An enquiry into the medicinal virtues of Bristol-water: and the indications of cure which it answers / By George Randolph.

AN

ENQUIRY

INTO THE

MEDICINAL VIRTUES

OF

BRISTOL-WATER:

AND THE

INDICATIONS of CURE

which it anſwers.

By GEORGE RANDOLPH, *M.D.*

Late Fellow of *All-Souls* College, *Oxford.*

——Παρ' ἔμ' ἵσατο, καὶ ἴδε ΄ΕΡΓΟΝ.

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MDCCL.

TO

Edward Wilmot M.D.

Phyſician in Ordinary to His MAJESTY,

AND

His Royal Highneſs the Prince of WALES;

Fellow of the College of Phyſicians,

and of the Royal Society.

SIR,

I Humbly offer You this Product of my Studies, in Acknowledgment of many Favours receiv'd from You, and in full Perſwaſion that No One is a better Judge or a greater Encourager of Writings of this Kind. That I was permitted to addreſs this Work when imperfect, to a Perſon ſo

eminently diſtinguiſh'd in his Profeſſion, is an Honour of which I ſhall ever retain the moſt grateful Senſe, and I ſhall eſteem your favourable Acceptance of it, now it is compleat, as an additional Inſtance of your Goodneſs to, Sir,

Your moſt obliged

and obedient

humble Servant

GEO. RANDOLPH.

PREFACE.

AS *I cannot think the Virtues of* Briſtol-*Water ſufficiently underſtood, and believe there are many of the Faculty, who would be glad to be informed, how far they may rely upon it; I hope I may be excuſed in attempting to explain what my particular Station in this Place obliges me to enquire into, and what I really have taken ſome Pains to acquaint myſelf with.*

True it is that the general Diſorders, for which this Water is of Service, have already been made publick; but the particular Indications which it anſwers, (the one Thing needful for every Body to know before he can judge of it as a Remedy) ſeem either not truly, or not fully explained. Some Writers deal too much in generals, and others who are more particular, have been more earneſt in ſearching into the Nature of its Contents, than obſerving its Ef-

fects; not conſidering the Weakneſs of the Foundation they build upon. For, not to mention the many notorious Contradictions of theſe Writers between themſelves, our Reaſon ſufficiently teaches us, that Chymical Analyſis is by no means the proper Method of Proceeding in this Caſe; but that after all our Search, the little Knowledge we have of what is done under the Earth, muſt ever leave us ill and incompetent Judges of the Products of it; for 'till we are acquainted with all the different Subſtances there lying hid, and all their poſſible Combinations, together with the Effects reſulting from them, how can we pretend to ſay, that the Virtues of any mineral Waters depend upon ſuch and ſuch Subſtances found in them by Chymical Analyſis?—— Whilſt, for ought we know, they may not at all be concerned in the Effects; and if they are, it may be in Conjunction with ſome one or more other Subſtances, which we are ignorant of, as we are of the Effects following ſuch Conjunction. Again; ſuppoſing we could arrive at a certain Knowledge concerning every ſeparate Ingredient, the Qualities ariſing from the Mixture might poſſibly be very different from any Thing we find in the Ingredients, and we not be able to produce the Compound as Nature has.——But enough of this; Mr. BOYLE *having*

having long ſince given his Opinion, * " *That the* " *Difficulty of ſecurely determining the Effects of* " *Mineral Waters* a priori *is little, if at all, leſs* " *than inſuperable to Human Underſtandings.—And* " *that the ſureſt Way of knowing them, is by a* " *long and ſufficient Experience of their good and* " *bad Effects.*"

Waving therefore all Chymical Experiments, as a ſubſequent Affair, I ſhall conſider the Water as a Medicine ſui Generis, *which Nature has provided for our Uſe, and in order to find out the Virtues of it, I ſhall proceed in the following Manner.*

Firſt, *I ſhall give a Medical Hiſtory of it, (ſo far as we can trace it) from its firſt Diſcovery, until now; endeavouring to ſhew* " *what has been* " *the current Opinion of Phyſicians concerning it;* " *what Diſeaſes it has been principally uſed and* " *eſteemed for, at different Times ſince; and for* " *what it is now at this Day in Reputation,*" *thereby attempting to give ſuch a general Idea of this Water, as may conduce to the more exact and extenſive Knowledge of it.*

* *Boyle's* Memoirs for the Natural Hiſtory of Mineral Waters, p. 3, 4.

And

And for the better aſcertaining of ſuch Caſes, as Phyſicians ſhall think proper to ſend here for Relief, I ſhall in the ſecond *Place enquire into the Nature and Cauſe of ſuch Diſtempers, as it is found more ſpecifically to hit; thereby endeavouring to find out what Indications it anſwers, how far it may be depended upon in the many different Diſorders it is good for, and how far not.*

And this being done, I ſhall in the third and laſt Place, enter into an Examination of the Properties and Qualities of it, ſo far as they are diſcoverable by Experiments; and here I ſhall take Occaſion to enquire into the uſual Methods, by which this, and other mineral Waters have been examin'd.

PART I.

A MEDICAL HISTORY OF THE HOT-WELL-WATER NEAR *BRISTOL.*

THE Hot-Well-Water Spring riſes on the Bank-ſide of the River *Avon*, about a Mile below *Briſtol*, between * high and low Water-Mark: It is ſaid to have been known long ſince to the Sailors, who coming by in their Boats, firſt diſcover'd it, and uſed it outwardly (as Tradition informs us), for the Itch, and healing up of old Sores: But, as it is not mentioned by any Writer, nor atteſted to by any known Facts, 'till after the Beginning of

 the

* The Spring riſes about 26 Feet below High-Water Mark; the whole Difference between this and Low-Water being about 36 Feet.

the laſt Century, it was probably, but little regarded, 'till that Time, when, from its paſſing freely by Urine, it began to gain a Character as a Diuretick, and ſo came into Repute for Nephritick Caſes; and its Virtues in this particular ſeem to be what chiefly contributed to bring the Water into Uſe.

The firſt Author that I know of, who mentions it, is Dr. *Edward Jorden* of *Bath*, who, in his Diſcourſe on Mineral Waters, publiſh'd in 1632, barely names the *Briſtol*-Water, by *Saint Vincent's Rock**, but ſeems, though he lived ſo near, and was no incurious Enquirer, to be very little acquainted with it, in that he ranks it among the Chalybeates, with *Spa* and *Tunbridge* Waters.

The next to him is Mr. *Thomas Johnſon*, who, in his *Mercurius Botanicus*, ſays, he was upon the Spot, 17 *July* 1634†, "where "from the Clefts of the Rocks, ſays he, iſſues "forth a Spring of warm Water, pleaſant "to the Taſte; it is a Water of ſome Repute, "and much commended for ulcerous and "calculous

* *St. Vincent's Rock*, ſo called from a Chapel, which ſtood formerly on the Top of it, dedicated to that Saint, who was a Native of *Spain*, and ſuffer'd Martyrdom at *Valencia*, *Anno Dom.* 305.

† *Mercurius Botanicus*, p. 12.

" calculous Affections of the Kidneys, taken " inwardly; and for old Sores, applied out- " wardly. It is in pretty frequent Uſe, and " not without Succeſs, as I am inform'd by " thoſe who have experienced it." And this is the firſt Writer, that I know of, who poſitively ſays, what the Water was reckon'd good for. Who firſt applied it to Ulcers of the Kidneys does not appear: Poſſibly, as it was a kindly Waſh for outward Ulcers, it might be deem'd of equal Service to inward ones, in a Part through which it ſo manifeſtly paſſed; or, as Ulcers are often complicated with Stone and Gravel, the Trial might be natural, and the Succeſs of it firſt appear from Experience. But be this as it will, it is plain this Water was now in ſome tolerable Credit, tho' the preciſe Time *, in which its

* By all the Enquiry I can make of ancient Perſons, now living, they not only ſay, that they never could learn by what means it was firſt found out, but alſo that they never could hear any Account given, when it was firſt incloſed. For, before the late Alterations were made, the Water was inclos'd in a Brick Ciſtern, about 3 Feet long, 2 Feet broad, and 4 Feet deep; the Bottom whence the Water ſprang being unpav'd. Out of the South-ſide of this Ciſtern came a wooden Pipe about four Feet long, 14 Inches ſquare, whoſe Bore was about 3 Inches Diameter. This Pipe emptied itſelf into a little Pond beneath, about 8 Feet ſquare; and in this Pond it was that People uſed to waſh themſelves, letting the Waters run from the Pipe upon their Sores: But no one can I find, who remembers, or can give me any Account, when, and by whom this Incloſure was made.

Virtues in any one particular were firſt diſcovered, I cannot learn; nor indeed is it to be expected I ſhould, ſince there is no fixing the firſt Original of that which, from many and repeated Trials, comes gradually into Uſe.

Dr. *Venner*, in his ſecond Edition of his *Via recta ad Vitam longam*, publiſhed in 1622, ſays nothing of this Water; whereas in his third Edition of 1650, he has a ſmall Treatiſe expreſſly upon it. How far this will warrant us in ſuppoſing, that it was in no great Repute, 'till after the firſt of theſe Dates, I leave to my Reader to judge. In this Treatiſe he tells us, "That this Water was fre-
" quented for no other Uſe, but the Stone;
" though, ſaith he, it hath alſo other excel-
" lent Qualities: It notably cooleth the In-
" flammations of all the inward Parts, and
" yet does not offend the Stomach, as ſome
" other Waters do, and is withal of a gentle
" mundifying Quality. It is therefore very
" effectual againſt the burning Heat of the
" Stomach, Inflammations of the Liver and
" Reins, and Aduſtion of the Humours, be-
" ing taken with fine Sugar, a Dram to a Pint.
" In ſuch as have hot Livers, red pimply
" Faces, and aduſted Humours, I have cauſed
" a Tincture of Roſes and Violets to be
" made

" made therewith, with ſingular Succeſs:
" In Inflammation, and Siccity of the Inte-
" ſtines, it is good to give, with this Water,
" *Mel violar. ſolut.* In Inflammations of
" the Kidneys with Obſtruction, and where
" there was withal hot Livers, I have given
" it with *Chryſtal. Miner.* with wiſh'd Effect,
" for the Diſtemper of the Kidneys was not
" only quickly allay'd therewith, but alſo
" abundance of Sand, and other droſſy Mat-
" ter purg'd off. That this Water is good
" againſt the Stone and Strangury, and pu-
" rulent Ulcers of the Kidneys and Bladder,
" is evident, by reaſon of its mundifying
" Quality. This Water is alſo good in Ulce-
" rations of the Inteſtines, with this Proviſo,
" that it be taken with ſome convenient
" Adjunct, as *Mel Roſar.* to occaſion the
" Paſſage thereof, through the Belly, divert-
" ing it from the Veins. This Water is not
" to be given to ſuch as cannot excrete, and
" paſs it away by Urine; neither is it to be
" given to ſuch as have cold Stomachs, weak
" Livers, feeble Brains, and ſuch as are ſub-
" ject unto Rheums; in a word, not to
" phlegmatick, nor to any that abound with
" Crudities, or have a cold and moiſt Habit
" of Body; for, in all ſuch, it will ſoon in-
" fringe the natural Heat, breed Rheum, an-

" noy

" noy the Breaſt, occaſion Cramps, and by " filling the Body with watery Superfluities, " incur a Lethargy, Palſy, or ſome other De- " bility of the Limbs, and Sinews: As for " outward Uſes, he ſays, the Water may aſ- " ſuage the Itch, mundify and palliate old " Sores, but no Matter of Moment is to be " expected from it."

This Account lets us into a little farther Knowledge of the Nature of this Water, as a Cooler of the Blood: " It notably cooleth " Inflammations of all the inward Parts.—It " is of Service in hot Livers and Reins, Adu- " ſtion of the Humours, and red pimply " Faces;" all which might perhaps be as well expreſs'd by ſcorbutick Heats, for which it now ſtands famous. And this Quality of it appears farther, in that he informs us, that if this Water is given in cold moiſt Conſtitutions, or does not paſs by Urine, it will produce cold Diſeaſes. He allows of its Virtues in the Stone, and Ulcers of the urinary Paſſages; but particularly in the former, for which it was principally frequented; he believes that its good Effects in both are owing to its " cleanſing mundifying Quality;" by which I preſume he means, that it both deterges Ulcers, and waſhes away Gravel. And

for

for the ſame Reaſon, he alſo thinks it good for Ulcerations of the Inteſtines; but as to Ulcers of any other Part, he is quite ſilent; from whence I conclude, that it was uſed for ſuch Ulcers only, as the Water, in its Paſſage, was ſuppos'd actually to waſh and keep clean. As for outward Ulcers, his Opinion is, that little is to be expected from it.

In 1655, we have a Letter extant from Dr. *Maplet* to Dr. *Bate*, in which, ſpeaking of a young Lady who had received no Benefit from a long and continued Uſe of theſe Waters, "So powerful an Effect have they, "ſays he, in voiding Gravel, that as ſhe has "drank them all this while, and diſcharg'd "none, I could almoſt venture to conclude "ſhe has none." And again, "when I con-"ſider the extraordinary healing Quality of "theſe Waters, and the little good they have "done her, I am apt alſo to think, ſhe can "have no Ulcer in her Kidneys; for I have "ſeen cancrous Sores of the outward Parts, "which I thought incurable, healed by them, "as it were by Miracle, in leſs time than this "Lady has been there. The Method they "uſed, was to let the Water (which runs "down from a wooden Pipe upon a Pave-"ment beneath) fall upon the Part, and, hav-

"ing

" ing well waſh'd it, to wet a Cloth in the " Water, and wrap the Part up with it four " times doubled: The very firſt time of uſing " it, it would give Eaſe; then the Sore would " aſſwage, then change Colour for the better, " and ſo heal: And the Patient uſed to " drink of the Water daily during the Cure " *ad libitum:* Now, I ſay, if this Spring is of " ſuch wonderful Efficacy in ſo very malig- " nant Ulcers of the outward Parts, why ſhould " it not exert itſelf in the Kidneys which " it runs through, and heal Ulcers there?"

The ſame Dr. *Maplet*, in a Letter dated 1668, written to Dr. *Creyghton* Dean of *Wells* (afterwards Biſhop), ſays, " But if you " receive little Benefit from what I have pro- " poſed, I really ſhould adviſe you to *Briſtol-* " Water; which is of excellent Virtue in all " Diſorders of the Kidneys and Bladder " whatſoever." And again, in a Letter wrote the *January* following,—" You'll conſider of " the Advice I gave you, about drinking our " Waters, and be perſuaded, I hope to come " and try their Effects in the Spring, when " the warm Weather comes on." And again, in a Letter, dated *April* 7, 1669, " In my " Opinion you ſhould come to *Briſtol*, to " drink our Waters; which are very benefi-

" cial to the Kidneys and Bladder, be the " Caſe either Stone or Ulcer; which alſo " greatly cool and temper the Blood, and " thereby ſoften the Urine which is diſ- " charged from it."

In another Letter to Dr. *Wall*, he ſpeaks of *Briſtol* Water, and deſcribes the Place whence it ſprings; telling him, " it is " counted good for Nephritick Caſes, and " that he reſts his Cure upon this Water, " drank of * *largely*, upon an empty Sto- " mach, at ſuch times as the *Tide per-* " *mits* †."—

Theſe Letters contain the Teſtimony of one, who practis'd Phyſick upon the Place, and therefore could not be unacquainted with the Character this Water then bore; and yet he ſays nothing more of it than others had ſaid before him, only he extols

* They drank it formerly in greater Quantities than they do now.

† It is plain from what has been ſaid, that, when the Tide roſe even with the Spring, it muſt mix with it and foul it. But there was ſtill a further Inconvenience; for altho', when the Tide roſe, the Water would continue clear, 'till it came up to the Spring, yet when the Tide ſunk it was not ſo; but the Spring would continue foul for ſome Hours after the Tide had ſunk below it; ſo that the Times of Drinking were but ſeldom, and they altering every Day.

it greatly, both as to its outward and inward Uſes. He indeed ſays, that " it is " good for all Diſorders whatſoever of the " Kidneys and Bladder:" But this can mean no more, than that it is in general friendly to thoſe Parts; becauſe as it will not ſuit all, ſo there are ſome which it does ſuit, which he knew nothing of; it being at that time famous for nothing more, than for waſhing of outward Sores and Humours, and for calculous and ulcerous Affections of the urinary Paſſages. But is it not ſurpriſing, that neither of theſe Gentlemen ſhould ſpecify *what Sort of Sores* they more eſpecially healed outwardly; and, as to their inward Uſe, that they ſhould not diſtinguiſh between Stones that are paſſable and Stones that are fixed; or tell us of the reſpective Service they are in each Caſe?— That they ſhould confound the Stone in the Bladder with the Stone in the Kidney; and give us no Cautions, concerning the Application of this ſo powerful Remedy; not even ſo much as to tell us, when it is of moſt Service, in the Fit, or out of it; how far cold Conſtitutions may venture upon it, *&c.* but only tell us in general, that it is of a cooling or cleanſing Nature; and thus, by general Words, leave us to

gueſs,

gueſs, at what perhaps they never diligently enquired into: As for Dr. *Maplet*, he indeed writes only to his particular Patients, and therefore cannot be expected to ſay ſo much, as if he had wrote profeſſedly on the Subject; though had it had any farther Excellencies, it is probable both would have been ready enough to urge them. That its Virtues in conſumptive Caſes were not known at this time, appears from Dr. *Bennet*, who wrote his *Theatrum Tabidorum* in 1650. In which we do not find a Word ſaid of the Efficacy of *Briſtol*-Water in this Diſtemper, though this Gentleman was himſelf in a Conſumption, and practiſed Phyſick in his younger Days at *Briſtol*.

I ſhall now turn to ſome other Teſtimonies concerning it. In *Fuller*'s *Worthies*, printed 1662, we have the following Account: "St. *Vincent*'s Well, lying Weſt of "the City of *Briſtol*, under St. *Vincent*'s "Rock, and hard by the River, is ſove-"reign for Sores and Sickneſſes, to be "waſhed in or drank of, to be either out-"wardly or inwardly applied; it hath a "ruſty ferrugineous Taſte, which it retain-"eth, though boiled never ſo much. Ex-"perience proveth that Beer brewed there-

"with,

" with, is wholesome against the Spleen;
" and Dr. *Samuel Ward*, afflicted with that
" Malady, and living in *Sidney* College,
" *Cambridge*, was prescribed the constant
" Drinking thereof, though it was costly to
" bring it through the *Severn*, and narrow
" Seas, and thence by the River to *Cam-*
" *bridge.*" This is so very imperfect an Account, that it is highly probable he knew nothing of the Water, but by Report, which is *tam ficti pravique tenax, quam Nuncia veri.* Nor indeed should I have thought him worth quoting, were it not that he pronounceth the Water good against the Spleen. A Virtue, I am sure does not belong to it, nor can I find out, who first taught it did. Probably, as it shewed itself as a Diuretick, and might in some scorbutick Hypochondriacks agree well, it was imagined to be of no small Efficacy this way, especially as it had been hitherto supposed to be impregnated with Iron; a Character which it will appear from what follows, to have kept much longer than one could believe, if those only had wrote of the Water, who were acquainted with the Nature of it.

