt her work. The hiſto-

ries therefore of criſes, though of great uſe and certainty under ſuch management as this, were at length unavoidably ſet aſide and loſt; when acute caſes came to be cured, according to this or that hypotheſis, not only by evacuations, but hot or cold alteratives too: there being no longer any room for thoſe laws of practice, which ſuppoſed a regular and uniform progreſs of the diſtemper.

WHEREFORE, in order to underſtand a little, both what might induce the firſt maſters of our profeſſion to ſo nice and ſtrict an obſervance in this point; and what grounds there may be now, for a more due regard to their precepts, even upon the ſcore of the lunar attraction only; I propoſe a few remarks, after having premiſed

ſome things proper to be known on this ſubject.

It is moſt certain, that *epidemic fevers* are cauſed by ſome noxious qualities of our atmoſphere; and therefore it ſeems reaſonable to ſuppoſe, that ſuch changes as produce thoſe effects may happen in it in all ſeaſons by the influence of the moon. And this is confirmed by *Ramazzini* in his treatiſe of the epidemic conſtitution of the years 1692, 1693, and 1694. in the city and neighbourhood of *Modena*. During theſe three years a very contagious purple fever reigned. *And it was worthy of obſervation*, ſays he, *that the diſeaſe raged more violently after the full moon, and eſpecially in the dark quarter; and abated upon the appearance of the new moon; as not only I, but other*

phyſicians

phyſicians here, conſtantly obſerved; and this obſervation was of great ſervice both in the prognoſtic and cure (t).

'Tis well known, that in ſolar eclipſes the moon is in conjunction with the ſun, and in oppoſition in lunar eclipſes: wherefore there is nothing ſtrange in what this ſame author wonders at in theſe words. *What happened* January 21. 1693. *was very ſurprizing. For the moon having been eclipſed that night, the greateſt part of the ſick died about the very hour of the eclipſe: and ſome were even ſtruck with ſuddden death (u).* And the learned *Ballonius* relates a fact of the ſame nature, where he ſays, that ſome phyſicians having met on the caſe of a lady of quality; while they

(t) *De conſtit. ann.* 1692-3-4. *Mutin.* 1695. | 4*to. pag.* 97.

(u) *Ibid. pag.* 98.

they were actually in conſultation, a ſolar eclipſe was at hand. Wherefore, as they thought the patient in no imminent danger, they went out to view the eclipſe: but they were ſoon called back, upon the lady's fainting away, the very inſtant it began. And ſhe did not recover her ſenſes, till the eclipſe was quite over (*w*).

If phyſicians had formerly been acquainted with what I have laid down on the moon's influence, I make no doubt but a much greater number of facts of this kind would occur in the hiſtories of epidemic diſeaſes, than we find recorded at preſent. To thoſe already mentioned let me add one more, which is the more intereſting, upon account

(*w*) *Epidem. lib. i. pag.* 48.

count of the ſubject of it. It was our great genius and excellent philoſopher the lord high chancellor *Bacon*, viſcount St. *Albans*; who had this peculiarity in his conſtitution, that at every lunar eclipſe he ſuddenly fell into a ſwoon; tho' he did not ſo much as think or even know of the eclipſe; and did not recover, till it was ended (*x*).

And it is ſtill freſh in the memories of ſome, that in that memorable eclipſe of the ſun, which happened *April* 22. 1715, and in which the total obſcuration laſted here at *London* three minutes and twenty three ſeconds, many ſick people found themſelves conſiderably worſe during the time: which circumſtance people generally wondered at, but I could eaſily account for.

(*x*) *See* Rawley's *life of the right honourable* Francis Bacon, *Lord* Verulam, *&c.*

for. In the morning I went with dr. *Halley* and other aſtronomers to the obſervatory on the top of the *Royal Society*'s houſe in *Crane Court*, in order to view the eclipſe, and conſider the ſtate of the weather, and changes that might probably happen in our atmoſphere; and then the ſun was very bright, and the ſky remarkably ſerene. But when the eclipſe became total, the air was ſo uncommonly cold and moiſt, that it made us ſhiver; and the face of nature appeared ſo extremely gloomy and diſmal, that the birds fluttered about in wild affright, and the cattle in the fields ſtood fixed as ſtatues, through exceſs of aſtoniſhment. Whereas, no ſooner had the ſun begun to emerge, but every creature aſſumed ſo chearful an aſpect; that I never ſaw, nor indeed do I ever expect to ſee ſo pleaſing a ſight.

But to return to the ſubject of fevers; it is evident that thoſe changes of the air, which affect healthy bodies, muſt have a conſiderable effect on weak conſtitutions, and thoſe labouring under acute diſeaſes. To what has been already ſaid on this head I ſhall here add, that the *plague* itſelf is liable to be affected by the moon's action. For *Diemerbroeck*, who has given an accurate deſcription of the plague at *Nimeguen* in the year 1636, obſerved, *that the contagion conſtantly increaſed about the new and full of the moon; and that the greateſt part of thoſe, who were then ſeized, died (y).* Much more may be ſaid on this ſubject; but it appears too plain, to need further illuſtration: wherefore I return to the ſubject of criſes.

(y) *De peſte, pag.* 9.

First, all epidemic diſeaſes do in their regular courſe require a ſtated time, in which they come to their height, decline, and leave the body free. This is ſo conſtant and certain, that when a fever of any conſtitution, which is continual in one ſubject, happens, from ſome other cauſe, in another to be intermitting; the paroxyſms do always return ſo often, as all together to make up juſt as many days of illneſs, as he ſuffers, whoſe diſtemper goes on from begining to end, without any abatement. Dr. *Sydenham*, a ſworn enemy to all theories, learn'd thus much from downright obſervation; and gives this reaſon, why autumnal quartans hold ſix months: becauſe by computation the fits of ſo long a time amount to 336 hours, or 14 days, the period of a continual fever

fever of the ſame ſeaſon *(z)*. So *Galen* takes notice, that an exquiſite tertian is terminated in ſeven paroxyſms; becauſe a true continual has its criſis in ſeven days: that is, the fever laſts as long in one, as in the other; in as much (ſays he) as *a fit in an intermitting fever anſwers to a day in a continual (a)*. Now this ſo comes to paſs, becauſe,

SECONDLY, in theſe caſes there is always a fermentation in the blood, which goes not off, till the active particles are thrown out by thoſe organs of ſecretion, which, according to the laws of motion, are moſt fitted to ſeparate them.

THIRDLY, as different liquors, put upon a ferment, are depurated

(z) Method. curandi febres Lond. 1666. 8vo. *pag.* 100.

(a) Comment. in aphor. Hipp. lib. iv. aph. 59. *& de criſib. lib. ii. c.* 6.

in different times; ſo the arterial fluid takes up a determined period, in which it is diſcharged of an induced effervеſcence.

FOURTHLY, the ſymptoms, during this ebullition, do not proceed all along in the ſame tenor; but, on ſome days particularly, they give ſuch evident marks of their good or bad quality, that the nature of the enſuing *ſolution* may very well be gueſſed at, and foretold by them. Things being thus, thoſe days, on which the diſeaſe was ſo evidently terminated one way or other, were by the ancients called the days of *criſis*; and thoſe, upon which the tendency of the illneſs was diſcovered by moſt viſible tokens, the *indices* of the *critical days*.

AND thus far the foundation was good: but when a falſe theory

happened unluckily to be joined to true obſervations, this did conſiderably puzzle the affair. *Hippocrates*, it is plain, knew not to what to aſcribe that remarkable regularity, with which he ſaw, that the periods of fevers were generally ended on the ſeventh, fourteenth, or one and twentieth day. The philoſophy of *Pythagoras* was in thoſe ages very famous, of which *harmony* and the *myſteries of numbers* made a conſiderable part; *odd* were accounted more powerful than *even*, and *ſeven* the moſt perfect of all. Our great phyſician eſpouſed theſe notions, and confined the ſtages of acute diſtempers to a *ſeptenary* progreſſion (*b*): upon which this inconvenience followed, that when a criſis fell out on an even day, his

(*b*) *De ſeptimeſtri partu.*

his meaſures were quite broken, and he apprehended a relapſe (*c*); and if the fever did not terminate on the ſeventh, he waited for the fourteenth, and even for the twenty-firſt day.

BUT whereas the criſes of fevers were ſometimes obſerved to fall on the ſixth or eighth day of the diſeaſe, without any return; *Aſclepiades* rejected this whole doctrine as vain (*d*): and *Celſus*, finding it to be too nice and ſcrupulous, obſerves, that the *Pythagorean numbers led the ancients into the error* (*e*).

Galen, being aware of this, ſucceeded much better in his reaſoning upon the matter; and very happily imputed the critical changes,

(*c*) *Aphor. ſect. iv.* 36.

(*d*) *Vid. celſum, lib. iii. c.* 4.