In

In 1672, *Claromontius* publiſhed a Treatiſe, *de Aere, Aquis, & Locis Angliæ*, in which he ſpeaks of *Briſtol*-Water, as good for the Gravel, and Obſtructions of the Inteſtines: As to himſelf he tells you, they did not agree with him by any means, for they made him puke, and did not paſs as they ſhould do by Urine; he fancied them of an acerb Taſte, and tells you they are a harſh Water, and that if they do not paſs by Urine, they either come up again by Vomit, or gripe the Bowels and cauſe Ruptures.

As this Gentleman, tho' a Phyſician, was a Stranger, we cannot expect ſo accurate an Account of them as from thoſe acquainted with the Place; eſpecially as he conceived a Diſlike to them. So far he ſays true, that, where they do not paſs, they may be apt to make the Stomach ſick, and gripe the Bowels; but, as to the acerb Taſte, and their being good for Obſtructions of the Inteſtines, he ſeems rather guided by what others had ſaid, than what he himſelf had experienced. For, as it was pronounced by *Jorden* to have Iron in it, many would have it, that it had an acerb ferrugineous

Taſte; whereas no Water ſeems ſofter to the Palate than this does. But the ignorant Part of Mankind are ſo ready to aſſure us of more than they know, and the inquiſitive Part ſo ready to believe them, that we muſt not wonder at Miſtakes of this Nature. And thus between thoſe Writers, who are too ſuperficial in their Accounts of this Water, and them who are miſinformed, we are (as in moſt other Parts of the *Materia Medica*) left very much to our own Experience; but with this Difference, that whereas the Uſe of other Medicines may be examined into any where, this only can be learnt upon the Spot.— Yet thus far I think, we may fairly collect from what has been ſaid, that whatever might be the Opinion of ſome particular People, the Water was not yet of any eſtabliſhed Credit, except as to calculous and ulcerous Affections of the Kidneys and Bladder, taken inwardly; and to divers Sores and Humours applied outwardly.

And this is confirmed by the Teſtimony of Mr. *Oneſiphorus Tyndal*, now living, who came to *Briſtol* in 1674, at which Time he informs me, that this Water was in Uſe chiefly for the Stone and Gravel; that

that People uſually waſhed themſelves with it for the Itch, with great Succeſs; but as to any thing further, it was in no Reputation, till ſuch time as it was found out to be a Cure for the Diabetes. The Occaſion of which Diſcovery, he aſſures me, was as follows: It happened about the Year 1680, that two or three Perſons of Note in *Briſtol* died of this Diſtemper; the Phyſicians acknowledging and bewailing the Ineffi-cacy of their Art in ſuch manner, as it was looked upon by every Body to be incurable. One Mr. *William Gagg*, a Baker, who lived in *Caſtle-ſtreet*, being ſeized with it, was accordingly deſpaired of by all that knew him; but dreaming one Night, that he drank plentifully of the Hot-Well-Water, and was wonderfully refreſhed by it, he was much inclined the next Morning to quench his Thirſt with it, and found it to anſwer to his Wiſh ſo effectually, that by continuing the Uſe of it, in a few Days he came abroad, gathered Fleſh and Strength daily, and recovered to the great Surpriſe of every Body that knew him. This one remarkable Inſtance was ſufficient to recommend this Water to others labouring under the ſame Diſorder; and accordingly it was found to anſwer Expectation, and

was

was ſoon brought into Reputation for it.

In 1688, Dr. *Etwall*, who is *now living* *, came to *Briſtol*: He informs me, that this Story was then averred to him for Truth; that People then depended on it for the Cure of a Diabetes; but that it had not gained Reputation ſufficient to draw much Company thither.

In 1690, Dr. *Guidot* publiſhed his Book *de Thermis Britannicis*, where he has a particular Treatiſe on *Briſtol*-Water; in which he has not only collected all that Dr. *Venner* and *Maplet* had ſaid, but adds, that it is good for the Wind in the Stomach, the Cholick in the Bowels, a Diarrhæa, Dyſentery with Excoriations of the Inteſtines, but more eſpecially for the Diabetes, and *Flatus Hypochondriacus*: For which latter he quotes *Fuller*'s Authority, and gives a Copy of a Letter from Dr. *Harbech*, Phyſician of *Briſtol*, confirming its Virtues in a Diabetes.

It is very probable, that this new Diſcovery much excited the Enquiries of Phyſicians con-

* Dr. *Etwall*, and Mr. *Tyndal*, both died ſince the firſt Edition of this Treatiſe.

concerning this Water, and that Dr. *Guidot* might, for that Reaſon, chuſe to enlarge upon it, though he does not ſeem to have ſufficiently acquainted himſelf with its Nature; elſe ſurely he could not pronounce it good in a windy Cholick, it being one of its moſt common Inconveniencies, that it is apt to chill the Stomach, and gripe the Bowels: And therefore I am of opinion, that this with his *Flatus Hypochondr.* is of a Piece with the miſtaken Notion of *Fuller*'s about the Spleen, and perhaps deduced from it. His mention of a Diarrhæa is new, and was perhaps one of the firſt Concluſions from this new Diſcovery; the Benefit received in one Kind of Flux, directing them to the Trial of it in another: And this might farther encourage them to apply it to a Dyſentery; eſpecially, as it had before been recommended for Ulcerations of the Inteſtines. But theſe good Effects of it ſeem built rather upon Surmiſe, than Experience.—Dr. *Guidot* had likewiſe probably heard, that the Water was good for a Conſumption and Hectick; another probable Concluſion from its curing a Diabetes: But that he knew very little of the Matter, appears from his commending *Bathing* in it (not drinking it) for that

Purpoſe, and wiſhes that there was a Receiver at the Spring-head, large enough for People to go in.

About this time it was, that the City began to think the Water worth their Care, and propoſed ſecuring it from the Tide, which made it very inconvenient for thoſe that needed it; and accordingly, in 1691, Sir *John Knight*, Mayor of *Briſtol*, endeavoured to incloſe the Spring, in ſuch manner as that the Tide ſhould not mix with it; and, for this purpoſe, raiſed a Stone-work round it, which being built higher than the Tide ever roſe, was conceived ſufficient to keep it out: But the Weight of the Water incloſed altered the Courſe of the Spring, and put them in fear of loſing it.

In 1695, the Merchants of *Briſtol* granted a Building Leaſe to certain Proprietors, to ſecure the Spring, and contrive, if poſſible, that the Water might be had as well at High as Low-water; which Proprietors found the Spring, and made a proper Foundation for Pumps, which now carry the Water near Thirty Feet high; the Tide-water being kept out by means of Pipes, which

which carry the Spring-water into the River, and have Valves, which open, to let the Water out, but ſhut againſt any that would force itſelf in. But, neverthelefs, it is found by Experience, that the High Tides will mix with the Spring, and foul it, (which they can do no other way than by ſome unknown Clefts in the Rock) and the Water continues foul for ſome time after the Tide is ſunk.— From this time other Perſons began to build, and make the Place commodious for the Reception of Company; and ſo it came, by degrees, into the Repute it is in at preſent.

There were now two ſtanding Principles, which every one who was inquiſitive into the Nature of the Water might build upon; *Firſt*, Its Virtues in calculous and ulcerous Affections of the Kidneys and Bladder: *Secondly*, in a Diabetes. Men now began to perceive that its Virtues, as to the firſt, could not be owing to any forcing diuretick Quality; for, if ſo, how could it cure a Diabetes? And therefore it was more probable, that the Good obtained this way was rather owing to its cooling Nature, by which it might ſerve to allay the Inflamma-

tion and Pain cauſed by Stone or Ulcer. And, by giving Eaſe, it gained a Reputation for theſe Diſorders, and that very deſervedly; becauſe, in Caſes where the Stone or Gravel is paſſable, whatſoever allays the Inflammation, not only gives Eaſe, but Room alſo for the Stone to paſs; eſpecially, if it ſupplies the Body at the ſame time with Matter to paſs, as Water certainly does. And we obſerve, that in fixed Stones the Service done is generally no more than may be accounted for from this one Conſideration. And the ſame may in ſome meaſure be ſaid of Ulcers; though, as there is another Circumſtance to be attended to, we muſt not make our Concluſions without it; and this is, its Virtues in a Diabetes; a Diſtemper ſuppoſed to ariſe from a Weakneſs and Laxity of the Kidney: From which it was obvious to conclude, that it had alſo an aſtringent Quality, by which it might conduce to the healing and drying up of Ulcers, as well as aſſwaging the Inflammation attending them; and that it might not only eaſe Pain, and diſcharge Gravel, but alſo by ſtrengthening the Kidneys guard againſt it for the future,—And this was further confirmed, in that its Virtues in outward Sores were directly accounted for from

from theſe two predominant Qualities; it being good only in ſuch Sores and Humours, where the Indications are cooling and drying. And this new Diſcovery not only gave Men a better Idea of the Benefits before received, but alſo greatly extended the Uſe of this Water; for now they began to apply it to every Purpoſe of cooling and aſtringing. No Diſtemper was thought too hard for it, in which either, or both of theſe were indicated. One of the firſt Concluſions was, that great Good might be expected from it in Diarrhæa's and Dyſenteries, and other colliquative Diſcharges; *next*, that it might be of ſervice in all ſeminal and uterine Weakneſſes; *thirdly*, that all Heats, whether hectical or ſcorbutical, Conſumptions, and all Diſorders proceeding from the Acrimony of the Blood, might be cured by it. How far it anſwered in theſe Particulars will appear in the Sequel of this Diſcourſe. So far is reaſonable to believe, that theſe two Principles of Cooling and Aſtringing, which now ſeemed to manifeſt themſelves in this Water, were the Ground-work of all the late improved Uſes of it; and indeed the Virtues of this Water may not improperly be ſaid to ariſe from a due Conſideration

of

of theſe two different Qualities. Where they both jointly contribute to the Cure, they are little leſs than ſpecifick: Where they claſh, they are not ſo much to be depended on. It is therefore incumbent upon the Phyſician to conſider well the Circumſtances of every particular Caſe, and where he finds any Contra-indications, to qualify, if poſſible, the Inconvenience, and to make them ſerviceable to the Point he aims at. But, leſt I ſhould be thought not to pay a proper Deference to what others have ſaid, I ſhall proceed to give an Account of ſuch Authors as have taken notice of this Water ſince the Diſcovery of its Virtues in a *Diabetes*.

And firſt, I am ſomething ſurpriz'd to find ſo little Notice taken of this Spring by the Writers of Natural Hiſtory. For, except that Sir *Robert Atkyns*, in his *Ancient and Preſent State of* Glocesterſhire, printed 1712, juſt ſays of it, that, "it is a "Remedy famous for divers Diſeaſes, eſpe-"cially the Diabetes," I know not of any that have mentioned it. In the late Edition of *Camden's Britannia*, though tranſlated and improved by ſo able a Hand, we do not find a Word of any ſuch thing, though both

both in the Edition of 1695, and in that of 1723, there is a Note upon the Diamonds of St. *Vincent*'s Rock, nothing near ſo famous as its Water, *Qualis Gemma micans, pretio ſed major.*—It were indeed to be wiſhed, that ſome one or other of the Phyſicians of the Place had publiſhed their Sentiments of it: But, as this has not been the Caſe, we muſt content ourſelves with ſuch, who, if they knew leſs, preſumed more: For, in the Space of Forty Years, I find but one Author, who has wrote on the Subject; which is one Mr. *John Underhill*, a Practitioner indeed in Phyſick in *Briſtol*, but by no means qualified, as I am told, for ſuch an Undertaking. This Gentleman finding, as he ſays, no ſatisfactory Account of the Water extant, undertakes to give one, and dedicates his Book to the Mayor and Corporation. This Book bears Date 1703, and is entitled, *Johannis Subtermontani Thermologia.* It conſiſts chiefly of a Collection of Caſes, extracted from a Liſt of Cures, which was formerly kept at the Well-houſe; by which he would eſtabliſh the Uſe of the Water, not only in *Diabetes*, *Gravel*, and *Scurvy*, but alſo in *King's-Evil* and *leprous* Diſorders; and, in ſhort, in every thing. "This Hot-well

"Water,

" Water, ſays he, will extinguiſh the Flame " in all *Synochi*, and putrid, if not malig- " nant Fevers: It is *Inſtar omnium*, the " laſt and only Refuge in Hecticks, and " Dyſcraſy of Humours. It is of excellent " Merit, *a Capite uſque ad Calcem*, in all " Cephalick Caſes, and Ataxy of the Spi- " rits, and Palſies, and other Impotencies; " and, as to external Uſes, it is a truſty " Aſylum in all left-off incurable Ulcers, " Fiſtula's, and eroding Sores, if not Can- " cers." And, in proof of all theſe Wonders, he has his Caſes ſigned by the Patients Names. Thus we ſee, what a Medley of Concluſions may ariſe, when People are left to tell their own Caſe, and theſe Relations built upon as Matters of Fact.—To underſtand the Nature of a Diſorder, to obſerve the Operation of Medicines, and to give a faithful and exact Account of a Cure, requires more Attention and Capacity, than the Generality of Mankind are Maſters of; not to mention how very apt we all are to magnify every thing that relates to ourſelves. There are doubtleſs ſome anomalous Caſes, which have met with a Cure from theſe Waters: But what Concluſion can we draw from hence? only that this, like other Medicines, will ſometimes have very

ſurpriſing Effects. Beſides, it is well known, that hot ſcorbutick Blood may poſſibly ſhew itſelf in divers terrible Shapes, and yet the *Cauſa Morbi* be nothing more than what is eaſily curable by theſe Waters. I ſhall however recite the Liſt he gives of the Diſtempers, for which, he ſays, the Water was famous in his Time; which, though not juſt, may ſerve to ſhew us ſome of the improved Uſes. "It is of excellent "Merit, ſays he, in all Cachochymy, "Cholick, bilious Vomitings, Cardialgia, "Dyſenteries, and Fluxes of all Kinds, "Fevers, and all hectical Caſes, all laviſh "Sweatings, all Rheumatick Pains, all "Herpetes, Puſtules, Itch, Scorbute, all "Inflammations and ſulphurous Erup-"tions; all Sorts of Ulcers, whether in-"ward or outward, Aſthma, King's-Evil, "Dyſuries, Diabetes, Kidney Gravel, Blad-"der, and other Excoriations; it extin-"guiſheth all Thirſt; it is rather binding, "than laxative." In another Part of his Book, he obſerves, that "it is of excellent "Uſe in Sterility, Debility, or any Fluor, "or Slipperineſs of the Parts, by its forti-"fying the Veſſels, and contemperating "the Humours." He tells us moreover, "of its Virtues in hectick and colliqua-

" tive Sweats." From all which it appears, that it was looked upon as a great Temperer of acrimonious Juices, and as a Binder and Strengthener of relaxed Parts; and, that it was extended to every Diſeaſe, of which either of theſe was the ſuppoſed Cauſe; with what Succeſs, I fear, our Author is too vehement in his Praiſes, to be received as a credible Witneſs.

In the Year 1725, Dr. *Wynter* publiſhed his *Cyclus Metaſyncriticus*, in which he profeſſes to give an Account both of *Bath* and *Briſtol* Water, their ſeveral Virtues and Differences. But, I can by no means think, he has acquitted himſelf of his Promiſe; nor is it to be expected he ſhould, having, as he tells you in his Preface, wrote this Performance on board a Ship, in his Paſſage from *Jamaica* in about four Weeks. His Liſt of the Diſeaſes, for which *Briſtol* Water was then famous, is as follows. " Internal Hæmorrhages and In-
" flammations, as Blood-ſpitting, Dyſen-
" tery, and immoderate Fluxes of the
" Menſes, purulent Ulcers of the Viſcera,
" hence in Conſumptions. *&c.* Dropſy *,
" Scurvy

* *Dropſy.* Perhaps ſome may be ſurpriſed, ſays our Author, to find *Briſtol* Waters preſcribed in Dropſies: But ſince

" Scurvy with Heat, Stone, Gravel, Stran-
" gury, and habitual Gout; ſcorbutick
" Rheumatiſm, Diabetes, ſlow Fevers,
" Atrophy, Pox, Cancers, Gleets in both
" Sexes, King's-Evil." And yet, for all this, he is ſo inaccurate, as to ſay in a Page or two before, that Dr. *Venner* had wrote of it 70 Years ago, and recommended it in all Diſtempers, for which it now ſtands ſo famous, except the Diabetes. The chief Motive that induced the Doctor to write of this Water was, to oblige Dr. *Friend* with a Compariſon betwixt the Mineral Waters of *Bath* and *Briſtol*. What he ſays of this Matter, is as follows: " *Bath* Waters are beneficial, where the " Secretion is diminiſhed: *Briſtol*, when " too much increaſed. *Bath* attenuates " powerfully: *Briſtol* incraſſates. *Bath* " is ſpirituous, and helps Defect: *Briſtol* " is more cooling, and ſuppreſſes Pleni-
" tude. *Bath* Waters rouſe up the too " languid, and quicken the too lazy Cir-

 " culation:

ſince no one can doubt, that diuretick and drying Medicines are of great Service in this Diſeaſe; and, it is alſo evident, that *Briſtol* Waters have theſe two Qualities in a great Degree, *Ergo*—But, if we conſult Experience, it will prove the Doctor egregiouſly miſtaken; all the Water a dropſical Man drinks not paſſing, but lodging within, and increaſing the Diſeaſe.

" culation: *Briſtol* allays Heat, and re-
" ſtrains the too rapid Motion of the Blood.
" *Bath* invigorates the Phlegmatick:
" *Briſtol* attemperates the Cholerick Con-
" ſtitution. *Bath* Waters ſeem to be de-
" dicated to the Maladies of the Stomach,
" Guts and Nerves: *Briſtol* to thoſe of the
" Lungs, Kidneys, and Bladder." Again,
" *Bath* Waters are at variance with a Milk
" Courſe, and *Briſtol* never judiciouſly
" directed, but where that may be joined
" with Reaſon and Succeſs."

Thus, from a ſimple diuretick Water, calculated for ſome few Diſorders of the urinary Paſſages, are we now arrived at a ſovereign Remedy, applicable to ſome of the moſt ſtubborn Diſeaſes of the Body. For, when once it was found to cure a *Diabetes*, nothing afterwards was thought too hard for it;—it was to ſtop all Fluxes, and temper all Humours. And yet this is the firſt Author who mentions its Virtues in internal Hæmorrhages; which, one would imagine, might have been gueſſed at from the Beginning, from its cooling Nature only; eſpecially, as its good Effects in bloody Urine muſt appear from the frequent Uſe of it in the Stone and Gravel.

But,

But, when it was once known to have alſo an aſtringent Quality, the Application of it to inward Hæmorrhages becomes very obvious; though this ſeems to have been one of the lateſt Concluſions made. For, unleſs what is before ſaid of a Dyſentery be referred to Hæmorrhage, I don't know of any Writer that has made the leaſt mention of it before this time, not even *Subtermontanus*, who ſeems to have omitted nothing that he could poſſibly alledge in Praiſe of this Water.

There have been, ſince Dr. *Wynter's* Book, Two farther Treatiſes publiſhed on this Subject; the one by Dr. *Keir*, in 1739, the other by Mr. *Shebbeare*, in 1740; but as both theſe Authors dwell chiefly on the Analyſis of the Water, they will come more properly under my Third Head: However, as the former has given a Liſt of the Diſorders in which he thinks *Briſtol* Water is principally of Benefit, it will be proper to recite it. After having from the Nature of its Contents deduced the Reaſon of its Effects, he concludes in the following Manner: "From this Idea of the "Virtues of *Briſtol* Water, it will not be "very difficult to conceive, after what

"manner

" manner it acts in the Cure of the fol-
" lowing Diſtempers, *viz.* Hæmorrhages,
" Inflammations, ſcorbutick and febrile
" Heats, cutaneous Eruptions, ſcorbutick
" Rheumatiſms, habitual Gouts, Gravel,
" Stone, Strangury, Diabetes, ſome Drop-
" ſies, Cancers, King's-Evil, Atrophy, Con-
" ſumptions; all which, ſays he, imply
" Obſtructions of ſome Veſſels, a Viſcidity
" or Acrimony of the Humours, or a Com-
" plication of theſe.

But it is now time that I ſpeak for my-ſelf, and declare what I think to be the preſent eſtabliſhed Virtues of this Water, if happly I can hit the prudent Mean,

Neve operæ deſim, neve immoderatus abundem.

The *firſt* and principal Virtue is, that of tempering the bad Effects of hot acri-monious Blood; generally preventing, of-ten curing, Inflammations and Hæmorrhage from this Cauſe; but more eſpecially thoſe of the Kidneys, Womb, and Lungs.

It has, *ſecondly*, been found of great Service in Gleets of both Sexes, and other

ſeminal

ſeminal and uterine Weakneſſes; but it is more particularly famous for a Diabetes, in which it is deemed a Specifick.

Thirdly, It is a ſovereign Remedy in a hectick Fever: It is a notable Preſervative againſt the Stone, not only preventing Gravel from gathering, but powerfully diſcharging it when gathered; and is a friendly Drink in all inward Ulcers, but more eſpecially thoſe of the urinary Paſſages. How far, and under what Circumſtances it relieves theſe Complaints, will appear under my *ſecond* Head.

As to its outward Uſes, it is now very little depended on; not, that I doubt of its good Effects in many Caſes, where the Indications are cooling and drying. But People do not care to be at the trouble of Bathing; and indeed I cannot think it ſo efficacious as formerly. For, as the Spring-head is now ſo incloſed as not eaſily to be come at; and, as the Water for Bathing is pump'd into Ciſterns at a Diſtance, it loſes ſome of its Heat, and probably ſome of its Virtue too. And indeed, we adviſe it now rather as a convenient Cold-Bath than any thing elſe; though ſome will go into

into it, as it comes warm from the Spring.—But, to return to the inward Uſe of it.

It is found more eſpecially ſerviceable in all hot dry Conſtitutions; moiſtening and cooling the Body, quenching Thirſt, creating Appetite, giving Fleſh, and increaſing Strength.

But it is rather prejudicial to all cold watry phlegmatick Conſtitutions; chilling the Body, griping the Stomach and Bowels, binding in Humours, and cauſing Dropſy and ſwell'd Legs.

As to the ſenſible Effects of it on healthy Bodies, they are hardly obſervable; it generally creates Appetite, provokes a limpid Urine, is apt to get up in the Head, like other mineral Waters, as alſo to bind the Body; and, if taken in too great a Quantity, chills the Stomach and Bowels, and ſometimes ſwells the Legs.— And thus, having finiſhed my *firſt Head*, I ſhall now, in the ſecond Place, proceed to enquire into the Nature and Cauſe of ſuch Diſtempers as this Water is found more particularly to hit, and firſt of a hectick Fever.

PART

PART II.

Of ſuch Diſtempers as may be reliev'd by the Uſe of Briſtol-Water.

CHAP. I.

Of the Nature and Cauſe of a hectick Fever in general.

IT is univerſally agreed, that when the Body is drained by Evacuation, the Conſequence is often a hectic Fever: Thus, for Inſtance, Diarrhæa's, Dyſenteries, profuſe Sweats, Salivation, Diabetes, and other immoderate Diſcharges, are the frequent Cauſes, and known Forerunners of this Diſtemper. Nor does the Reaſon of this ſeem very difficult to explain; for whenever the *Egeſta* exceed the *Ingeſta*, the Body cannot be properly nouriſhed; becauſe the Waſte is greater than the Supply: Hence, Loſs of Fleſh and Strength, continual Heat, Acceleration of the Pulſe,

and all other Symptoms of a Hectick enſue; which will come on ſooner, and continue ſtronger, according as the natural Conſtitution is hot or cold, dry or moiſt; or, in other Words, according as the Diſcharges were before, in proportion to the Food, great or little.

Taking therefore Things in this ſimple View, let us examine whether any Light may be gathered from hence, in hectick Fevers from other more complicated Cauſes; ſuch as *inward Ulcers, ſcorbutic Acrimonies, acute Fevers*, &c.

But, before we proceed, it will be requiſite to obſerve, that it is not every Increaſe of the *Egeſta* above the *Ingeſta*, which will cauſe a Hectick; for if the Evacuation be of the vital Blood, or ſuch as any way checks the Force of the Circulation, ſo, as there remains not Vigour enough to carry on the neceſſary Secretions; then will the Blood be overcharged with Humidities, and the *Egeſta* will no longer exceed the *Ingeſta*, but a *Cachexy* will enſue.

But if, on the contrary, it ſhall happen, that the Evacuation made, does not ſo immediately deſtroy the animal Strength, only robs the Blood of its more ſerous Parts, as it will do, if it is by Increaſe of any of the Secretions; then cannot the Blood be overcharged with Humidities; and the Circulation will be ſo far from being check'd, that it will, on the contrary, be quicken'd, for want of thoſe Parts which are neceſſary to allay the Activity of it; on which Account the *Egeſta* will continue to exceed the *Ingeſta*, and hectical Symptoms will of conſequence ariſe. When therefore we ſpeak of Evacuation being the Cauſe of a Hectick, it muſt be underſtood of ſuch Evacuations only, as are ſo circumſtanced, as to rob the Blood of its more *unactive* Parts.

The moſt common and obvious Cauſe of a hectick Fever is *Heat*; which, if once predominant, waſtes the Strength, and inclines to this Diſorder; not that this is by any means the direct Conſequence of Heat, which is more apt to cauſe Inflammations, and Fevers of another Kind; but when the Blood is only put, as it were,

upon the Fret, not kindled up into a Flame, then a Hectick is the Conſequence. Thus, outward Heat of the Sun, immoderate Exerciſe, the continued Uſe of heating Food or Medicine, may occaſion this Diſtemper; for whatever heats the Body, increaſes the Proportion of the *active* Parts, and diminiſhes that of the *unactive*; which being once predominant, there is a Waſte made of thoſe Parts which are requiſite to preſerve the natural Craſis of the Blood, and a Hectick will of conſequence enſue. And there is likewiſe a farther Reaſon, why Heat may cauſe a Hectick; for as the Rarefaction cauſed by Heat, both in Fluids and Solids, relaxes and weakens the Fibres of the whole Body, it may happen that ſome one or more of the Glands, thro' Laxity, ſhall diſcharge more than they ought, and ſo a hectick Fever enſue, from Inanition, as before.

But if this Heat ſhall meet with an acrimonious State of Blood, and that from any Cauſe whatſoever, *conſtitutional*, or *acquired*; then will its Effects be greatly heightened, by reaſon of the ſtimulating Nature of ſuch Blood, which will add to the Activity of the Fluids, by increaſing the

the Motion of the Solids, and act with further Force.

And if, moreover, there ſhall not be only *Heat* and *Acrimony*, but alſo a *Drain* made, by any accidental Flux of Humours, or by the undue Uſe of any Medicines which increaſe the Secretions; there the Waſte is ſtill greater, and that which was before of itſelf ſufficient to raiſe a Hectick, by this additional Aid, becomes almoſt neceſſarily productive of it.

And thus we are enabled to account for ſeveral other manifeſt Cauſes of a hectick Fever; ſuch as Exceſs of Venery, long Watchings without Sleep, Fatigue of Body or Mind, ſcorbutick or other Acrimonies; all which are plainly reducible to *Heat*, or *Stimulus*, or *Drain*, either ſeparately, or jointly.

The next remarkable Source of a Hectick are *acute Fevers*; which are frequently obſerved to end in this Diſtemper, and ſometimes to be complicated with it: For, as a Perſon in a hectick Fever is very ſubject to Inflammation, it often happens that he is attacked with two Fevers at once; which

which latter will be ſo far from giving place to the former, that it will appear the ſtronger for it, and conſequently be the more dangerous. And, on the other hand, an inflammatory, or other acute Fever, may produce a Hectick, and that either before, or after its Criſis; for if it meets with a dry bilious Conſtitution, a Hectick may ariſe, even before the Fever is come to its Height, and be complicated with it, much more may it follow after the Fever is over; for as there is hardly any thing that quickens the Circulation, and exhauſts the Body more than a Fever, nothing will lay a more likely Foundation for it: And accordingly, we ſee it the Effect of ſuch Fevers chiefly, which either rage with violent Heat, or leave a morbifick Acrimony behind them; whence ariſes an active State of Blood, eaſily taking Fire, upon every ſlight Occaſion, and ever throwing off more than it can ſpare, which, in this weak State, cannot be done without incurring Danger of a Hectick.

That inward Ulcers, not only of the Lungs, but alſo of the Liver, Meſentery, Kidneys, Womb, and other Parts of the Body, cauſe a Hectick, is an Obſervation as old as *Galen*; though the Cauſe *why*

has

has not, I think, been ſufficiently explained. It is confeſſed on all Hands, that Ulcers are the Conſequence of a preceding Inflammation, which, not being diſcuſſed in time, forms itſelf into *Pus*, and is uſually called an *Abſceſs*; which, when broke, leaves an Ulcer. From the Inflammation during the making of this *Pus*, we well know there is a conſiderable Fever raiſed, which may be of itſelf ſufficient to bring on a Hectick; eſpecially, if we conſider, that there frequently is a prior Diſpoſition towards it: When the *Pus* is made, the inflammatory Fever indeed abates, but then another ariſes (as I conceive) from a new Inflammation, cauſed by the continual Fretting of the Matter detained in the Ulcer, which will be Stimulus ſufficient to raiſe a Hectick, and, by the Help of a prior Diſpoſition, deſtroy the Balance of the *active* and *unactive* Parts. For though the Inflammation be ſmall, yet as this Fretting never ceaſes, ſo long as the Ulcer remains unhealed, the Fever, though at firſt hardly perceptible, will in time have the Effects of other Fevers, which greatly exhauſt the Body, and tend, ſooner or later (according to the Nature of the Ulcer, and the Conſtitution it meets with) to a hectical State.

I know this Fever has been accounted for, from the *Abſorption of Pus*, which getting into the Blood, and circulating with it, obſtructs the Veſſels, and ſo cauſes this kind of Hectick: And, as a Proof of this, it is ſaid we often find *Pus* will paſs the Kidneys, ſalival Glands, or other Emunctories, without any Apoſtemation of ſuch Parts. But as this ſeems to me to be a *Deceptio viſûs*, I cannot altogether agree to it; for the preternatural Secretions of the Glands, may ſo reſemble *Pus*, as not eaſily to be diſtinguiſhed from it; as is manifeſt in a weeping Eye, (not to mention other Inſtances) which will yield Matter ſo like *Pus*, as the niceſt Judgment cannot diſcern any Difference; whereas the paſſing of *Pus* already formed through the minuteſt Veſſels, and the Secretion of it afterwards, in the ſame Shape again, is no very plauſible Conjecture, and ought to be ſupported with better Proofs than I ever yet heard for it, before it can be admitted for true. I am therefore rather inclined to believe, that the *Pus* is not *abſorbed* at all; but that, on the contrary, Nature is very induſtrious in puſhing it forth out of the Body; otherwiſe, I do not ſee, how Mat-

ter

ter could ripen, and form an Abſceſs outwards, and that in many Caſes againſt great Reſiſtance; nor indeed how it comes to paſs, that old Ulcers of the Legs, and Iſſues, ſhould be ſo great Derivatives of noxious Humours; which, as they are hardly ever kept perfectly clean, would ſurely on this Suppoſition be not ſo ſafe, much leſs ſo beneficial, as Experience tells us they are: It therefore ſeems probable, that the Reaſon aſſigned, is the truer Cauſe of theſe *Hecticks.*

But here it may be objected, that if a hectick Fever is cauſed only by the *Egeſta* exceeding the *Ingeſta*, it would not ſurely be ſo difficult of Cure; becauſe it were an eaſy Matter to remedy this, by throwing in ſuch Food as is proportionate to the Expence made. To this I anſwer, that as the Blood conſiſts of *active* and *unactive* Parts, and as the latter of theſe, are neceſſary to qualify the too great Activity of the former, if theſe unactive Parts are in great meaſure drawn off, as is the Caſe in hectical Drains, it will be no eaſy Matter to recover them, nor will any Supply of Food anſwer to the Waſte made: *Firſt*, as it will be too ſpeedily attenuated and conſumed by the

prevailing Activity of the Blood. *Secondly*, as it will find a quick and eaſy *Exit* at the Outlet made, and thus be rendered ineffectual for the intended Purpoſe.

And here it may be obſerved, that as this Diſtemper may proceed from Evacuations made *out* of the Body, ſo likewiſe it may ariſe from want of Aliment taken *in*, and that apparently for the ſame Reaſon. Thus we ſee long Faſtings, Obſtructions of the firſt Paſſages, Indigeſtions, *&c.* ſometimes end in a Hectick; though it muſt be confeſſed, that it is not ſo direct a Conſequence of theſe, as of the foregoing Cauſes. For, as there is no Drain made, the little Food which is taken in, ſerves in ſome meaſure to anſwer the Expence; and though the Blood be not fully ſupplied, yet the Proportion of the *active* and *unactive* Parts being not ſo much altered, the Conſequence is rather a ſlow nervous Fever, than a Hectick *, unleſs the *Ingeſta* are very ſmall indeed,

* One great Difference between a hectick, and nervous Fever, ſeems to be this, that the one proceeds from a Drain, which hinders the equable Diſtribution of Aliment; the other from Want of Strength to effect it; hence the Symptoms of a Hectick are ſimple and uniform, thoſe of a nervous Fever complex and innumerable, depending ſometimes on

indeed, or by ſome Accident the *Egeſta* are increaſed, or the Conſtitution is very hot and dry.

Nor ſhall I here omit to mention the hectick Fever, which ariſes in the laſt Stage of a *Dropſy*, and is accounted for upon the ſame Principles; for though in this Caſe, the Humours are not evacuated from the Body, yet they tend all to one Point; and therefore, in reſpect of the other Parts which are robbed of their proper Moiſture, the Water in the Abdomen muſt be conſidered as an *Egeſtum*, by which the Body is drained in ſuch manner, as the *Ingeſta* cannot ſupply and make up for.

From the whole therefore may we not conclude, that all hectick Fevers proceed from the *active Parts* of the Blood prevailing over the *unactive?* which is occaſioned either by the too plentiful *Ingeſtion* of ſuch Things as encreaſe the former, or a too great *Egeſtion* of the latter; ſo that *Inanition* muſt ever be conſidered as a Circumſtance eſſentially requiſite, towards the

on particular, ſometimes on general Weakneſs; and what ſtill makes them more complicated, are the divers unaccountable Spaſms that weak Nerves are ever ſubject to.

Production of a hectick Fever, and that ſuch Inanition in particular as deprives the Blood of its *unactive Parts:* For although this Fever may be acquired by the Ingeſtion of ſuch Things as encreaſe the Activity of the Blood, yet, as I have already obſerved, this is not the direct Conſequence; for the *active* Parts never take Poſſeſſion, unleſs where they are able firſt to ſubdue and expel the Power of their great Antagoniſts, the *unactive*; which is brought about chiefly by *encreaſed Circulation*, or *encreaſed Secretions:* The latter, directly and neceſſarily; the former, ſometimes directly, but often ſecondarily, by cauſing *Inflammation, Hæmorrhage, Fevers*, &c. of which a Hectick is the frequent Conſequence.

CHAP.

CHAP. II.

On the Cure of a HECTICK FEVER.

IF we may be allowed to build upon the Principles laid down, The firſt and moſt general Indication of *Cure* will be, to guard againſt the Evacuation made, and, if poſſible, ſtop the Drain; which is effected, by taking away the Cauſes of it, (*viz.*) *encreaſed Circulation*, and *encreaſed Secretions*. Encreaſed Circulation is cauſed by too great Activity of the Solids or Fluids, which muſt be provided againſt; *firſt*, by abſtaining from all ſuch Things as may either heat the one, or ſtimulate the other; *ſecondly*, by adminiſtring ſuch Remedies, as ſhall lower the præternatural Activity of both. *Encreaſed Secretions* ariſe either from encreaſed Circulation, which conſumes and carries off the Humours too faſt; or from weak Glands, which if they are by any Accident whatſoever ſo loaded as to be thereby weakened, or ſo weakened as to be thereby loaded, their Diſcharges will be encreaſed. When encreaſed Circulation encreaſes the Secretions, the Cure of the Cauſe is the Cure of the Effect: When the

Glands

Glands are in fault, though there are divers Methods made uſe of, for the Remedy of this Evil, yet, I believe, they may in general be reduced to *Derivatives*, and *Aſtringents*. Other various Methods may indeed take place, by way of prevention, according to what we fear; but when the Secretions are once actually impaired, though ſome Regard may be had to the original Cauſe, yet, I ſay, we do in general depend on Derivatives and Aſtringents. But, to be more particular.