(*e*) *Ibid.*

es, not to the power of numbers, but to the influence of the moon; which he obſerves, *has a mighty action upon our earth, exceeding the other planets, not in energy, but in nearneſs* (*f*). So that, according to him, the ſeptenary periods in acute diſeaſes are owing to the *quarterly lunar phaſes, which are the times of the greateſt force, and which return in about ſeven days* (*g*). Hence it appears, that *Galen* hit upon the cauſe of the changes in the returns and periods of fevers; but did not ſo much as gueſs at the manner of its producing the effect.

The reſult of the whole affair in ſhort is this. A *criſis* is no more than the expulſion of the morbific matter out of the body, through

(*f*) *De diebus decretor. lib. iii.*

(*g*) *Ibid.*

through ſome or other of the ſecretory organs; in order to which, it is neceſſary that this ſhould be prepared and comminuted to ſuch a degree, as is required to make it paſs into the orifices of the reſpective glands. And therefore, as the moſt perfect criſis is by ſweat, (both by reaſon that the ſubcutaneous glands do naturally diſcharge more than all the others put together; and alſo that their ducts being the ſmalleſt of any, whatſoever comes this way is certainly very well divided and broken) ſo the moſt imperfect is a hemorrhage: becauſe this is an argument, that what offends is not fit to be caſt off in any part, and conſequently breaks the veſſels by the effervescence of the blood. An abſceſs in thoſe organs, which ſeparate thick ſlimy juices, is of a middle nature betwixt theſe two.

Now

Now it is very plain, that if the time, in which either the peccant humor is prepared for ſecretion, or the fermentation of the blood is come to its height, falls in with thoſe changes in the atmoſphere, which diminiſh its preſſure at the new and full moon; the criſis will then be more compleat and large: and alſo, that this work may be forwarded or delayed a day, upon the account of ſuch an alteration in the air; the diſtenſion of the veſſels, upon which it depends, being hereby made more eaſy, and a weak habit of body in ſome caſes ſtanding in need of this outward aſſiſtance. Thus a fever, which requires about a week to its period, may ſometimes have a good criſis on the ſixth, and ſometimes not till the

eighth day, as *Hippocrates* has obſerved.

In order therefore to make true obſervations of this kind, the time of invaſion is to be conſidered; the genuine courſe of the diſtemper muſt next be watched, which is not to be interrupted by any violent methods; the ſtrength of nature in the patient is to be attended to, and by what ſecretions the criſis is moſt likely to be performed: and it will then be found, that not only the new and full moons, but even the ſouthings, whether viſible or latent, of the planet, are here of conſiderable moment.

To conclude, this powerfull action of the moon is obſerved not only by philoſophers and natural hiſtorians, but even by the common

mon people, who have been fully perſwaded of it time out of mind. *Pliny* relates, that *Ariſtotle* laid it down as an aphoriſm: *that no animal dies but in the ebb of the tide* (*h*). And that births and deaths chiefly happen about the new and full moon, is an axiom even among women. The huſband-men likewiſe are regulated by the moon in planting and managing trees, and ſeveral other of their occupations. So great is the empire of the moon over the terraqueous globe.

(*h*) *Hiſt. nat. lib. ii. cap.* 98.

CHAP. III.

Of the benefits accruing to the practice of phyſic from this theory.

IT is now time to inquire, what uſe may be made of theſe obſervations in practice. And firſt, they muſt be of ſervice in predicting the returns of the paroxyſms, and the iſſue of the diſeaſe; which will gain reputation to the phyſician, and give confidence to the patient. But I will endeavour to ſhew, that they will be of greater ſervice ſtill, in contributing towards the cure of diſeaſes. In order to which I will firſt lay down ſome general remarks, and then deſcend to particulars.

IT ſeems pretty evident, that all diſeaſes, whoſe returns anſwer

to the changes of the moon, ariſe from repletion. For as the moon's action produces its effect by diſtending the veſſels only; it is manifeſt, that plenitude alone can increaſe this diſtenſion, whether it happen by the quantity of the fluids, or their effervescence. And therefore all diſeaſes, which return but once or twice in a month, and are increaſed by the moon's influence, require evacuations: which muſt diminiſh at leaſt, if not cure the diſeaſe. But as regard is to be had to the nature of the diſtemper, and the time and manner of the evacuation; it is neceſſary to eſtabliſh ſome rules on each of theſe heads.

First then, we are to conſider, whether the diſeaſe lies in the blood-veſſels, or in the vicious quality

quality of the fluids ſeparated from the blood, and conveyed to ſome principal part of the body. In the firſt caſe we ſhould lay the greateſt ſtreſs on phlebotomy; in the ſecond, on proper medicines for correcting the taint of the fluids. Beſides, as we know by experience, that evacuations are to be made by the way, which nature points out; great attention muſt be given to finding out that way in every particular diſeaſe. Then the beſt time for evacuating is in moſt caſes a little before the paroxyſm or exacerbation: not only becauſe its violence is thereby obviated, but likewiſe becauſe the humors then turgid will flow out of the body with more eaſe, and in greater plenty. And in order to make this matter better underſtood, I will add ſome few practical remarks

remarks on the diſeaſes mentioned in the foregoing chapter.