And firſt, as to the *Activity of the Fluids*; which the Art of Phyſick informs us may be allayed theſe ſeveral Ways; by *Bleeding*, by *Diluting*, by *Acids*, by *cooling Salts* and *Herbs*, by *Incraſſants*, and *Emollients*; of which in their Order.

Bleeding is what indeed we often have recourſe to in hectick Caſes, when we would prevent Inflammation of any particular part; and is greatly to be relied on, where a Hectick is not already formed, but apprehended from this Cauſe: But, in general, it by no means ſeems to anſwer the Indications required; for, *firſt*, it is not to be expected, that Evacuations of any

any Kind, ſhall be beneficial in a Fever, of which they are the immediate Cauſe; nor becauſe Bleeding is of Service in plethorick Heats, does it therefore follow, that it will allay Heats ariſing from Inanition. *Secondly*, it is contrary to one great End we muſt always aim at in the Cure of a Hectick, which is giving Strength; the Loſs of which is a Circumſtance neceſſarily attending this Diſorder, and as neceſſarily to be attended to. I cannot therefore think any Good can be expected from Bleeding in a hectick Fever, as ſuch; unleſs it be adminiſtred as a Preventive of Inflammation, either as a Cauſe or a Conſequence.

By *diluting* Medicines, I would be underſtood to mean thoſe of the watry Tribe only, ſuch as ſmall Teas, Whey, Barley-Water not boiled up into an Incraſſant, or otherwiſe mixed with Pectorals. And theſe in Theory ſeem to promiſe very fair, in that they give a Supply to the Waſte made, and that of ſuch cooling Particles as the Blood now needs to allay its Heat, and ſoften its Acrimony. But however they may be of ſervice in common bilious Heats, they do by no means anſwer Difficulties: Whether they are too waſhy, and ſo di-

miniſh Strength; or are not duly diſtributed; or whether they relax too much, I cannot ſay; this is pretty certain, they do not take off the prevailing Acrimony; nor is any Thing of this Kind to be expected from Acids, which, as they ſtimulate the Solids, will increaſe the Secretions, and ſo be apt to do Miſchief. And as to the ſtronger *Mineral Acids*, if it be asked, Why that which is ſo powerful in allaying the Heat of putrid Fevers, ſhould be found ſo prejudicial in hectical Heats? I anſwer, That the Benefit obtained in theſe Fevers does not ariſe ſo much from their tempering the Heat of the Fluids, as from their ſtimulating the weaken'd Solids, and thereby promoting Sweat; and hence it is, that, joined with Cordials, they become more efficacious: For if they did immediately reſiſt and temper the Heat of the Blood, as is generally believed, I cannot ſee why they ſhould be mixed with warm Medicines, or how they could do ſuch hurt in hectick Fevers, as from all Antiquity they have been obſerved to do, and which it is manifeſt they muſt do, if they act by Stimulation.

Thus,

Thus as to the Intention of tempering the Heat of the Blood, we are reduc'd to cooling *Salts* and *Herbs*, and *Incraſſants*: And it muſt be acknowledg'd, that the former may be of Service where the Strength admits of them; but it is upon the latter chiefly, that we muſt depend; under which I comprehend almoſt the whole Tribe of Conſumptive Medicines, ſuch as *Milk*, *Snails*, *Jellies*, *Flummery*, *Sago*, *Saloop*, *Broths*, *Vipers*, *Gum. Arab.* *Gum. Tragac.* *Whites of Eggs*, *Cremor Ptiſanæ*, *emollient Pectorals*, &c. which, as they are of ſuch ſignal Service, will deſerve ſome Explication of their Virtues, which ſeem to ariſe, from their power to reſtrain the too great Mobility and Fluidity of the Blood, by which Means they not only abate the Fury of the active Parts, but alſo give ſuch a Conſiſtence to the Fluids, as will in ſome meaſure prevent their running off too faſt, whereby they nouriſh and give Strength at the ſame time that they allay Heat; and ſo anſwer *both* Indications of Cure, providing not only againſt encreaſed Circulation, but alſo againſt the Encreaſe of Secretions. But the Misfortune is, that in many Caſes the Stomach cannot receive nor digeſt them: and not only ſo, but when a

Hectick once begins to be dangerous, and needs them moſt, tho' the Fluids are ſo active, yet the Solids loſe their Strength, and have not Force ſufficient, to blend and mix together ſuch Parts as might be of Service. And as this Failure of Strength encreaſes, the Fluids themſelves will loſe all their Activity, and be ſo far from receiving Benefit from Incraſſants, that they will require *Volatiles*, as the only Method left of keeping the Machine in Motion.

Let us now ſee what Remedies we are to have Recourſe to, in order to quiet the too great *Activity of the Solids*. And here it is to be obſerv'd, that if a Hectick ariſes from Heat, whatſoever checks the Activity of the Blood, will alſo in like Manner affect that of the Solids, which depends upon it. But if the Hectick ariſes originally from Stimulus, we muſt by all means attempt to take it off; and if it is ſuch as is not in our Power to remove, we are then to give ſuch Remedies as ſerve to allay the Effects of the Stimulus, which are principally *Opiates*, and *Emollients*. There is Caution to be had in adminiſtring *Opiates*; becauſe they have only a temporary End, to pacify the Hurry of the Spirits, to relieve a particular

Symptom,

Symptom, or procure Reſt; but cannot be relied on, as to any laſting Effect. Our chief Dependance therefore muſt be on *Emollients*, ſuch as are ſoft pectoral or oily Medicines; which, beſides their ſmooth lenient Qualities, do in ſome meaſure anſwer the Purpoſe of Incraſſants, and are generally preſcrib'd in ſome Shape or other, in all Hectick Fevers. And here it may be proper to obſerve, that the nearer they approach to Incraſſants, the better they are; becauſe all thin watry Emollients are apt to relax too much, and increaſe the Secretions one way, more than they reſtrain them another: And agreeably to this, *Milk* has been recommended in all Ages, as the ſovereign Remedy, which allays Stimulus, and ſtrengthens at the ſame Time.

It now remains, that we ſhould treat of the ſeveral Methods of Cure, made uſe of in the Stoppage of *encreas'd Secretions*; which, as I have before obſerv'd, may be in general reduc'd either to Derivatives or Aſtringents. The Doctrine of *Derivatives* is founded on this Maxim, that the Encreaſe of one Secretion is the leſſening of another; but whoever conſiders how little it is in our power to encreaſe what Secre-

tions we pleaſe; and, where we can do it, how little it often proves to the Purpoſe; will not reſt much on this Notion, except in ſuch Caſes, where Experience warrants the Event. We ſhould therefore carefully obſerve, what particular Methods of Derivation have been found, by Experience, beſt to anſwer the End we aim at; whether *Diaphoreticks*, or *Diureticks*, or *Purges*, or *Vomits*, or *Iſſues*, or any other Method can moſt ſafely or ſurely diſcharge the Humours we would draw off. For whoever ſeeks Relief from either of theſe at random, without conſidering their reſpective Powers in relation to the Caſe in Hand, will not find Practice anſwer to Theory, and in moſt Caſes will probably do more harm than good; for Counter-Evacuations of all Kinds, if they do not relieve, will of Neceſſity hurt, becauſe they add ſo much as they diſcharge to the Cauſe of the Diſtemper; and therefore, as I ſay, are not to be ventur'd upon, except in ſuch Caſes where Experience warrants the Succeſs, and even then are frequently not ſufficient to ſtop a Flux of any Continuance. If indeed the original Cauſe of a Hectick Fever be in ſome particular Glands, which are weak, and diſcharge more than they ought, *De-*

rivations

rivations may be of Uſe: But if a Hectick from other Cauſes encreaſes the Secretions, this does not ſeem to be the proper Method of proceeding.

What then are we to expect from *Aſtringents?* Where we indeed know of an Aſtringent, that will directly act upon the Parts affected, much good may be expected from it. But this is what in very few Caſes we can pretend to, and therefore we make uſe rather of thoſe that are powerful, than ſuch as are ſpecifical; the Misfortune of which is, that they act generally upon other Parts, and not upon the Part affected; or at leaſt act more ſtrongly upon one, than the other: the Conſequence of which is, that the Diſorder is encreas'd, rather than diminiſh'd by them; the Part affected being ſtill weaker, in reſpect of thoſe other Parts, than it was before. But when there is a general Encreaſe of many Secretions, what Particulars can we truſt to? Muſt we not muſter up all our Forces, and do our utmoſt? Can the ſtrongeſt Aſtringent do too much? I anſwer, yes; for if they conſtringe the Parts affected too powerfully, they ſcrew them up to a Point they will not admit of; and therefore, inſtead of ſtrengthening, ſtrain

and

and weaken them. Hence we ſee that common *vulnerary Herbs*, ſlight Solutions of *Vitriol*, *teſtaceous Powders*, &c. often do more Service, than the moſt powerful Aſtringents; and hence perhaps it is that the ſubaſtringent Quality of *Briſtol*-Water takes place in this Diſorder.

If then ſuch are the Difficulties ariſing in this Diſorder, that its main Indication of Cure, cannot well be anſwered by any known Method or Medicine, how valuable muſt that Water be, which not only Experience, but Reaſon alſo pronounces ſo effectual in this Caſe, as almoſt to deſerve the Name of a Specifick? And that which ſeems to render it ſo effectual to the Purpoſe is, that it is ſlight in its Operation, that it cools without weakening, and aſtringes without overacting its Part; a Mean perhaps only attainable by the Preparations of Nature, who can fit her Inſtruments to her work, and ſeems here to have join'd theſe two Qualities together in ſuch nice Proportion, as not only to counter-act the Inconveniencies ariſing from each of them *if ſingle*, but alſo to adapt them to very ſurprizing Purpoſes. Add to this, that it is a very powerful Corrector of Acrimony, and ſo

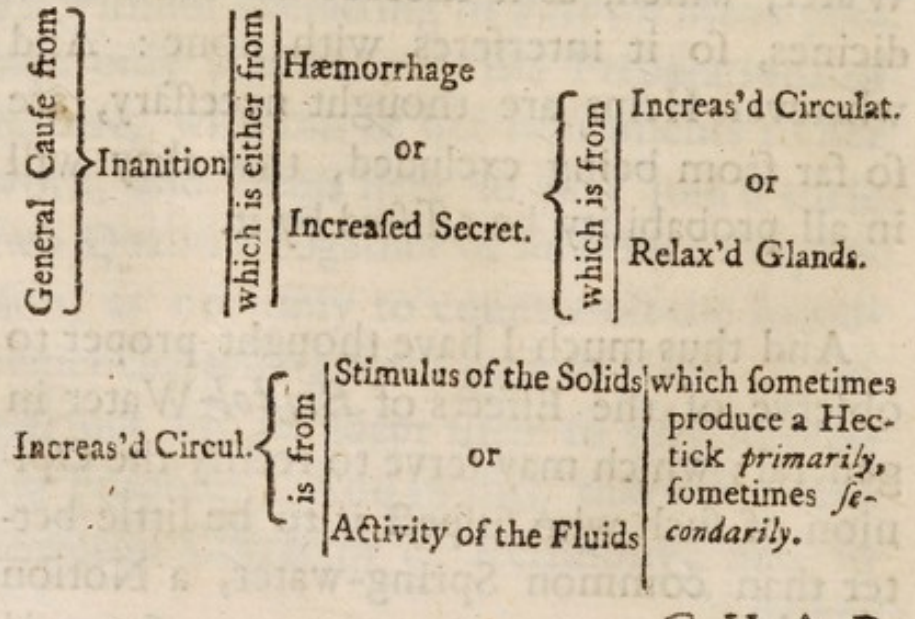
ſtrikes

ſtrikes at the very Root of the Diſorder, deſtroying that, which, for the moſt part, is the firſt Occaſion of it.

As therefore Incraſſants anſwer to both Indications of *encreas'd Circulation* and *encreas'd Secretions*, by giving Conſiſtence to the Blood, ſo likewiſe does *Briſtol*-Water, but with this Difference, that it ſtrikes at the *Cauſe*, whereas Incraſſants ſeem only to allay the *Effects*; and this it does by correcting the Acrimony. If this Acrimony is looſe, and circulating in the Veſſels, I do not ſay what may be done by other Medicines, nor would I be underſtood to derogate from the Virtues of any of them; but where the Acrimony is fix'd, and ſeizes upon any particular Part, there none of them anſwer Expectation like *Briſtol*-Water, which, as it exceeds all other Medicines, ſo it interferes with none: And whatever Helps are thought neceſſary, are ſo far from being excluded, that they will in all probability be aſſiſted by it.

And thus much I have thought proper to obſerve of the Effects of *Briſtol*-Water in general; which may ſerve to rectify the Opinion of ſuch who ſuſpect it to be little better than common Spring-water, a Notion

favour'd by the little good done by it at a Diſtance, and confirm'd perhaps by many Miſcarriages upon the Spot. But whoever conſiders that the Caſes ſent hither, are for the moſt part very difficult of Cure, and ſome of them quite paſt it, will be inclin'd to make great Allowances, and not condemn us for what we do not pretend to. But I now proceed to *Particulars*; for as *Generals* convey little or no Knowledge, and it is my Deſire to give a full and ſatisfactory Account of theſe Waters, I ſhall follow a Hectick Fever through all its Branches, as the beſt Clue whereby we may unravel the whole of what is to be expected from it. The Heads, which I ſhall proceed upon, are laid down in the following Table, under which I have endeavour'd to comprehend Hecticks of all Denominations whatſoever.



CHAP.

CHAP. III.

Of HÆMORRHAGE.

LET us then begin with *Hæmorrhage*, which may cauſe a *Hectick*, either *primarily*, from bare Inanition only; or *ſecondarily*, in that, if inward, it may end in Ulcer. But as this latter Caſe will come under another Head, I ſhall confine myſelf at preſent to ſuch *Hæmorrhagies*, as end in Hectick from Inanition only.

Of all the *Hæmorrhagies* which are apt to end in Hectick, none threatens it more than *Hæmoptyſis*; though I believe I may venture to ſay, that this is much oftner the Conſequence of a Hectick, than the Cauſe of it; for where the Circulation is quick, and the Blood acrimonious, as it is in hectical Perſons, any ſlight Accident, may make a Breach in the tender Veſſels of the Lungs; whence ſpitting of Blood, which often ends in Conſumption and Hectick, and that not from the Quantity diſcharged, but from the prior Diſpoſition of the Blood towards it. And this ſeems to be the Reaſon, why

Briſtol-Water is ſo ſpecifically good in this particular Hæmorrhage: Not that it ſo immediately acts upon the ruptur'd Veſſel, but that it corrects the Acrimony, and abates the Hectick, which was the Cauſe of ſuch Rupture.

And the ſame may be ſaid of ſome *Hæmorrhagies* from the Kidneys and urinary Paſſages, of which Acrimony is the Cauſe, and for which this Water is alſo ſpecifically good. But as I ſhall be more particular as to both theſe Hæmorrhagies in another Place, and I look upon neither of them to be ſo much the Cauſe as the Conſequence of a Hectick; I proceed to treat of ſuch Hæmorrhagies as end in Hectick chiefly from Inanition.

And here it is to be obſerved, that a Hectick is not to be conſider'd as a *direct*, but rather as an *accidental* Conſequence: For the End of *Hæmorrhage* is for the moſt part *Cachexy*; and where it is otherwiſe, it is generally obſerved to be in Fluxes of the Womb, or Inteſtines. Whether it is that theſe Bleedings, flowing from Parts remote from the Heart, (the neceſſary Receptacles of the more unactive Blood) this being diſcharg'd,

charg'd, the active becomes predominant;—or that ſharp Humours (being the frequent Occaſion of theſe Fluxes) do in themſelves diſpoſe to Hectick, ſo that there is a Tendency towards it, not only *derivatively* from the Evacuation made, but *originally* from the very ſame Cauſes which diſpoſe to ſuch Evacuations;—or that Blood, diſcharged from theſe Parts, generally brings with it large Excretions from the Glands;—which ever of theſe is the Caſe, I ſay a Hectick is the frequent, tho' not the conſtant Conſequence; they often ending in *Cachexy* and *Dropſy*.

If we examine into a *Dyſentery*, and the ſeveral Cauſes of it, we ſhall find that it chiefly ariſes from ſharp Humours falling upon the Bowels, which irritating the Parts, throw them into ſtrong expulſive Convulſions, exciting Pain and bloody Stools; hence it is ſo rife in hot Climates, where the Heat of the Sun renders the Humours acrid, and the cold and moiſt Nights ſtrike them inward; hence alſo we obſerve it in Camps and in Priſons, eſpecially if in damp Places, where the Food is none of the beſt, and the Air the very worſt that can be: And hence it is, that it ſhews itſelf in Autumn,

rather than any other Time of the Year; when the Humours, being exalted by the foregoing Heat of Summer, are now thrown in upon the Bowels by the Evening and Morning Colds; and that more eſpecially, if, by indulging in cold Fruits, which are now in Plenty, you chill the Bowels, and invite Humours that Way. For the Weakneſs of the Part muſt be conſider'd as contributing to the Complaint, and the Violence of it; and is often of itſelf ſufficient to cauſe it: Thus we obſerve it to be not only the Conſequence of Diarrhæa's, but alſo common with ſuch whoſe Bowels are either accidentally or conſtitutionally weak; and that in many Caſes it is the Forerunner of Death. This then being acknowledg'd, can there be any thing better adapted to both Indications of Cure than *Briſtol*-Water, and what is there that we may not expect from a Medicine, which both tempers the Acrimony of the Juices, and ſtrengthens the weak Part? But I fear, upon Trial, it will not anſwer to theſe promiſing Concluſions. For, *firſt*, its Aſtringency is ſo ſlight, in compariſon of many other Medicines, that it is not of Force ſufficient to put a Stop to the Violence of the Flux. *Secondly*, it does not effect the great End

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we aim at, of promoting Perſpiration, and throwing the Humours outwards: And beſides theſe, there are ſo many other Conſiderations, which for the moſt part forbid it, that I cannot much recommend it, except in ſome particular Caſes: But when the Violence of the Diſtemper is abated, and the Flux is rather continued than violent; when hectick Atrophy appears, and where inward Ulcers are apprehended, it may be given with Succeſs, and, with the Help of other Medicines, prove of great Service. But where Schirrhus and Dropſy are the Conſequence, I look upon it as hurtful.

Uterine Bleedings are ſo far allied to a Dyſentery, as to proceed generally from the like Cauſes, but with this Difference, that whereas ſharp Humours are the principal Source of the one, which, by falling on the Bowels, rather make them weak, than find them ſo; the Foundation of the other chiefly lies in the Weakneſs of the Part, which yields to good Blood as well as bad, and will often ariſe without any material Fault of it, either in Quantity or Quality. That the Womb is more peculiarly ſubject to Diſorders ariſing from weak Veſſels, appears, as from many other Cauſes, ſo in par-

particular from its ever being in a State of alternate Dilatation and Conſtriction; whereby, if its Blood-Veſſels either fill too faſt, or reſtore themſelves too ſlow, the Part is of Neceſſity loaded, and a Hæmorrhage will be more apt to follow this, than Plethora's of another Part; becauſe, if we may give Credit to the moſt skilful Anatomiſts, the Veſſels from which the *Menſes* flow, and which ſerve at other Times to empty the overcharg'd Womb, are open at their Extremities, and yield to a much leſs Preſſure than would cauſe a Rupture; as is requiſite in other Parts, before a Hæmorrhage enſues. And hence, probably, may be deduc'd the Reaſon, why *Briſtol*-Water is of more eminent Service in this, than in other Hæmorrhagies: For though it is of Benefit in all Hæmorrhagies proceeding from Heat and Acrimony of the Blood, and will do its Part in this, ſo far as it ariſes from this Cauſe, yet here it aſſiſts us ſtill further, and that in a moſt material Point: For if the Fault lies in the Laxity of the Part, and *Briſtol*-Water is able to conſtringe and ſtrengthen that Part, (which daily Experience teaches us it is,) it ſtrikes at the Root of the Diſeaſe, and anſwers the principal Indication of Cure. And accordingly

ingly we ought to diſtinguiſh between Hæmorrhagies ariſing from Humours thrown upon the Part, being otherwiſe ſtrong and in due Tone; and thoſe which ariſe from Humours lodging there, becauſe the Parts are weak: For in the firſt Caſe, tho' *Briſtol*-Water may be of Service, it by no means anſwers the chief End, which is to draw off the Plethora from the Womb; whereas in the latter it does, which is to ſtrengthen it. We are to diſtinguiſh alſo between Hæmorrhagies that are profuſe, ariſing from Abortion, or other violent Cauſes, and ſuch as are more moderate: In the firſt of which it can do nothing, but in the latter may anſwer to Expectation. But here it behoves us to obſerve, that if the Weakneſs of the Parts proceeds from Cachexy and poor Blood, much leſs is to be expected from the Water, than when it is a Fault of the Part only. For in this Caſe the *Cauſa Morbi* is rather encreas'd than taken off, and the State of the Blood is ſuch, as will not bear the Remedy; not to mention the Stomach, which in this and many other Caſes, will be too much chill'd by it, either to digeſt or diſtribute it: On the contrary, when the Humours are ſharp and acrid, and the Body Hectick, its good Effects encreaſe upon us,

ſo as almoſt to exclude the Uſe of other Medicines.

And here we muſt not omit to mention the *Hæmorrhoids or Piles*, and the ſeveral Conſequences of them, in which *Briſtol*-Water is frequently of great Service: But this is a Diſtemper ſo complicated, both as to its Cauſes and its Cure, as would require a whole Treatiſe to be tolerably explicit thereon; and therefore I ſhall only obſerve in general, that if Atrophy is the Conſequence, it is highly beneficial; if Cachexy, it is not ſo.

It muſt indeed be acknowledg'd, that both Dyſenterick and Uterine Bleedings have alſo many Circumſtances and Cautions attending them, which deſerve Conſideration; but this is a Field too large for me to enter upon, who aim only at aſcertaining the general Uſe of *Briſtol*-Water, not at comprehending all poſſible Caſes and their Cures. And what *Quinctilian* obſerves *, is by the change of Perſons as applicable to the Phyſician as the Lawyer: *Si certa aliqua Via tradi in omnes materias ullo modo poſſet, non tam paucis contigiſſet: ſed cum*

* Præfat. ad Lib. 7.

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infinitæ * Morborum *formæ fuerint, futuræque ſint, & tot Sæculis nulla reperta ſit* † Ægritudo, *quæ eſſet tota alteri ſimilis, ſapiat oportet* ‡ Medicus, *& vigilet, & inveniat, & judicet, & Conſilium à Seipſo petat.*

CHAP. IV.

Of HECTICKS *from encreaſed Circulation.*

WE now proceed to treat of Hecticks from encreaſed Secretions; which ariſe either from *encreaſed Circulation*, or *relaxed Glands*. And firſt of ſuch as proceed from *encreaſed Circulation*; for tho' encreas'd Circulation and encreas'd Secretions do reciprocally beget each other, and the Complication of theſe two together is what properly conſtitutes a Hectick Fever; yet, as it may conduce to the better Explication of my Subject, I ſhall beg leave to conſider them ſeparately.

* *Litium.* † *Cauſa.* ‡ *Actor.*

Encreaſed Circulation may ariſe, either from Stimulus of the Solids, or Activity of the Fluids; which mutually produce each other, and are generally ſo blended together, that it is hard to ſay, from which of the two, the Hectick properly proceeds. As therefore this cannot exactly be diſtinguiſh'd, we ſhall include under Hecticks from *Heat*, all we have to ſay of the Activity of the Fluids; and then proceed to Hecticks from *Scurvy* and *inward Ulcers*; under which, I think, I can beſt explain ſuch as ariſe from Stimulus of the Solids.

It has already been obſerved, that a Hectick may be the Conſequence of *Heat*, either *primarily*, in that it gradually cauſes Waſte of Fleſh and Strength, and robs the Blood of its unactive Parts; or, *ſecondarily*, in that it is the frequent Source of Inflammation or Hæmorrhage, which end in it. But as the latter of theſe Caſes will be explain'd under a following Head, we ſhall confine ourſelves at preſent to ſuch Hecticks as ariſe only from a ſimple Heat of Blood.

And here, as it would be endleſs for me to ſpecify the many different Accidents, in-

ternal and external, which encreaſe the Heat of the Blood; ſo, I believe, it will be more to our Purpoſe, to omit the Conſideration of the particular Cauſes of it, as things better known than taught; and enquire into the Manner *how* a Hectick Fever is the Conſequence of Heat. That Heat relaxes the Solids, will, I believe, be eaſily granted me, without further Pains of proving it; as alſo that the Solids ſo relax'd will let thro' what they ought to retain, whence the Proportion of *Egeſta* will be encreaſed. But if I can alſo prove, that Heat robs the Blood of its unactive Parts, there will ſurely be ample account made for its giving Riſe to a Hectick Fever.

In order to which it will be neceſſary to ſhew, what I mean by the *unactive Parts* of the Blood, which have already been frequently mention'd, (*vid.* Chap. I.) and which I ſhall now endeavour to explain. The neceſſary Rapidity of the Blood is ſuch, that were not our Bodies wiſely defended from the Effects of it, it muſt deſtroy that which it was ordain'd to give Life to. But this is prevented, as I conceive, by its *aqueous* and *gelatinous* Parts, which I call the *unactive* Parts, in oppoſition to thoſe

which are more *active* and *volatile*, and which I ſhall prove to be of the higheſt Importance.

As it manifeſtly appears that great Part of our Blood is *Water*, and our very Drink will teach us, how neceſſary it is to our Subſiſtence; there is no need of Words to prove it. But the *gelatinous* Subſtance of the Blood ſeems not to be ſo well underſtood, tho' equally neceſſary, and that in very great Quantities, to our Well-being. The Neceſſity of it is apparent from the abundant Proviſion made of it; almoſt all our Food, whether animal or vegetable, yielding this *Gluten* in great Plenty, eſpecially our common Bread and Meat; not to mention our Beer, and other Liquids which abound with it. And if we further conſider the great Supply made by the Lymphaticks, which conſtantly feed the Blood with a diluted Size, as alſo by the Saliva, which mixes with all we eat; the Care taken of this Matter ſeems ſo great, as if we were not fit to be truſted with ſo weighty an Affair ourſelves, leſt, if it depended altogether on the Quality of what we eat or drank, we might defraud the Blood of its due. And that it is actually in great Quantities

tities ever circulating in the Veſſels, we may learn from our Senſes, in that we obſerve with our Eyes, how ſoon the Blood let out of the Body coagulates; as alſo, if we put our Fingers into it when warm, from the ſlippery Feel, and Clammineſs it will leave on them. And this will ſtill further appear from hence, that if the Blood be kept ſtirring from the time it is let out 'till it cools, the gelatinous Parts will adhere to the Stick, and leave the more fluid Parts behind, which will never coagulate. This, therefore, together with Water, being admitted as Ingredients abſolutely neceſſary to a healthful State of Blood, for what End is this plentiful Proviſion of them made, but to keep the Body cool and moiſt, and to counter-act the Miſchiefs which muſt otherwiſe follow from the Blood's neceſſary Heat and Motion? Theſe then are properly called the *unactive* Parts of the Blood; which, if in due Proportion, produce that Temperament in which Health conſiſts; if deficient, leave the Body a Prey to its own Heat, and, if they abound, are the Parent of cold Diſeaſes. And when we conſider, that neither the *aqueous* or *gelatinous* Parts, will anſwer the Purpoſe ſingly, and ſeparate from each other, but that it is neceſſary they be

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properly blended and mixed together, before they can ſerve the Ends of Circulation; then we ſhall the better conceive, how Heat deprives the Body of theſe Parts. The Means by which they are beſt mix'd, and kept in proper Fluidity, is Motion; which being deficient, they will ſeparate from each other, and be difficultly ſecreted, more or leſs, according to ſuch Deficiency; if encreaſed, (as it always is by Heat) they will be more intimately united together, and paſs off the quicker. For as Gluten is not in its own Nature ſecernible, and cannot well diſcharge itſelf without the help of Water, becauſe it cannot paſs thro' the ſmall Strainers of the Body; ſo whatever contributes to mix them thoroughly together, will reduce them into one uniform Fluid, better fitted for Secretion: And the more intimate this Mixture is, the more of this Gluten will continually be carried off. And accordingly, we find that the Blood in hot Conſtitutions is very thin and watry; not from a Separation made of the aqueous Parts from the gelatinous, as in cold Conſtitutions; but from a quick Conſumption of that which was deſign'd by Nature to give a Conſiſtence to it. And that this is the Caſe in Hectick Fevers, will appear from a Con-

a Conſideration of the ſeveral Symptoms and Appearances of them.

Firſt, then, it is obſerved, that the Blood is exceeding florid and fluid in this Diſtemper. *Hectici rutilantem & difficulter coagulabilem habent Sanguinem*, ſays *Baglivi*. And * Dr. *Bennet*, who was a nice Obſerver of a Conſumption, and wrote of it by deſire of the *College*, expreſſes himſelf in the following Manner: *Corporis Succi* (*in Phthiſi* ſcil.) *Calore immoderato attenuati, & ſubtiliores quam par eſt redditi, ad nutriendum inepti ſunt.* Primo, *Quia balſamicâ indigent Conſiſtentiâ.* Secundo, *Quia concitatiori circulantur Motu, ita ut moram nutritioni debitam in partibus non fecerint, exinde deficientiæ neceſſitatem importantes.* Tertio, *Quia humidum depaſcendo, propriâ conteruntur induſtriâ.* And there are other Paſſages *in his Book* † which ſhew, that he was of Opinion, that Heat may thin the Humours ſo, as even to render the Blood itſelf tranſudable thro' the Veſſels.——But this Defect of gelatinous Parts in a Hectick will appear ſtill plainer, if we examine into the ſeveral *Symptoms* attending this Diſorder.

* Pag. 87. † Pag. 63. Exerc. de Sputo ſubdulci.

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The firſt and principal of which is *Loſs of Fleſh* and *Strength*, both which, in great meaſure, depend upon the due Conſiſtence of the Blood. For, as Water is found by Experience to tranſude the Veſſels of the human Body; the thinner the Fluids are, the nearer they approach to the Nature of Water, and the more apt they will be to paſs off; the Conſequence of which is, that the Fleſh cannot look plump: And that our Strength greatly depends upon the firm Conſiſtence of the Blood, appears from the acknowledged Maxim of *Quo fibroſior ſanguis eo robuſtior Homo.* And accordingly, the Aliment provided by Nature for Fœtus's, and young Animals, is of a ſlimy, gelatinous Nature, in order to give ſome Conſiſtence to the Fluids, which, if too thin and waſhy, would neither give Fleſh nor Strength. Other Symptoms of a Hectick are, *Encreaſe of Pulſe, Heat after Eating, Heat of the Palms of the Hands and Feet, Fluſhing of the Cheeks*, and great *Fluttering and Hurry of the Spirits*, upon the leaſt ſudden Fright or Motion: All which ſeem to ariſe from the too great Mobility and Fluidity of the Blood, and ſhew the Defect of ſuch Conſiſtence, as is proper to give a Check to both.

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There is indeed ſomething further to be conſider'd, if we would account for the Symptoms attending a Hectick in its laſt Stage; ſuch as are *Night-Sweats*, *Looſeneſs*, and *ſwell'd Legs*; which, tho' they in ſome meaſure depend on the Tranſudation of the Fluids, ariſe partly from the Relaxation of the Solids, which we have proved to be conſiderable in this Diſtemper. Thus, ſo long as there is *Vis Vitæ* to throw Matters outward, whenever the Warmth of the Bed encourages Perſpiration, the Patient will run into profuſe Sweats; and when the Body becomes ſo weak, as this cannot ſo well be effected, this ſame Diſpoſition of the Solids and Fluids will cauſe Humours to be extravaſated, and lodge in thoſe Parts where the Circulation is moſt languid, whence Looſeneſs and ſwell'd Legs; and the *Intermittent Fever*, which frequently attends this Diſorder, is from the ſame Cauſe.

But here it will be neceſſary for me to obviate an Objection, ariſing from a common receiv'd Opinion, that Heat *coagulates* the Blood, which is contrary to what I aſſert, that it *fuſes* it. This Notion is built

upon two Experiments; the one *out of* the Body, upon obſerving that the Serum of the Blood, held over the Fire, coagulates; the other *in* the Body, that the Blood, in many Fevers, is exceeding ſizey and thick. But neither of theſe ſeem to prove the Point for which they are alledg'd: For as to the firſt, it ariſes from the Evaporation of the watry Parts by Heat; the Serum being held in a quieſcent State over the Fire; which can never be the Caſe in the Body, where all is in Motion, and where there can be no ſuch Evaporation.——But if the watry Parts tranſude, does not this amount to the ſame thing, and are not the gelatinous Parts left behind? I anſwer, No: Becauſe, *within* the Body, if Heat and Motion encreaſe, there is always a more intimate Mixture of the gelatinous and aqueous Parts together; and it is impoſſible for one to go off ſingle, without carrying off much of the other with it. And this indeed has been practically allowed, by the Maintainers of this Opinion; who, not finding Experience anſwer to Theory, have acknowledg'd, that Heat fuſes the Blood, *ordinarily*; but that, if it is *exceſſive*, it will coagulate it; which, if it means to expreſs the Effects of violent ex-

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ternal Heat on the Fluids and Solids, may be true; but if they only mean ſuch Heat as can be internally produced within the Blood-veſſels, I cannot believe it. As to the other Obſervation, of the Blood being ſizey in *inflammatory* Diſorders, I am enclined to believe, that it does not proceed from the Heat of the Fever, but rather from the Check given to the Circulation, by the Cauſe from which it was at firſt produced; for as certain as Heat and Motion fluidizes the gelatinous Parts of the Blood, ſo certain it is, that Cold, and plethorick Stagnations coagulate it.

The Cure of a ſimple Hectick from *Heat*, (without Inflammation, or other Hurt of the Solids) is ſo very eaſy, if taken in Time, that little elſe is requir'd, but Abſtinence from every Thing that may encreaſe the Heat of the Blood; common nouriſhing Diet being of itſelf ſufficient, in moſt Caſes, to reduce the Blood to its proper Temperament, eſpecially if aſſiſted by Milk, and other Incraſſants; ſo that I ſhall not make a Merit of eaſy Work, and extol *Briſtol*-Water for that, which may as well be effected by other Means. For here is not properly a Hectick Fever, but only a Diſ-

poſition towards it; and that from ſimple Heat only, not from Stimulus. Nevertheleſs, it muſt not be defrauded of its juſt Praiſe, being exceeding helpful to us, both as it conduces to the more ſpeedy relieving of ſlight Caſes, and the better Security of ſuch as threaten Danger. And this it does, not only as a *Cooler*, but alſo as a *Strengthner* of ſuch Parts, as are now in danger of Relaxation from the encreaſed Heat and Fluidity of the Blood. And this is what, perhaps, is not to be met with in any other cooling Medicines whatſoever; which are apt rather to enervate than ſtrengthen. We may, indeed, join Aſtringents and Coolers together, and this may be commendable Practice; but, I believe, it is not in the Power of Art to adapt any Medicine to this Purpoſe ſo happily as Nature hath done this to our Hands.

And thus much ſhall ſuffice for Hecticks from ſimple *Heat*. I ſhall now proceed to ſuch as ariſe from *Stimulus*; only obſerving, that as Stimulus begets active Blood, ſo active Blood reciprocally begets Stimulus; and ſo complicated are theſe two together, that we cannot always diſtinguiſh to which of them the Hectick does primarily belong.

belong. The Hecticks more apparently ariſing from Stimulus are thoſe from *Scurvy*, and from *inward Ulcers*, to which we proceed.

CHAP. V.

Of SCURVY *and* ULCER.

IT would exceed both the Intent and Limits of this Treatiſe, were I to enquire into the ſeveral Cauſes of ſo complicated a Diſorder as the Scurvy is, or attempt to deſcribe the many different Effects it has on different People, according to the Difference of the Cauſe, Conſtitution, or Part affected;—ſo far as it is productive of a Hectick Fever, I ſhall endeavour to explain it.

As the Blood muſt be acknowledg'd to have two Motions, the one *progreſſive* from the Action of the Veſſels, the other *inteſtine* from the Activity of its component Parts; ſo there are two Ways, by which the Blood may be the Cauſe of encreas'd Circulation; *firſt*, as it abounds with ſuch ſubtil Particles as actuate the Fluids, tho' the natural Force of the Solids be not encreas'd;

creas'd; *ſecondly*, as it is loaded with Salts, or other acrimonious Particles, which may not directly add to the Activity of the Fluids, but will encreaſe Circulation, by ſtimulating the Solids. The former of theſe has already been treated of; the latter remains now to be conſider'd, as what ſeems to afford us the beſt Idea of the Diſorder we are now upon.