THE *epilepſy* is extremely difficult to be cured in adults, but in children it is the reverſe. And that evacuations, eſpecially by a bliſter laid to the back part of the head, are of great uſe here, is plain from a caſe above related (*i*); which not only confirms the aſſertion of *Panarolus*, who ſays, *that he cured a boy of ſeven years of age, who had been ſpeechleſs, ſtupid, and epileptic, by a bliſter applied to the coronal ſuture* (*k*); but proves the goodneſs of *Celſus*'s advice, *to apply cupping glaſſes with ſcarification to the occiput*; *and beſides to apply the actual cautery in two places, one in the occiput, and the other lower down in the neck upon the*

(*i*) *Pag.* 43.

(*k*) *Obſ. med. pentecoſt. iv. obſ.* 30.

the firſt vertebra; in order to have a plentifull drain of the noxious humor (*l*). For the head is the chief ſeat of diſeaſes of this kind: frequently occaſioned in children by plenitude, and the lentor of the blood, which has not been comminuted by bodily exerciſe, or the action of the lungs; and in adults by a redundancy of humors, falls, or ſudden frights. In this obſtinate diſeaſe the moſt proper medicines for correcting the juices, ſeem to be *native cinnabar*, and more eſpecially *wild valerian root*, before it has ſhot out its ſtalk; pulverized, and given frequently in a due quantity. For my part, I have ſeveral times found them both very ſucceſsfull; and for the virtues of the laſt, I particularly recommend the reader to *Pana-*

(*l*) *Lib. iii. cap.* 23.

Panarolus (m), and the famous botaniſt *Fabius Columna (n)*. However it muſt not be forgot, that this diſeaſe owes it origin to ſo many different cauſes, and is bred in ſo many different conſtitutions of body; that the ſame remedy, which ſucceeds in one caſe, often fails in another: and therefore different medicines are to be tried, eſpecially on adults. And great regard muſt be had to the times, in which the paroxyſms moſt uſually return, in order to effect a cure.

THE *vertigo* is likewiſe cured by theſe ſame medicines. But the patient muſt be vomited now and then, and bliſtered on the head or neck. This is a diſeaſe of the eyes, and generally ariſes from too great tenſion of the extremities of

(m) *Obſ. med. pen.* 1. obſ. 33.

(n) *Phytobas.* p. 120.

the ſmall arteries, as *Bellini* has demonſtrated: wherefore it is no wonder, if it ſhould follow the changes of the moon.

Hyſterical diſorders are cured much in the ſame manner. But they ſeldom require bleeding, and purging ſhould be uſed with caution. Emetics are of greater ſervice, eſpecially a little before the fit. For in the fit the beſt medicines are thoſe, which repair the loſs of ſpirits, as *gum ammoniac*, *Ruſſian caſtor*, *ſalt of amber*, in pils, and the like. And in moſt of thoſe caſes, care muſt be taken to adapt the medicines to the uſual way of living of the patient, and to the affections of her mind.

The monthly returns of *paralytic diſorders*, which are ſometimes obſerved, are owing to the ſource of the diſeaſe, which is ge-

nerally the head: in which the ſeroſities of the brain being extravaſated, attack the origin of thoſe nerves, where they happen to lodge, and cauſe a palſy of this or that part. Hence it is, that this diſeaſe is very often the conſequence of an apoplexy, under the ſhape of a general palſy, or that of one ſide only. But when this diſorder is occaſioned by an external injury done to the nerves, or by internal tumors, then it obſerves no regular periods. The cure is to be begun by evacuating the redundant phlegm, which in moſt caſes is beſt done by ſtool; and then an eye muſt be had to the return of the diſtemper, not only by putting the patient into a courſe of attenuating medicines, as the *horſe radiſh root*, *wild valerian root*, *muſtard ſeed*, and ſuch like; but alſo of cold bathing, if

his age and ſtrength will allow it: for this remedy is not ſo beneficial for old folks, as for young; but as it braces up the relaxed fibres, and promotes urine, it is proper for this diſeaſe in both theſe reſpects. For this reaſon the ancients, according to *Caelius Aurelianus* (*o*), ordered their paralytic patients to ſwim in the ſea, or to undergo the cataractical courſe, by the fall of water from on high on the weak parts; on account of the greater weight of ſalt than freſh water, and the more intenſe cold of falling than ſtill water.