The Scurvy, in general, is agreed to ariſe from an acrid *Serum*, which is occaſioned either from *Ingeſtion* or *Retention* of ſuch Parts as favour this Diſpoſition of Blood. *Ingeſtion* may be either in Quantity or Quality, ſuch as begets Acrimony even in thoſe who diſcharge well; and thus any Conſtitution may, by Intemperance, be liable to this Diſorder: But if thoſe who are conſtitutionally inclined to it, indulge themſelves this Way, they almoſt neceſſarily run into it. But, nevertheleſs, it is to *Retention*, chiefly, that the Scurvy is to be imputed; I mean that called ſo κατ' εξοχην, and is principally incident to thoſe who continue long out at Sea, or live in moiſt ſtagnating Air, not friendly either to Reſpiration or Perſpiration. The Air at Sea cannot indeed be ſaid to be ſtagnating, be-

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cauſe of the Winds to which it is open, and with which it is perpetually ventilated: But if we conſider the Stench of the Ship to which they are confin'd, the Impurity of the Air is perhaps greater than any we naturally meet with elſewhere; and accordingly we ſee the Conſequence more certain, and more fatal.

What a ſurprizing Variety of Caſes may ariſe from this Cauſe, is hardly to be conceived by any but thoſe who have ſeen them: And if we conſider further, that a Scurvy may not only produce the Symptoms conſequent on its original Cauſe, but, *ex accidenti*, almoſt any other Diſtemper; the Caſe becomes ſo perplex'd and intricate, as hardly to admit of any Diviſion whatſoever. But as I conſider it only as it is productive of a Hectick Fever, I muſt endeavour to diſtinguiſh it.

The Scurvy then is to be conſider'd not only as to its Cauſe, and as ariſing from *Ingeſtion*, or *Retention*, or both, but alſo according to the Conſtitution it meets with. Thus, for inſtance, if it ſeize on a phlegmatick Habit, in which the Secretions are not very open, it will cauſe a Plenitude of

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ill Humours, and Obſtructions conſequent thereupon; but if the Conſtitution be bilious, it will have very different Conſequences: For, in this caſe, the Blood is naturally acrimonious; and that not from Ingeſtion or Retention, but rather from a too quick Diſcharge of thoſe Parts which ſhould temper its Craſis; and if, by any Accident, this prevailing Acrimony is encreaſed, it will follow the Bent of the Conſtitution, and there will be no Plenitude, but rather a hectical Atrophy. And theſe two Caſes require very different Treatment; the former being benefited by Evacuations, and active ſtimulating Medicines, the latter bearing neither of them. And this Oppoſition between theſe two Caſes has been obſerv'd in Practice; but no diſtinctive Name given to them, except that of the *hot* and the *cold* Scurvy; which, as it is not expreſſive of the Thing, I ſhall beg leave to ſubſtitute another in its Room, which is, *Scorbutus cum Secretionibus auctis, vel diminutis.* The former of theſe is what I have to do with in this Place, and ariſes, as I have before ſaid, from an acrid Serum, which, as it pervades all Parts, will ſtimulate many, and ſo cauſe a Hectick. *Firſt*, as it barely ſtimulates the Solids, and thereby quickens

quickens the Circulation, and encreaſes the Secretions. *Secondly*, as this Stimulus may be the Cauſe of Inflammation or Hæmorrhage, which end in it. *Thirdly*, as the Glands are exceeding apt to be foul'd by ſuch Blood, and thereby become liable to Inflammation, Schirrhus, Scrophula, Cancer, and all their Conſequences, which may in other Parts of the Body cauſe a Hectick, but neceſſarily do ſo in the Lungs. But as the two latter of theſe Caſes are to be conſider'd elſewhere, I ſhall here confine myſelf to the Hectick ariſing from the firſt only.

And firſt, it is to be obſerv'd, that this is a Diſorder chiefly incident to Youth, whoſe Veſſels are more permeable, and more ſenſible of Stimulus, than in thoſe of riper Years. It is ſometimes Conſtitutional; but, for the moſt part, is acquir'd by hard Drinking, or high Living; or is the Conſequence of ſuch Diſeaſes as manifeſtly leave the Blood full of acrid Particles; ſuch as Small-pox, Meaſles, and other Fevers. The Cure of it will indeed greatly differ, according to its different Effects; but we now conſider it only in its firſt Stage, be-

fore the Solids have receiv'd any material Hurt. In which we muſt have regard both to the Acrimony of the Blood as the Cauſe, and the Hectick as the Effect. Were we only to ſtrike at the *Cauſe*, we ſhould have recourſe to ſuch Things as temper the Sharpneſs of the Humours in the Body, and ſuch as evacuate them out of it. And even here it would be very difficult to determine, what Methods we could depend upon; becauſe different Acrimonies require different Antidotes, and ſeek their Exit at different Emunctories. But as we muſt likewiſe conſider the *Hectick*, the Difficulty will be ſtill greater; becauſe the Fever will be apt to encreaſe the Stimulus faſter than we can allay it, and will not bear the neceſſary Evacuations. If then *Briſtol*-Water ſhall be found to reconcile theſe Contra-indications together, it will juſtly claim a Preference to all other Medicines whatſoever, We can temper Heat, and ſoften Acrimony, by ſuch Medicines as are cooling and incraſſating, tho' perhaps by none more powerfully than by *Briſtol*-Water; whoſe Excellency it is, that it not only ſtifles it, but expels it at the ſame Time: Which, that we may the better conceive,

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we muſt here recollect its diuretick Quality; by which it checks the Paſſage of watry Parts through the Skin, and diſpoſes them rather to paſs thro' the Kidneys: For as Perſpiration and Urine are the two great Secretions of Nature, by which ſhe diſcharges theſe watry Parts, the Decreaſe of one will be the Encreaſe of the other. And accordingly we find by Experience, that it paſſes with moſt People this Way in large Quantities; and with it undoubtedly carries off many ſaline and ſtimulating Particles, which would otherwiſe remain in the Body. But here a Queſtion may ariſe, Why the like is not to be expected from *other* Diureticks? To which I anſwer, *Firſt*, that in this State of Blood thoſe of the cooling and watry Tribe will paſs off other ways; at leaſt, will not paſs in ſo great Proportion by Urine as this will: *Secondly*, that the Kidnies will not bear other Diureticks, of the contrary Kind, ſo well as this; the Conſequence of which is, they will not operate ſo certainly, nor ſo effectually: For it is a peculiar Property of *Briſtol*-Water to ſtrengthen the Kidney as it paſſes through it; which no other Diuretick proper in this Diſorder will do, but rather the con-

trary. There are indeed Hecticks which are call'd Scorbutick, and yet do not meet with expected Relief. But whoever conſiders how nearly allied the Scurvy is to many ſtubborn Foulneſſes of the Blood; and how impoſſible it is to diſtinguiſh, in many Caſes, what is Scurvy, or other more inveterate Humour, will not wonder at ſome Miſcarriages. This is certain, that in the moſt ſtubborn Caſes, *Briſtol*-Water will always be a good Aſſiſtant at leaſt; and ſometimes cure even beyond Expectation: And I know not of any Caſe, in which I can more cordially recommend the Uſe of this Water, than in Diſpoſitions to a Hectick from a Scorbutick Cauſe. And when I conſider how common this Diſorder is among young Gentlemen eſpecially, how fatal are the Conſequences of it, and how certain the Cure, if not already far gone, I am mov'd to ſpeak of it in higher Terms than is decent for me, who will be ſaid to be intereſted in the Commendation of it. But, as I muſt ever believe thoſe who labour under this Complaint to be much more intereſted to hear, than I to ſpeak of it, I ſhall, for their Sakes, venture to aſſure them, that there is not, in the whole *ma-*

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teria medica, any Thing ſo well adapted to their Caſe as this is; whether contracted from intenſe Study and ſedentary Life, from Free-living, or from unhappy Conſtitution; and that they will probably meet with nothing elſewhere, that will cure them ſo agreeably, or ſo effectually, as *Briſtol*-Water.

Of ULCER.

Let us now proceed to the Hectick occaſion'd by *Ulcer*. There are two Ways by which an Ulcer may cauſe a Hectick; *Firſt*, by the Diſcharge of Matter which it yields; *Secondly*, by the Stimulus which it gives. The one is for the moſt part the Caſe of large outward Ulcers, the other the Effect of inward ones. The Manner how a Hectick is the Conſequence of inward Ulcers has already been explain'd; how it proceeds from outward ones, appears plainly from the Drain made, and is properly reducible to Hectick from encreas'd Secretions: But I here chooſe to conſider both together.

What then are the Indications of Cure? And this is what I would gladly ſettle; but

then I muſt explain the Nature and Difference of Ulcers in general, from the Cauſe occaſioning them, from the Part affected, and other Conſiderations too complicated for me to enter upon, and much of it ſuch as would be foreign to my Purpoſe. I ſhall therefore content myſelf with enquiring, in general, what may be expected from *Briſtol*-Water, when a Hectick is the Conſequence of them. Firſt, then, in large Diſcharges where it proceeds from the Drain made, it keeps the Body from waſting, and gives better Room for Reſtoratives; in ſuch Ulcers as ſtimulate, it gives a Check to the Encreaſe of Circulation, it prevents further Inflammations, and, in ſome meaſure, mitigates the Effects of thoſe already begun: Nay, further, by ſoftening the Acrimony of the Blood, it may poſſibly diſpoſe them to heal. But as this is ſeldom or never the Caſe, and inward Ulcers are not ordinarily to be cur'd by *Briſtol*-Water, they muſt be acknowledg'd, in general, to be above the Power of it. The bad Effects of Ulcers are indeed greatly mitigated by it, but I cannot eaſily believe it heals them; much leſs do I think that it has any cleanſing Quality, whereby it waſhes away the

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Foulneſs of ſuch Ulcers, and acts on them in the ſame Manner as on outward Sores. In Ulcers of the Lungs and Kidneys it is greatly recommended; but I forbear ſpeaking of its Merit in theſe Particulars at preſent, and only obſerve in general, that I do not believe Ulcers of either of theſe Parts to be ſo common as is generally imagined; which will appear more plain from what follows. And thus I have gone thro' all the Species of Hectick from *encreaſed Secretions*, ſo far as they ariſe from *encreaſed Circulation*. I now proceed to encreaſed Secretions from *relax'd Glands*; and firſt of a *Diabetes*.

CHAP.

CHAP. VI.

Of the DIABETES.

AS there is no Sort of Hectick ſo remarkably benefited by *Briſtol*-Water, as the *Diabetes*, we ſhall be the more particular in our Enquiries into the Cauſe of it; to find out, if poſſible, what it is which makes it ſo effectual. I have before obſerv'd, that all Hecticks are cauſed by ſome *Drain*; and that the general Indication of Cure is the Stoppage of ſuch Drain; which is effected by taking away the Cauſes of it. And this is ſo manifeſtly true of a Diabetes, that it never was diſputed. The only Difficulty therefore is, to find out the Cauſe of this immoderate Flux of Urine, and ſettle our Indications accordingly. In which Enquiry, I ſhall not take upon me to give an Account of every different Opinion which has been ſtarted concerning it, but rather confine myſelf to what I think the principal Point in Diſpute, *viz.* Whether this Diſtemper proceeds from a Fault in the Blood, or a Fault in the Kidney?

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Antiquity is altogether for the latter; and Dr. *Willis* is the firſt Writer that I know of, who is an Advocate for the former; who ſuppoſes, that the Blood being fuſed, or turn'd like Milk into Curds and Whey, the watry Part ſeeks its Exit thro' the Kidneys, and ſo cauſes a Diabetes. And hence it is, ſays he, that Rheniſh Wine, Cyder, and ſuch like acid Liquors, cauſe this Diſtemper; *viz.* by curdling the Blood. The Weakneſs of the Part may poſſibly, he thinks, contribute ſomething to the Diſeaſe, but he is apprehenſive, if this was conſiderable, Blood, rather than Water, muſt paſs this Way; and therefore directs his Cure entirely to the amending the Craſis of the Blood; aſſerting, that Aſtringents are contrary both to Reaſon and Experience; and by no Means to be depended on. In anſwer to which I beg leave to obſerve; *Firſt*, that our Author has given no one Proof, that ſuch Separation of the Blood is poſſible, whilſt circulating in the Veſſels. *Secondly*, that if ſo ſlight Acids cauſed ſuch Separation, would not this Diſorder be more frequent? Or could we in any caſe ſafely uſe the ſtronger Acids? *Thirdly*, ſuppoſing the Blood thus ſeparated, he aſſigns

no Reaſon, why the watry Part ſhould run thro' the Kidneys only, and not thro' other Emunctories. ——Is it not more agreeable to Experience, to believe it might paſs off at the Skin? Or if Nature could not effect this, that it would lodge in the Abdomen, ſwell the Legs, and tend to a Dropſy?—— *Fourthly*, it does not appear that Acids are the principal Cauſe of this Diſtemper: Nay once, I think, I ſaw it brought upon a Patient by the frequent and continued Uſe of *Sal Abſynth.* a Salt which he propoſes for the preventing this Curdling of the Blood. I need not take any further Pains to confute one whoſe Philoſophy is now exploded, and whoſe great Abilities claim no better Character, in this Age of Certainty and Demonſtration, than that he was *Egregius Hypotheſium Artifex.*

But Phyſick is now become clear and demonſtrable, and, as we are told, ſtands built upon the known Laws of Motion and Mechanicks. A renown'd Writer of this Claſs, has the following Words in ſupport of a Diabetes being a Diſeaſe of the Blood. * "The evident Cauſe of this Diſtemper is

* Dr. *James Keill* of Animal Secretion, p. 70.

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" an habitual Drinking of ſtrong Liquors;
" and the more ſpirituous they are, the
" ſooner and more violently they bring
" it.——Hence it comes to paſs in proceſs
" of Time, that the Serum, or thin Part of
" the Blood, contains a large Proportion of
" a ſpirituous Fluid, or that Part of the
" Serum which ſhould be Water, is for
" the moſt part Spirit. Now the Salts of
" the Urine, or Blood, will not diſſolve in
" a vinous Spirit; that is, the Particles of
" which the Salts conſiſt are more ſtrongly
" attracted by one another, than they are
" by ſuch a Fluid, as by Experiment ap-
" pears; and therefore the Quantity of Salts
" in the Blood will be daily encreas'd, and
" circulating thro' the capillary Veſſels,
" muſt irritate the fine Fibres, and cauſe
" little Pains and Twitchings all over the
" Body, (which he before ſays are Symp-
" toms preceding a Diabetes.) But when
" the Serum is full of theſe Salts, the Diſ-
" tance between them and the Globules of
" Blood will be leſs, and conſequently
" they will attract the Globules of the
" Blood more ſtrongly than the Globules
" attract one another; and the Globules,
" or red Part of the Blood, will be diſſolv'd
" and diffuſed thro' the Serum of the Blood.

"And this again is confirmed by Experi-
"ments; for nothing does render the red
"Part of the Blood ſo fluid, and keep it
"more from coagulating when drawn in a
"Cup, than urinous Salts and Spirits.
"When the red Part of the Blood is thus
"diſſolv'd, and united to its Serum, it will
"with the Serum be carried off thro' the
"Glands of the Kidnies; and being united
"to their Salts, will alter their Figures and
"Properties, as Litharge and Corall do the
"Salts of Vinegar, giving them a ſweet
"Taſte." Thus from this one ſimple *undoubted* Principle of Attraction, and three known Experiments, the whole Myſtery is explained.

But it is to be obſerved in the *firſt Place*, that it by no Means appears, that drinking of ſpirituous Liquors is the moſt general and evident Cauſe of this Diſtemper; much leſs that the more ſpirituous they are, the ſooner they bring it: For it has not only been before obſerved, that acid Liquors, ſuch as Cyder and ſmall Wines, are a common Cauſe of it; but it alſo appears from daily Experience, that Small-beer, Water itſelf, or any other waſhy Liquor, taken in too great Quantities, may be the Cauſe of this

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Diſorder. This may, indeed, be more likely to happen, if the Digeſtion is impaired by frequent Dram-drinking; but Drams alone are rather productive of other Diſtempers; elſe ſurely the Diabetes would be more frequent: So that no certain Effect is to be gather'd from the Blood thus impregnated with Spirit, as our Author ſuppoſes. *Secondly*, if it were poſſible that ſpirituous Liquors could ſo ſaturate the Blood with Spirit, as not to leave aqueous Moiſture ſufficient to take up its Salts; but that Part of the Serum, which ſhould be Water, becomes for the moſt part Spirit; ſhould we not hence apprehend worſe Conſequences? How could the Blood circulate without aqueous Moiſture? How could the neceſſary Secretions be carried on? How would the tender Fibres perform their reſpective Offices? How would the Brain bear it? Does not every Drunkard ſhew us, that Spirit is of a tranſmeable Nature, and eaſily carried off? Are little wandring Pains and Twitchings of the Tendons the only Miſchief that would enſue? Or indeed are they uſually reckoned among the fore-running Signs of a Diabetes? But, *thirdly*, ſuppoſing there is Spirit enough in the Blood to hinder the Salts from diſſolving,

and the Experiment ſhall take Place; could we not eaſily ſupply the Body with aqueous Moiſture, ſufficient to overbalance the ill Effects of the Spirit? and would not the Cure conſiſt in that which by Experience is found hurtful, *viz.* the plentiful drinking of ſmall watry Liquors?

But to proceed to his ſecond Experiment, which, is the fuſing of the red Part of the Blood by means of urinous Salts, which makes the Blood become thin as Water, and tranſmeable thro' the Kidnies. Did this Gentleman ever ſee Blood turned to Water, by means of urinous Salts? And if it was ſo, what determines the Paſſage of it thro' the Kidnies only? Not the Salt; for that has alter'd its Qualities, and become ſweet: And he brings a third Experiment to prove why it muſt be ſo, *viz.* "Becauſe a red "Subſtance out of the Body makes an acid "Salt ſweet; therefore a red Subſtance in "the Body ſhall make an urinous Salt "ſweet." I need not ſurely dwell any longer on ſuch Reaſoning as this, but ſhall only obſerve, that this Gentleman was a Phyſician of great Note in the Mathematical Way, and profeſs'd to build Phyſick on the clear and demonſtrable Principles of that Science;

Science; but ſtands an Inſtance, among many others, that theſe *Philomaths* are no wiſer than other Folks; tho' they think they have a moſt piercing Eye, and can with Certainty declare,

Quod latet arcanâ non enarrabile Fibrâ.

As therefore I am by no means ſatisfied with either of theſe Accounts, I muſt beg Leave to proceed in my own Way, and declare what appears to me to be the Caſe. And *Firſt*, I think it is evident, that a *Diabetes* is a Diſeaſe of the Kidney: For when any Glands diſcharge more than they ought, and this Diſcharge is of different Quality from that which is natural, then are ſuch Glands ſaid to be diſeaſed; and this is apparently the Caſe of the Kidnies in a *Diabetes*. In what Manner they are diſeaſed will appear, in ſome meaſure, from the following Conſiderations; *firſt*, from the moſt evident Cauſes of it; *ſecondly*, from the Analogy it bears to other Accidents of the Body; *thirdly*, from the Cure.