St. *Vitus*'s *dance* is generally called a convulſive diſorder; but I look on it to be rather paralytic, and to take its riſe from a relaxation of the muſcles, which being unable to perform their functions in

(*o*) *De morb. chronic. lib. ii. cap.* 1.

in moving the limbs, ſhake them irregularly by jirks. And it is for the moſt part but a ſlight evil, and commonly ſeizes weak habits of body; girls more frequently than boys, and ſeldom adults. Wherefore I never found it difficult to be cured by the cold bath and chalybeate medicines.

THE diſorders of the *monthly evacuations* of the fair ſex require our ſerious conſideration. As the exceſs of them generally proceeds from an acrimony in the blood, ſo the defect is chiefly owing to a *lentor*. For this flux is ſeldom ſuppreſſed for want of a ſufficient quantity of blood: ſuch wonderfull art has the all-wiſe author of nature employ'd in making full proviſion for an evacuation, equally requiſite for the health of the individual, and the propagation of human

human kind. Wherefore, as in immoderate diſcharges regard ſhould be had to the times, when the efferveſcent humor can the more eaſily burſt thro' its veſſels, according to the doctrine already laid down; in order to make a revulſion at thoſe times, by drawing blood from parts the moſt diſtant from the ſeat of the diſtemper: ſo when a ſuppreſſion of the *menſes* requires blood-letting, *Vander Linden*'s caution is to be obſerved, which is recommended by *Etmuller* (*p*), and rationally accounted for by dr. *Freind* (*q*). Moreover, as the Peruvian bark is very powerfull in allaying the efferveſcence of the blood, whereby the veſſels are diſtended; it will be very proper to give it plentifully ſome few days

(*p*) *Tom. iii. pag.* 442. *edit.* 1736.

(*q*) *Emmenalog. pag.* 103.

days before the time, that too great a diſcharge is apprehended.

THE ſame method is to be obſerved in all periodical *hemorrhages*, giving thoſe medicines at the ſame time, which reſtringe and brace up the fibres: of which the beſt are *burnt alum*, with a fourth part of *ſanguis draconis*, as I have found by repeated trials.

AND it is worthy of remark, that ſo great is the moon's influence in caſes of this nature, that upon the ſuppreſſion of theſe evacuations from one part, the blood forces its way through ſome other part: which was the caſe of the young gentleman, mentioned above (*r*). For when his ſpitting of blood was ſtop'd by the medicines juſt now recited, he was at the ſame

(*r*) *Pag.* 53.

ſame ſtated times ſeized with a bleeding at the noſe, which gave me no apprehenſions, as the principal organ was no longer affected.

And this action of the moon extends even to thoſe quadrupeds, that are menſtruated; for it has been obſerved, that they generally have thoſe evacuations about the new moon: in particular mares and monkeys, and that ſo conſtantly, that, according to the teſtimony of *Horus Apollo*, *the Egyptians painted the Cynocephalus to repreſent the moon, upon account of a certain ſympathy, whereby the female of this animal has evacuations of blood from the uterus at the new ~~and full~~ moon: and they kept monkeys in their temples, in order to point out the times of the conjunction of the ſun and moon* (s). Where-

(s) *Hieroglyphic. vid. Geſner. de Simiis.*

Wherefore the moon's influence is apparent in all animals; provided irregularities in their way of living do not prevent it.

AND this theory accounts for the periodical returns of the *fluor albus*, which are ſometimes obſerved, eſpecially if the diſcharge be from the uterine veſſels: for it iſſues ſometimes from theſe, and ſometimes from the glands of the *vagina*. In the firſt caſe, it ſtops upon the menſtrual purgations; in the latter, it flows with them, and continues even in pregnant women.

RUNNING *ulcers* are likewiſe comprehended in this doctrine, it being no way ſurprizing, that the forementioned cauſes ſhould increaſe the diſcharge of *pus*, eſpecially in thoſe parts, where the lax pliant texture of the body makes little or no reſiſtance to the

diſtenſion of the veſſels. Hence in ulcers of the head it has been found, that the patients are in great danger at the new and full moon.

THE beſt method of treating *nephritic pains*, is to begin by blood-letting. And it will be of ſervice to the patient, to obſerve, when the paroxyſms are wont to return, and to empty the veſſels, at the time, which threatens the greateſt danger. For it is well known, that this diſeaſe is partly occaſioned by the compreſſion of the ſmall ducts of the kidneys from the fullneſs of the capillary arteries; which fullneſs is increaſed by the new and full moon. Whence I have more than once wondered, that the chief bent of the writers on this diſeaſe is, to drive down the gravel into the ureters and bladder.

bladder: whereas the diſſection of dead bodies has taught me, as I have mentioned before, that the firſt rudiments of a *calculus* are a very limpid *ſerum* in the *caruncles* of the kidneys; and that this may harden to the conſiſtence of ſtone, will not ſeem ſtrange to thoſe, who are acquainted with the attractive force of ſalts in ſolution, and with the effects of obſtructions in the capillary veſſels. And hence it is, that *calomel* given now and then is of greater ſervice in the begining of this diſeaſe, than any diuretics: becauſe this medicine removes the obſtructions of the minute veſſels, and thus prevents the coheſion of ſaline particles, which is frequently the conſequence of ſuch obſtruction. Moreover, daily experience ſhews, that too free an uſe of diuretics is prejudicial in diſeaſes of the kid-

neys. Which obſervation has not been ſufficiently attended to by ſome phyſicians, who not only patronized a certain monſtrous jumble of a medicine, till the legiſlature was wrought on to purchaſe the ſecret at an immenſe price; but ſtill go on to drench their patients with it, and thereby injure the ſtomach, kidneys, and bladder.

Aſthmatic diſorders are likewiſe hightened by the lunar action, both on account of a leſſer quantity of air taken into the lungs in each inſpiration, and of the diſtenſion of the veſſels by the rarefied blood: wherefore the returns of the fits are to be obſerved, and guarded againſt by moderate evacuations, as blood-letting, gentle vomits, laxatives, and ſometimes cathartics. But every thing that heats

heats the blood, ſhould be carefully avoided, eſpecially about the uſual times of the paroxyſms: becauſe there is generally then a lurking fever; which ought not to be exaſperated by heating food or medicines. Upon this ſcore *Hippocrates* adviſes *perſons labouring under difficult breathing, to abſtain from clamors and anger (t).* And *Van Helmont* obſerved, that *aſthmatic paroxyſms return more frequently in ſummer than winter (u).* For which reaſon, the proper medicines in this diſeaſe, beſides thoſe above mentioned, are ſuch as are cooling, and at the ſame time promote urine; as *vinegar of ſquils*; *ſpirit of nitre*, ; *gas ſulphuris*, which is water ſaturated with the fumes of ſulphur; and ſeveral others

(t) *Epidem. lib. vi. ſect.* 4.

(u) *De aſthm. et tuſſi.*

others of the ſame nature, enumerated by ſir *John Floyer*.

To what has been ſaid above on *criſes in acute diſeaſes*, it may be worth while to add this one remark. Although great care ſhould be taken, not to raiſe any commotion in the humors on the coming on of a criſis; yet there are caſes, in which there is a neceſſity of making ſome evacuations: as for example, if the fever runs very high, the humors are ſo agitated, that no ſecretions can be performed. In this circumſtance phlebotomy is ſo far from obſtructing, that it promotes the criſis: in the ſame manner, as in the ſmall pox and meaſles, before any appearance of the puſtules, when the turgeſcence of the humors is exceſſive, taking away ſome blood

facilitates

facilitates and haſtens the eruption.

THE caſe is much the ſame with *critical abſceſſes*, wherein the fullneſs and feveriſh heat are ſometimes ſo great, that they require moderate evacuations, either by bleeding, or purging. For it is to be obſerved, that the reaſon, why the ancients condemned purging in fevers, was, that the moſt of their cathartics were very violent; as *ſcammony*, *black hellebore*, *juice of ſpurge*, and others of the like acrid nature: upon which account they contented themſelves with emptying the inteſtines by clyſters. But as we have always a good ſtock of gentle cathartics, we may ſafely give them at any time of the diſeaſe, without the leaſt apprehenſion of heating the body; eſpecially if nature points out this way, as ſhe frequently does.

COROLLARY.

Wherein the preceding reaſoning is confirmed by obſervations of the effects of ſtorms on the human body.

AS we have endeavoured to prove in the begining of this treatiſe, that the celeſtial motions, which occaſion certain diſtempers, and their periods or returns at ſtated times, are likewiſe able to raiſe winds; and that we feel the different effects of theſe, according as other cauſes concur to put the air into violent agitations: it may not be amiſs to give ſome few inſtances, how much this reaſoning is confirmed by facts.

ON the twenty-ſixth of *November*, 1703, there aroſe a moſt furious

furious ſtorm of wind a little before midnight, which laſted upwards of ſix hours. The hiſtory and whole theory of this wonderful phænomenon I ſhall not attempt to compile. This province was by the Royal Society conferred on the learned dr. *Halley*, who was every way equal to the taſk. Wherefore I ſhall only touch on ſome circumſtances of it, which more immediately relate to the preſent theme.