The moſt common and evident Cauſe of a *Diabetes* is, the immoderate Uſe of ſuch Things, which cauſe Urine to flow plentifully

fully thro' the Kidnies: Thus *Cyder, cool Tankards, Punch,* which provoke Urine, and are drank in great Quantities, are a frequent Cauſe of this Diſorder; and that more eſpecially if the Conſtitution is ſuch, as to have its Diſcharges in this Way naturally large. — If drank at a Time of Year when Perſpiration is leſs. —At a Time of Life, when the Tone of the Part begins to be impair'd.—Or when the Kidnies are already weaken'd, thro' Intemperance, Diſeaſe, or other Accident. Theſe Conſiderations, I ſay, incline us to think, that a *Relaxation* of the ſecretory Ducts of the Kidnies is the Cauſe of this Diſorder: And this is ſomewhat confirm'd, in that * moſt Authors ſpeak of it as ariſing wholly from an undue Uſe of diuretick and forcing Medicines.—† Some have obſerv'd it conſequent upon a Suppreſſion of Urine—‡ As alſo an undue Uſe of Opium; of both which a *Relaxation* is the Conſequence.

And there ſeems ſtill farther Reaſon to believe this, if we conſider, *Secondly*, the Analogy it bears to other colliquative Diſ-

* Hildanus Cent. 5. Obſ. 53.—Tulpius, Lib. 2. Cap. 46.
† Foreſtus, Lib. 24. Obſ. 4.—Harris, Obſ. 3. de Diabete.
‡ Liſter Exerc. de Diabete.

charges;

charges; which we all agree, proceed in great meaſure, from the Relaxation and Weakneſs of the ſecerning Glands; and which are accompanied, more or leſs, with the ſame hectical Symptoms: And theſe Diſcharges are as much altered, both in Quantity and Quality, from what is naturally ſecreted, as in a Diabetes, tho' not in the ſame Manner.

Thirdly, The Cure of this Diſorder has from all Antiquity, conſiſted chiefly in ſuch Things as were ſuppos'd to aſtringe and ſtrengthen the Kidneys, without any Regard to the Craſis of the Blood; except that by Milk, and other nutritive Incraſſants, they endeavour'd to lower the Hectick Fever, and, by ſome cooling Medicines, allay the Thirſt. Dr. *Willis* does indeed ſay, that both Reaſon and Experience declare againſt Aſtringents, and that few or none are cured by this Method; but as the preſent Practice declares for them, and he was not able to ſubſtitute a better in their Room, they ſtill remain as Evidence, that this Notion of a *Relaxation*, was not only the current Opinion before his Time, but is ſo ſtill; and it is alſo evident, that many have been benefited by Aſtringents. From all which I

conclude, that where there is a diabetical Flow of Urine, there the Kidneys are relax'd.

But I very much doubt whether this is the whole of the Affair; for if the Kidneys only were in Fault, it would ſurely be a more frequent Diſtemper. The free Indulgence in all kind of Liquors—the common Accidents attending Stone and Gravel—old Age—and other incidental Weakneſſes of theſe Parts, would render it almoſt impoſſible to eſcape it, if Relaxation was the only Cauſe: Nor can I well conceive, if this were the Caſe, how ſome People ſhould drill ſuch Quantities of Liquor thro' the Kidneys, without any Tendency to Diabetes; whilſt others, who are guilty of much leſſer Irregularities this Way, ſhall be ſeiz'd with it.

And therefore I think a Relaxation of the Kidneys not the *Whole* of this Diſorder, but that ſomething farther is neceſſary towards conſtituting a Diabetes, which I believe to be Acrimony of Blood. Whether this Acrimony be of a peculiar Nature; or whether it only ariſes from a Suppreſſion of Perſpiration, high Feeding, or other common

mon ſcorbutick Cauſes, I do not take upon me to determine; but this I believe, that as Acrimony occaſions other Gleets, ſo this alſo; which in ſome meaſure appears from the following Obſervations: * That different Kinds of Fevers will ſometimes end in it.——That it has been ſeen to follow upon Mortifications from an inward Cauſe. ——† That People labouring under this Diſtemper are ſubject to Spaſms, Cramps, and hot fiery Eruptions of divers Kinds.——That if any Inflammation ariſes in the fleſhy Parts, it is generally very difficult to manage, and will often mortify.——Add to this, that the very higheſt Inflammation the human Body is ſubject to, *viz.* the Carbuncle, is ſometimes an Attendant on this Diſorder.

* Αἰτίη δὲ, ὀξέων νόσων τις, ἀποίσκηψεν ἐς τόδε, ἢ ἐν κρίσι κρύδην τὸ κακόηθες ἐγκατέλιπον αἱ νοῦσοι.

Aretæus de Diab.

† Obſervavi in pluribus huic Morbo per intervalla obnoxiis, quod paulo antequam in Urinæ Profluvium inciderint, in toto corpore partium nervearum dolores vagos, & corrugationes, modo cum ſtupore, & formicationis ſenſu, modo cum crebris ſpaſmis, ac tendinum ſubſultibus, aliiſque ſpirituum perturbationibus & inquietudinibus, paterentur. *Willis* de Diab.

I am very ſenſible, that all Diſorders conſequent upon a Diabetes, may be accounted for from the Alteration made, either in the Fluids or Solids, by the Diſtemper itſelf; but as many of them have been obſerv'd to precede a Diabetes, as well as follow from it; and there can be no Proof given, that when theſe Miſchiefs are the Conſequence, they do not ariſe from an original Fault in the Blood, it is reaſonable to think Acrimony is one great Cauſe of a Diabetes: And, indeed, I hardly ever have ſeen a Perſon labouring under this Diſorder, but, upon Enquiry, I had reaſon to think he was highly ſcorbutick, before this Misfortune came upon him; and however drinking of ſmall Liquors may have been the *cauſa* προκαταρκτικὴ, an acrimonious State of Blood has appeared to me to have been the *cauſa* προηγουμένη of his Diſtemper.

And this Account is ſtill farther probable, if we believe what is reported of the Serpent *Dipſas*, that its Bite throws a Man into a Diabetes. I cannot find any mention of a Diabetes in *Topſell*, who has collected both from Ancients and Moderns all that he could learn of this, and all other Kind

Kind of Serpents; nor does * *Lucan* ſay any Thing of it, tho' he deſcribes the Symptoms of a Man bit by this Serpent *Dipſas*. They only ſay, that the Thirſt is intolerable, and that they will drink till they burſt. Now if this exceſſive drinking ever ends in Diabetes, it ſeems to me to be a Caſe in Point; firſt, an Acrimony cauſing Thirſt, then a Diabetes from ſmall Liquors drank to aſſwage that Thirſt. We conclude then, that the Relaxation of the Kidney is the *immediate Cauſe* of a Diabetes; but that the more *remote Cauſe* (that without which it would not have been) is Acrimony; and that both together are the adequate Cauſe.

And, indeed, the Cure of this Diſtemper from *Briſtol*-Water ſpeaks as much; which ſeems to act, not only by ſtrengthening the relax'd Part, but alſo at the ſame Time correcting the Acrimony of the Blood, and ſo ſtrikes at the two joint Cauſes of it. *Aſtringent Medicines* may ſometimes be of Service in this Diſtemper, but *Briſtol*-Water greatly exceeds them, in that it will not only cure ſooner and ſurer than theſe will, but alſo when they abſolutely fail; and this

* *Lucan*'s Pharſal. Lib. 9, 434.

for

for two Reaſons. Firſt, as they ſeem to be an Aſtringent ſuited to the Part: Secondly, as they not only anſwer this Intention of ſtrengthening, but alſo another of equal Import, and without which the Cure is not eaſily effected.

It appears from outward Applications, that the milder Aſtringents will often be of Service, where the rougher would do Hurt: So that the moſt powerful are not always the moſt effectual, unleſs adapted to the Part. And there are two Things which ſeem requiſite in every aſtringent Medicine, that is of Service in this Diſorder; Firſt, that it arrive at the Part affected; Secondly, that it is adapted to it. As it is not every Aſtringent will do either of theſe, we muſt make Choice of ſuch as are moſt likely; and in this ſeems to be the Excellence of *Briſtol*-Water, which, tho' a ſlight Aſtringent, yet as it ſeeks its Exit thro' the Kidneys, acts more ſpecifically upon the Part than any other known Medicine, and may perhaps be peculiarly adapted to it. But whether this be ſo or no, this is certain, that it corrects Acrimony, and by ſo doing diſpoſes the weaken'd Part to a Cure, which, in all Probability, it cou'd not otherwiſe re-

receive. Hence we ſee, why none of the Medicines ordinarily made uſe of, will have the deſired Effect, be they either Incraſſants or Aſtringents; becauſe they do not correct Acrimony. How far they may be made to do it, by a prudent blending of them together with anti-acrid Medicines, I cannot ſay: Let it be tried.

This Diſtemper has been called *Hydrops ad Matulam*; intimating that, as in a Dropſy, the watry Parts of the Blood are ſeparated from it, and lodge in the Abdomen, ſo here is the ſame Thing, only with this Difference, that the Water ſo ſeparated is carried off by Urine. If they only mean, that there is in both Caſes a Separation of the watry Parts, I could eaſily agree with them. But if they infer from hence, they are alike either in their Cauſes or their Cure, I can ſee no manner of Reaſon for the Compariſon made. *Qui ad pauca reſpiciunt, de facili pronuntiant.* A Rebuke I wiſh was not quite ſo applicable to Phyſick as it is.

And thus have I endeavoured to explain the true Cauſe of a Diabetes, and the Indications of Cure anſwer'd by *Briſtol*-Water; which

which, as it is agreeable to, and explicative of, its Virtues in other Caſes, carries with it a great Probability of Truth; and farther than this I do not pretend to. I cannot conclude this Chapter without mentioning a Caution or two which may be of Uſe.

In ſcorbutick Habits of Body, where the Blood is acrimonious, and there is Thirſt, not to indulge too freely in Punch, Cyder, or eſpecially Small-Beer. In warmer Climates ſmall Liquors will perſpire away; but in this they are very apt to run off thro' the Kidneys, eſpecially if drank at a Time of Life when the Pores begin to be leſs open, and Perſpiration abates, and there is a ſcorbutick Habit from this Cauſe.

If there happens to be an unuſual Flow of Urine, to be upon your Guard. Many have had a Diabetes and have not known it; nor is it always diſcoverable by the Taſte. I have ſeen thoſe who have manifeſtly waſted from a Flow of Water, without any Sweetneſs diſcoverable in it, and have been cured at this Place; which I do not directly call a Diabetes, but rather an Inclination towards it, which, if not put a Stop to, will end in it. Others there are,

who have made ſweet Water probably for many Months, but have been ſo incurious as not to taſte it, and ſo have remained ignorant of their Caſe.

This Water takes Effect in ſome ſooner, in ſome later; it will ſometimes do its Work in three Weeks, without help of any other Medicines; ſometimes it will not do it in as many Months; and yet, by Care and Perſeverance, make a perfect Cure at laſt. The longer the Diſorder has been upon a Perſon before he applies to the Water, it is generally the more difficult to remedy. That this Diſtemper does not always meet with a Cure, is very true; and for this Reaſon it is that *Briſtol*-Water ſhares the Fate of the *Bark*, and other capital Medicines, and has been abuſed accordingly. But if thro' Length of Time, Weakneſs of Body, or bad Conſtitution, this Diſtemper gets a Head, and is above the Power of Medicine, it is no Reflection upon the *Briſtol*-Water that it cannot cure it. This is certain, that the ſpecifick Virtue of this Water, in this Diſtemper, is ſo well known, that it exhibits the ſtrongeſt Inſtance of the medicinal Qualities of it, and its Difference from other Waters, not

mineral; becauſe no Water will do what this does, nor will this do it at a Diſtance.

CHAP. VII.

Of GLEETS.

WHAT next offers to be conſider'd, under the Head of encreaſed Secre-cretions from relax'd Glands, are *Gleets*. And firſt of the *Fluor Muliebris*, than which perhaps there is not a more compli-cated Diſeaſe, whether it be conſidered in its Cauſes, or in its Effects. The *firſt*, and moſt general *Cauſe* of it is, the Abun-dance of phlegmatick or watry Humours, apt more eſpecially to lodge in Parts remote from the Heart, where the Circulation is languid, and the Veſſels numerous and lax, and which ſo lodging diſcharge themſelves in different Conſiſtence and Colour, and cauſe no ſmall Variety of Caſes. *Second-ly*, If from any Foulneſs of Blood, or Sharp-neſs of Humours, or other Cauſe, the Glands of theſe Parts happen to be inflam-ed, the Conſequence of ſuch Inflammation is, that when it goes off, it neceſſarily leaves ſuch Glands weak and loaded; which, if they do not ſoon recover their Tone, be-

become gleety, and will alſo produce different Effects, according to the Conſtitution it meets with, and end either in Cachexy or Hectick. *Thirdly*, The ſame Conſequences will follow, if theſe Parts are weakened from any other Cauſe, ſuch as natural Weakneſs of the Part, any Hurt from Cold, or Strain, or other Accidents, which are innumerable. And accordingly we find that the *Cure* of this Diſorder varies with the *Cauſes*; for in the *firſt* of theſe Caſes it is expedient to preſcribe Vomits, Purges, Stomachicks, Chalybeates, Bitters, Volatiles, warm Emmenagogues, &c. in ſuch Order and Proportion as the Caſe requires: In the *ſecond* Caſe, we dare uſe nothing which agitates the Blood, or ſtimulates the Solids; but muſt have recourſe to Incraſſants, and to ſoftening ſedative Medicines: In the *third* and laſt Place, our whole Care is to ſtrengthen the Part by Balſams, and warm Chalybeates, if the Conſtitution be moiſt and cold; by Alum, Bark, Vitriol, &c. if the Humours be ſharp; and by relieving the Part affected by every Method that can derive Humours from within outwards.

Let us now ſee what is to be expected from *Briſtol*-Water in theſe ſeveral Caſes before diſtinguiſhed. In the *firſt* Caſe, where the Blood is poor, and the Part loaded, I conceive it to be of no Service at all; for how ſhould ſuch a Habit of Body be improv'd by a Water, which rather binds *in* Humours than throws them *out*? And how ſhould it ſtrengthen a Part, of which it naturally encreaſes the Load? But in the *ſecond* Caſe I believe it may be of great Benefit; *firſt*, as it tempers the Sharpneſs of the Humours, and makes them leſs ſtimulating; *ſecondly*, as it ſtrengthens the Part, preventing Inflammation, and remedying the Effects of it. But even here there will be great Difference of Succeſs, in Proportion as the Conſtitution is hot or cold, and according as the Diſpoſition tends to a Hectick or Cachexy; which latter is the moſt common Conſequence; becauſe Women are not ſo ſubject to a Hectick as Men, having neither ſo active Blood, nor ſo active Solids, as Men in general have. But it is to be obſerv'd here, that Caſes are frequently complicated,——that the Body will ſeem cachectick, when the Humours offending are exceeding ſharp. And in

ſuch-

ſuch like Appearances, *Briſtol*-Water muſt not be deſpiſed; becauſe it may, in Conjunction with other Medicines, be of great Service; and that not becauſe of ſharp Humours *only*, but if we conſider that Weakneſs of the Part is a neceſſary *Concomitant*, ſo far as *Briſtol*-Water can help this Symptom, ſo far it may be uſed, and no further. And this brings me to conſider of the *third* Difference laid down, where the Weakneſs of the Part is chiefly in Fault. And here *Briſtol*-Water may be conſider'd as a Strengthner of the Part, but not ſuch as can be truſted to in great Hurts, ſuch as Abortions, Strains, &c. Where the Blood is warm and active, it does great Good; but where it is cold and languid, it cannot be relied upon.

What has been ſaid is, I think, ſufficient to explain the Diſorders of the *Glands* in general, at leaſt ſuch as end in Drain. *Firſt* then, they are either loaded by Quantity; or, *Secondly*, they are inflamed or obſtructed by ſome ill Quality of the Humours paſſing, which, if reſolved, neceſſarily leave the Part weak; if not, end in Schirrhus, Ulcer, &c. *Thirdly*, they, like all other Parts of the Body, are ſubject to Weakneſs,

neſs, either conſtitutional or acquired. Each of theſe three therefore will either end in Drain, or ſomewhat worſe. The firſt is the moſt eaſily remedied; next to that the ſecond, if it ends ſafely in Drain; laſt of all, the third. And if we conſider that any two or more of theſe may be complicated together, we ſhall then have ſome tolerable Idea of the great Variety of theſe Diſorders, and why they are often of ſo ſtubborn a Nature.

Simple Gonorrhœa's in Men ſtand diſtinguiſhed from thoſe in Women, in that they proceed only from Weakneſs of the Part, and are never occaſioned by *Humours* preſſing that Way, but by *Strain*, or other acquir'd Weakneſs of the Glands. Whence the ſole Indication of Cure (unleſs in ill Habits of the Body, which make the Cure complicate,) is ſtrengthening the Part; which as it is no eaſy Matter to do, ſo I cannot recommend *Briſtol*-Water as a Thing to be depended on. But when ſuch Caſes prove ſtubborn, and cannot be cured by the common Methods; I know not of any Thing more adviſeable to add to other Medicines than *Briſtol*-Water. It *may* better a ſcorbutick Habit of Body; it will

moſt certainly contribute to ſtrengthen the Part; and by its gentle gradual Manner of Operation, may, *perhaps*, act more friendly and effectually than that which ſeems more powerful. And accordingly we obſerve in theſe Caſes, that even regular Diet, gentle Riding, chearful Company, which all ſerve to keep up the Strength, are ſometimes more to be relied on, than the moſt promiſing Medicines.

In *Venereal Gonorrhæa's*, where the Virulence is entirely purged off, and a Gleet left, it generally yields to Turpentine Medicines; if it continues, or is encreaſed by repeated Acts of Venery, (without Infection) it is reducible to a ſimple Gleet, and *Briſtol*-Water will be of equal Service.

And thus much ſhall ſuffice to have ſaid on thoſe two great Sources of a Hectick, *Encreaſed Circulation*, and *Encreaſed Secretion*. Were I to treat particularly of Diarrhæa's, profuſe Sweats, and other colliquative Diſcharges, I could do little more than repeat what has already been ſaid. I ſhall therefore only obſerve in general, that where the Drain is great, and the Hectick certain, this Waters anſwers two main In-

Indi-

dications of Cure, of reſiſting the Activity of the Blood, and ſtrengthening the weak Part; except that in Diarrhæa's ſome of the ſame Objections will lie againſt it, as I have before obſerv'd in the Caſe of Dyſentery. But when the Evacuation is ſuch as the Body can bear, and the Conſtitution not hectical, it can only act as a Strengthener. Nor will it even do this, where there is the leaſt Tendency to Cachexy. The one appears from its Virtues in a Diabetes; what is ſaid of Gleets, may ſerve as an Inſtance of the other. What now remains is, to explain its Virtues in Diſorders of the *urinary Paſſages*, and in the *Phthiſis Pulmonaria*: And firſt, of the urinary Paſſages.