THE moon was then in her *perigeum*, and near the change: and it has been proved above, that both theſe circumſtances contribute towards attracting the air upwards, and raiſing winds (*w*). Accordingly, the barometer was lower than uſual (*x*), and the ſubſequent

(*w*) *Pag.* 9, 10. (*x*) *Phil. tranſ.* No. 289.

tides were very high. And moſt probably there was a concurrence of one or more of the other cauſes already aſſigned (*y*), tho' it might be difficult to come at the knowledge of them: but as the ſtate of the weather in the preceding ſeaſons of the year is of eaſier, and perhaps not leſs uſeful, conſideration; I ſhall remark, that in thoſe places particularly, which felt the rage of the ſtorm, the ſummer and part of autumn were remarkably wet; and the winter was uſhered in by open warm weather; ſo that a thermometer, (whoſe freezing point was about eighty four) was very ſeldom below a hundred to the latter end of *November* (*z*). Hence we may form a probable conjecture, that the atmoſphere was blended with vaſt quanti-

(*y*) *Pag.* 24, 25.

(*z*) *Phil. tranſ. No.* 289.

quantities of ſaline and ſulphureous exhalations; which, by their various combinations and agitations, at length gave that deſtructive force to the motion of the air. And this conjecture is confirmed by the flaſhes or coruſcations, which were obſerved during the ſtorm; and by the ſaline particles found the next day on the leaves of vegetables, even at many miles diſtance from the ſea: where the graſs in ſome places taſted ſo ſalt, that the cattle did not care to eat it.

INSTEAD of proſecuting this ſubject farther, I think it may not be amiſs to ſubjoin this remark; that as the new or full moon is capable of cauſing thoſe alterations in the human body, which we have already mentioned, even when it is not ſeconded by any

other cauſe; ſo if it be accompanied with a tempeſtuous ſtate of the weather, the effects will be the more ſenſibly felt. And indeed I my ſelf remember, that ſeveral perſons complained particularly of head-achs the very night of the ſtorm. But the caſe of a lady of quality of my acquaintance is very remarkable, who was ſtruck blind in an inſtant that ſame night. Her blindneſs was the ἀμαύρωσις of the *Greeks*, or the *gutta ſerena* of the modern phyſicians: and as this is a diſtemper, which does not ſeem to me to be ſufficiently underſtood, I will offer my thoughts on it in few words.

The cauſe of it is generally either an obſtruction and ſubſequent diſtenſion of the capillary arteries of the *Retina*, or ſome injury done to the optic nerves. In the

the firſt kind, which is vaſtly the more common, the ſight is darkened gradually; in the laſt, the ſight is loſt, ſometimes ſooner, ſometimes later, according to the cauſe, and ſometimes infine in an inſtant. For the optic nerves are injured many ways, and rendered incapable of performing their office: as by a blow, fall, fracture or depreſſure of the ſkull they are often compreſſed; in convulſions they are ſometimes loaded with extravaſated humors: and not uncommonly they are ſeized with a ſudden palſy. And in the diſſection of perſons, who had been long afflicted with epilepſies, I have obſerved, that the optic nerves were preſſed on by an extravaſated lymph collected juſt over the place, where after their junction they ſeparate, to run to

the

the eyes: and in paralytic diſorders I have found the fibres in that place waſted and dry.

I COULD produce a number of obſervations from medical writers in confirmation of this theory: but I believe the following few may ſuffice. *Felix Platerus*, a phyſician of great experience, obſerved, in the diſſection of a dead body, *a tumor, reſembling a gland, lying on the optic nerves, and obſtructing the paſſage of the animal ſpirits to the eye* (*a*). *Guernerus Rolfincius* found *both the optic nerves waſted*, in the body of a woman, which he opened (*b*). *Johannes Scultetus* (*c*) ſaw *the optic nerves waſted to half their uſual ſize, in the body of a woman, who had had a gutta*

(*a*) *Obſervat. lib. i.*
(*b*) *Diſſert. anat. lib. iv. cap.* 31.
(*c*) *Armament. chirurg. obſ.* 36.

gutta ſerena for twenty years. And the *Ephemerides naturæ curioſorum* contain the unfortunate caſe of a young girl, *who, from a blow on the left part of the head, was ſeized with a fever and delirium, then loſt her ſight, and died ſoon after. Upon opening the head, a great quantity of limpid ſerum was found in the ventricles of the brain, eſpecially forwards, where it entirely compreſſed the optic nerves (d).*

Now as to the caſe of the lady ſtruck blind during the ſtorm, I think it no difficult taſk to account for that misfortune upon the foregoing principles, by ſaying, that the moon's action, vaſtly increaſed by the concurrence of the ſtorm, was capable of obſtructing the paſſage of the animal ſpirits to the optic nerves in a tender conſtitution,

(d) *Vid. miſcellan. curioſ. anni* 1686.

tution, as effectually as if theſe nerves had been cut through; and conſequently of giving riſe to the *gutta ſerena*.

CONCERNING the uſe of this theory, I can ſafely ſay, that it has pointed out to me the true method of treating this diſtemper, which before my time was generally eſteemed incurable: and as the true knowledge of the cauſes of diſeaſes is a ſure foundation for practice, ſo I have ſucceeded in a number of trials on caſes of this kind. Wherefore when the capillary arteries are the ſeat of the diſeaſe, the proper medicines are thoſe, which moſt effectually attenuate the viſcid humors, and remove the obſtruction: and ſuch are the chemical preparations of mercury. And theſe are to be continued a good while, and frequently

frequently even to raiſing a ſaliva-tion, which is to be kept up twen-ty or thirty days.

But when the diſeaſe proceeds from a defect in the nerves, it re-quires a different method of cure from the preceding one; and is to be varied according to the injury, which the nerves have received. But it plainly appears from what has been ſaid, that this ſpecies of the *gutta ſerena* is generally incu-rable. For who, but the almigh-ty maker, can pretend to reſtore to the optic nerves their natural te-nor, either when obſtructed, or their cavities ſtreightened by a viſcid ſluggiſh humor, or when waſted and ſhriveled up; or to make a free paſſage for, and give a due impulſe to the animal ſpirits, when thoſe nerves are become para-lytic? But if any hopes remain,

while the diſeaſe is yet recent, a cauſtic is to be applied to the crown of the head, over the meeting of the coronal and ſagittal ſutures; and then the *perioſteum* is to be laid open, to make an outlet for the noxious humor from the brain. And this ulcer, like common iſſues, muſt be kept open with peas, and continued a long time: in the mean while the patient is to be put into a courſe of nervous cephalics, as *wild valerian root*, *Ruſſian caſtor*, *gum ammoniac*, *aſa fœtida*, *volatil ſpirits* and *ſalts* of the animal tribe, *&c.*

But to return to ſtorms: there happened a moſt violent one in *England*, on the third day of *September* 1658, the day of the death of *Oliver Cromwell*. As we have no journals of the weather for that year, that ever came

to my knowledge, I can ſay nothing of the preceding ſtate of the air. But this is remarkable, that the ſtorm happened near the autumnal equinox, and about the full moon: which concurrence of cauſes is very well adapted to ſtir up great commotions in the atmoſphere. However that be, it is to be obſerved, that the diſeaſe of that great man was of that kind, which we have ſhewn to be particularly under the moon's influence. For it is upon record, that he died of a fever accompanied with grief, from the unhappy ſtate of his domeſtic affairs: and it is very certain, that grief diſpoſes the animal ſpirits to be eaſily affected by cauſes of this nature.

But to come to a concluſion of this little work; it has been obſerved of thoſe countries, which

are ſubject to inundations, that theſe calamities generally happen at the times, when the moon's action is moſt powerful: ſo that the learned *Baccius* (*e*) ſeems to have reaſon for his conjecture, that the chief cauſe of theſe evils is to be ſought for in exceſſive high tides, with the unhappy concurrence of the attractive faculty of this or that planet.

Such are the natural cauſes of ſtorms and hurricanes: but as to the queſtion of the divine power, whether or no the wrath of the Almighty ſends theſe calamities on mankind, contrary to the ordinary courſe of nature, I will not take upon me to determine, who have no intention to diſengage men's minds from the bands of religion. For tho' I am thoroughly convinced,

(*e*) *Del Tevere, lib. iii. p.* 228.

ed, that each part of the univerſe is conſtituted and moved by certain laws; and that the ſame diſpoſition of the fabric, which is the moſt convenient for the whole, ſometimes brings inconveniencies and even deſtruction in ſome particular places: yet it is highly equitable, that the omnipotent creator ſhould be allowed to have an abſolute dominion over all his works. And poſſibly it was agreeable to the divine wiſdom to create the world in ſuch a manner, that natural cauſes ſhould now and then produce evils and inconveniencies on mankind; whom it was neceſſary to affright with ſtorms, thunder, and other extraordinary phænomena, in order to keep them in a continual ſenſe of their duty.

THE END.

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Page 96. line 19. for *new and full moon*, read *new moon*.

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