CHAP.

CHAP. VIII.

Of Diſorders of the URINARY PASSAGES.

IF this Water acts ſpecifically upon any one Part more than another, it is on the *Urinary Paſſages*, to which it is particularly friendly, in almoſt every Complaint to which they are ſubject.

In *nephritick Caſes* it may be of Service, barely as a Diuretick; but if we conſider that it alſo corrects Acrimony, allays Heat, and ſtrengthens the Part, there is hardly any Indication of Cure that may not be anſwer'd by it. In the Fit, indeed, I have ſometimes ſeen it not of ſufficient Force to paſs; in which Caſe it will rather do Harm than Good: But out of it this rarely happens; and where it does paſs, it cools, it cleanſes, and ſtrengthens at one and the ſame Time. Some may perhaps think, that as an Aſtringent it will contradict the general Intention of Cure, which is to keep the Paſſages open; but if they will conſider in how relax'd a State theſe Parts generally

are, from the Strain and Spaſms they undergo in the paſſing of Gravel, and how the uſual Regimen, which is opening and laxative in this Caſe, does rather encreaſe than remedy this Inconvenience, will be inclined to lend an Ear to *Fred. Hofman*, who obſerves: *Quod toni renalis nimia reſolutio, morborum qui renes occupant, potiſſima cauſa, & origo eſt—Quâ de cauſâ*, ſays he, *temperata aſtringentia & roborantia, in calculo tam præſervando, quam curando, palmam cæteris præripiunt*; and refers you to a Diſſertation of *Heucherus, de Aſtringentium uſu in Calculo*, Med. rat. Syſt. Pars I. Sect. ii. Cap. 8. And of all Aſtringents ſurely *Briſtol*-Water promiſes the faireſt, becauſe it is a Diuretick, and ſerves to cleanſe, as well as ſtrengthen, at the ſame time; which I believe no other Aſtringent does.

In the *Stone* (properly ſo called) it is of ſingular Service, in that it ſoftens the Urine, allays Heat, prevents the fretting of the Parts, and may ſerve to waſh away freſh Concretions of fabulous Matter, and, with the Uſe of other Medicines, be made ſubſervient to many good Purpoſes.

But

But its chief Excellence lies in Caſes where neither *Stone* or *Gravel* is already form'd, but only apprehended; whether it be uſed as a Preſervative for thoſe who never have had it, or as a Preventive to ſuch as have had ſome ſmall Intimations of it. For here, as the Kidneys are ſuppoſed to be tolerably ſound, a prudent Uſe of this Water will anſwer the End requir'd; whereas it muſt be acknowledged, that when the urinary Paſſages have receiv'd any material Hurt, it is not ſo eaſy to remedy, becauſe of the conſtant Motion they are in, and the no leſs conſtant Flow of Water through them: So that notwithſtanding the beſt of Remedies, much Patience and Perſeverance is neceſſary; nay more, a Temper of Mind willing to perſiſt in that which is right, tho' no great Benefit enſues, and above the Temptation of great and uncertain Promiſes.

As to all thoſe Diſorders which generally attend upon the Stone and Gravel, either as a Cauſe, or a Conſequence, ſuch as *Inflammation*, *Hæmorrhage*, *Ulcer*, &c. I did indeed intend to enlarge upon them in this Place; but as the Indications anſwer'd by *Briſtol*-Water in the Cure of them,

plainly appears from what has been ſaid, it ſeems altogether needleſs. One Thing I ſhall obſerve, which I think of no ſmall Moment, which is, that I do not think Ulcers of theſe Parts ſo frequent as is generally imagined. If at any time a Patient voids Matter reſembling *Pus*, with his Urine, it is immediately pronounced to be an Ulcer of the Kidneys; whereas, from what I have obſerv'd in ſeveral Caſes ſent down here, I have Reaſon to think it is no more than a Gleet, to which not only the *Urethra*, but alſo the *Glands of the Bladder*, *Ureters*, and of the whole *Urinary Paſſage* are ſubject: And of this I could bring ſome very convincing Proofs; but as my Deſign in this Treatiſe does not admit of relating particular Caſes, and as this Matter may be certainly known by Diſſections, of which I have not yet had an Opportunity, I leave it to the Examination of thoſe that have, and ſo conclude this Chapter.

CHAP.

CHAP. IX.

Of the PHTHISIS PULMONARIA.

THE next and laſt Thing which I have to conſider is the *Phthiſis Pulmonaria*; a Diſeaſe the moſt frequent of any that is ſent here, and the moſt difficult to manage. The general Opinion concerning this Diſtemper is, that it begins with Inflammation, which, not being diſcuſſed in time, ſuppurates, and ſo ends in Ulcer; and this by two different Ways; *firſt*, in the natural Method, as any other Inflammation may; *ſecondly*, by Hæmorrhage; in which Caſe, as the extravaſated Blood cannot be ſo perfectly expectorated, but ſome of it will remain behind; this, they ſay, in ſo moiſt and warm a Place, is very apt to be concocted into *Pus*, and ſo corrupt the neighbouring tender Parts. Hence we are told, by Authors both ancient and modern, that no Part of the Body is ſo ſubject to Suppuration as the Lungs; and moſt Writers not only deſcribe a Phthiſis as ariſing from Ulcer of the Lungs, but make *Ulcus Pulmonum* a ſynonimous Term for it.

And

And yet from a very careful Examination of this Matter, both from what I have experienc'd in myſelf, and obſerv'd in others, I find nothing but what may very fairly be accounted for from a *Catarrh*, and the natural Conſequences of it.

By *Catarrh*, I underſtand all Defluxions of any Kind, which fall upon the Glands of the Lungs, be they either *ſimple* or *compound*; *i. e.* whether they offend in Quantity only overloading them, or in Quality alſo inflaming and obſtructing them. The Conſequence of a *ſimple Catarrh* from Quantity only, is a greater Diſcharge than is natural; which, with common Care, uſually abates ſoon, and is cleared off, becauſe the Glands are not ſo hurt, but they will eaſily recover their natural Tone and Uſe.

But if the Humours are acrimonious, and ſo circumſtanced as not only to overcharge the Glands, but alſo to ſtimulate and inflame them, then will they not ſo eaſily recover themſelves, but be ſo weaken'd as not to yield their wonted Moiſture, nor anſwer their natural Uſe; whence they become

become gleety, and inſtead of ſecreting that which was requiſite, drain the Body of its moſt nutritive Juices. And this I take to be the true Cauſe of a Conſumption from phthiſical Spittle, which begins with a Cough, and ends in Gleet, and is, of all other Species of Conſumption, the moſt common, as it is the moſt natural Conſequence of a ſtubborn Catarrh.

But if this *Catarrh* be yet of a more malignant Nature, and ſuch as tends not only to ſtimulate the Glands, but alſo to corrode, or any ways deſtroy their ſecerning Power: Then follows either *Scrophula* or *Schirrhus*, or *encyſted Matter*, or *ſtony Concretions*, &c. All which may indeed end in Ulcer, but will cauſe a Conſumption whether they do ſo or no.

And as I have great Reaſon to think, that from one or other of theſe Accidents attending a *Catarrh*, a *Phthiſis* is for the moſt Part occaſioned; I muſt beg leave to obſerve *firſt*, how very ſubject theſe Parts are to *Catarrh*; how often, and how eaſily they are affected upon every ſlight Cold catched, and that perhaps more than any other Glands of the Body. *Secondly*, that the

the common procatarctick Cauſes of this Diſorder are not properly inflammatory, but rather ſuch as cauſe Defluxions on theſe Parts. Hence we ſee why Winter-Weather, and moiſt Air, Anxieties of the Mind, Night-Studies, and every Thing that checks Perſpiration, are the Forerunners of this Diſorder;——becauſe they naturally throw Humours upon the Part.——Why any natural Weakneſs of the Lungs, from Conſtitution, or Mal-formation, makes the Caſe more dangerous;——and *laſtly*, Why theſe Accidents are ſo fatal to ſcorbutick Habits of Body; ſuch as are not perfectly cleanſed of the Remains of Small-Pox, Meaſles, or other eruptive Fevers; or ſuch as have any Acrimony of Blood of other Kind——becauſe all theſe contribute to the greater Obſtruction and Hurt of the *Glands*. And do not we in general obſerve, that the Beginning of a Phthiſis is from ſome Cold caught, which gradually growing worſe and worſe, encreaſes by degrees into this Diſtemper; plainly ſhewing, that it ariſes from one and the ſame Cauſe? Does it not begin for the moſt part with a Cough, and phlegmatick Spittle, manifeſtly glandular? Have we any Symptoms anſwering to Inflammation tending to Suppuration? And

is it not much longer in coming to *Pus* than is poſſible, in a Part ſo liable to Suppuration as this is ſaid to be? And when it is arrived at it, does it deſtroy ſo ſoon as one would imagine by the Quantity diſcharged, and the Part affected? Theſe are Queſtions not eaſily to be anſwered upon the Suppoſition of an Ulcer; and accordingly Phyſicians will often declare, that the Lungs are not ulcerated, even in dangerous Caſes, where this puriform Spittle appears in great Quantities; whereby they tacitly confeſs what I am contending for.

There are indeed ſome Appearances which give Countenance to the receiv'd Opinion, and were probably the firſt Foundation of it; for as this Diſorder often begins with Heat and Inflammation, and after that, a Diſcharge of Matter follows, reſembling *Pus*, it was natural enough to imagine, that it was a Suppuration conſequent on a preceding Inflammation. And ſome Countenance has been given to this Opinion, by the late Doctrine of * *Tubercles*; whereby it is inſinuated, that theſe Inflammations are very ſmall, and conſequent-

* Vid. *Morton's Phthſiologia.*

ly not productive of violent Symptoms; yet, by being frequently repeated, evade the Art of Phyſic, and at Length exulcerate. By which they ſeem not only to account for the Length of Time to which this Diſtemper will run, before it deſtroys a Patient, but alſo for the gradual Encreaſe of it; and promiſe themſelves a Cure by incarning, as they hope, an Ulcer, which is but very ſmall in the Beginning, and if taken in time, remediable.

But theſe Miſtakes ariſe for want of a Diſtinction, between an Inflammation of the *Blood-Veſſels*, and an Inflammation of the *Glands*. In all Defluxions which are acrimonious, there is indeed an Inflammation, but very different from that which is commonly called ſo, and which, if not reſolved, ends in Suppuration: For tho' the Glands may ſuppurate as well as other Parts, yet in Inflammations that are reſolvable, the Conſequence is very different. If a common Inflammation of the Blood-veſſels is reſolv'd, it is a Cure, and no material Hurt remains; but if the Glands be inflamed, tho' the Inflammation is reſolved, the Part is left weak, and there follows a Gleet, and the Cure is not effected; and as this Gleet yields

yields Matter ſo very like *Pus*, that it is ſometimes impoſſible to diſtinguiſh it from it, we have been deceiv'd by Appearances, and apprehended a Suppuration where there is none. Whereas if we had obſerved the Difference between *glandular* and *vaſcular* Inflammations, as alſo conſidered the Nature of ſome other gleety Diſcharges more apparent to Sight, we might not have made this Miſtake. I will inſtance only in a weeping Eye, where the Matter diſcharg'd and lying in the Corner of it, is ſo like *Pus*, as no one can diſcern the Difference: And that this has been the Caſe in Conſumptions, has been prov'd by Diſſections, where, though great Quantities of this Matter has been diſcharged, no Ulcer has been found.

Another Reaſon which has inclin'd People to ſuſpect that an Ulcer is the moſt general Cauſe of a Phthiſis, has been the Appearance of Blood frequently intermix'd with phthiſical Spittle, which they think muſt proceed from ſome ulcerous *ſolutio continui*; as alſo, that this Diſorder ſometimes begins with Hæmorrhage; or if it begins with Cough, a Hæmorrhage will often enſue, which tends to Ulcer; becauſe the

extravaſated Blood not being perfectly expectorated, is apt to concoct into *Pus*, according to the known Aphoriſm of *Hippocrates*, Ἐξ αἵματος φτύσει Πύον φτύσις.

In order to obviate this Objection, it will be neceſſary to diſtinguiſh Hæmorrhagies (as I have before done Inflammations) into thoſe that are *vaſcular*, and thoſe which are *glandular*. By vaſcular Hæmorrhagies, I mean ſuch as proceed from the Rupture of any Blood-veſſel: By glandular, ſuch as ariſe from tumified or inflamed Glands. When Glands are inflamed, they may bleed either by admitting Blood into Veſſels which do not ordinarily carry any, whence there is a Rupture of ſuch Veſſels; or by letting Blood thro' the ſecretory Ducts, without any Rupture of the Veſſels at all; in both which Caſes the Hæmorrhage proceeds properly from the Glands. And if we conſider the great Mobility and Fluidity of the Blood in conſumptive Caſes, and that theſe Glands of the Lungs are more particularly affected, it is no wonder if the Blood will frequently ouze through them; ſo that here is no Proof of an Ulcer, nor is Ulcer the ordinary Conſequence of ſuch Hæmorrhage; for we generally obſerve, that as the

the Caſe grows worſe, the Patient ceaſes to ſpit Blood, and brings up a large Quantity of foul phthiſical Spittle, without the leaſt Tincture of it; and which proceeds not from Ulcer, but from the encreaſed Diſcharge of theſe weak and diſabled Glands.

As to *vaſcular Hæmorrhagies* which end in Conſumption, the Opinion of an Ulcer is very natural, and very ancient: And as it is here acknowledged that the Bleeding proceeds from the Blood-veſſels, and not from the Glands, it may not ſo eaſily be conceived how, in this Caſe, there is a Catarrh: But as theſe Hæmorrhagies for the moſt part ariſe from the ſame common Cauſes as a Catarrh, *viz.* Acrimony of Blood, and Weakneſs of the Part, and are generally the Conſequence of a prior hectical Diſpoſition; the Phthiſis which follows, is not perhaps to be imputed to the Bleeding, ſo much as to the Cauſes which firſt occaſioned it, which tend to Catarrh, and will certainly end in it, if no Stop is put to them: And it is obſervable, that where theſe Hæmorrhagies ariſe from other Cauſes, there the Apprehenſions of a Phthiſis leſſen in Proportion, which would not be the Caſe, if extravaſated Blood was the Cauſe;

and

and as we obſerve many to recover of this Diſorder, and to have no Signs of *Pus*, after repeated Extravaſations and Lodgments of Blood upon theſe Parts, I ſhould rather, I ſay, impute the Phthiſis ſometimes conſequent upon it, to a prior hectical Diſpoſition, than to this Cauſe; and *Hippocrates*'s Aphoriſm will ſtand good, tho' not in the Senſe generally put upon it; Ἐξ αἵματος φτύσει πύου φτύσις: Phthiſical Spittle (not *Pus*) is the Conſequence of ſpitting Blood. Was the extravaſated Blood concocted into *Pus*, as has been imagined, the Tragedy ſurely muſt begin ſooner, and rage higher than it ordinarily does, and ſomewhat like an Empyema muſt enſue; for I cannot well conceive an Ulcer once formed not to ſpread in a Part, which of all others is ſuppoſed moſt ſubject to Suppuration.

I would not be underſtood by what I have ſaid, to exclude Ulcers from having any Share in cauſing a Phthiſis; for as in other Parts of the Body they certainly have this Tendency, ſo likewiſe have they in the Lungs; and it is no uncommon Thing to meet with a Conſumption from this Cauſe; and not only ſo, but we acknowledge Ulcer to be the frequent Conſequence of

other

other Cauſes. But what we contend for is, that this Diſtemper is not ordinarily occaſion'd by Ulcer; and however it may end in it, yet the foul phthiſical Spittle, which has been taken for Matter proceeding from Ulcer, is no more than a gleety Running of the Glands, from acrimonious Humours thrown upon them.

And thus having endeavour'd to prove, that a Catarrh is the moſt general Cauſe of a Conſumption, if what I have ſaid be concluſive, the *Seat* of this Diſtemper is in the Glands of the Lungs; the *Cauſe* of it, acrimonious Defluctions thrown upon them. If indeed the Lungs are exceeding weak and tender, any Defluxion, not acrimonious, may have ill Conſequences; but in general no Phthiſis enſues from a ſimple Catarrh without Acrimony. And this in ſome meaſure appears from the violent Defluxions we obſerve on theſe Parts, in ſome aſthmatical People, who have great Diſcharges from theſe Glands; but becauſe their Humours are not acrid, or rather becauſe there is no hectical Acrimony, (for other Acrimony there may be) there is no Danger of a Phthiſis.

Acri-

Acrimony of Blood therefore is eſſential to the Phthiſis Pulmonaria, The *cauſa ſine qua non*, that without which it cannot well be; and this not every Acrimony, but ſuch only as quickens the Circulation, encreaſes the Secretions, and diſpoſes to a Hectick. Acrimony *cum ſecretionibus diminutis*, as I have before obſerv'd, begets Diſeaſes of another Kind; but *cum ſecretionibus auctis*, it ends in Conſumption. And here we may ſee the Reaſon why this Diſtemper is ſo rife in this Country; inſomuch that with ſome it has obtained the Name of *Morbus Anglicus*; we being very ſubject to ſcorbutick Acrimonies from our free manner of living, and to catching Cold from the Variableneſs of our Weather; ſo that I believe the Cough is heard no where ſo much as in *England*, of which a Conſumption is the Conſequence.

And as this will ſhew us the Nature of Acrimony in general, and how very hurtful it is to thoſe Glands on which it ſhall happen to fall; ſo will it let us into the proper Indications of Cure, which are to correct the

the Acrimony, and relieve the Part affected.

The firſt of theſe is generally attempted with ſoft pectoral Drinks, with cooling Salts, with Milk and other Incraſſants, which in many Caſes are of great Service, tho' I will be bold to ſay, that none of them all, anſwer the Indication like *Briſtol*-Water, which corrects Acrimony very powerfully, and is more effectual in this Caſe than all other Medicines put together.

The next Thing we muſt attend to, is to relieve the Part affected. It is a known Maxim in Phyſick, that the Encreaſe of one Secretion is the leſſening of another; but this will teach us very little, if we do not alſo know what particular Diſcharges are moſt effectual in every particular Caſe. Some have conceiv'd great Benefit from Iſſues and Bliſters; others from well-timed Evacuations of all Sorts; and Dr. *Bennet*, who was an experienc'd Man in this Diſtemper, is very zealous for diaphoretick Methods.

Prolixioris operis eſſet hiſtorias medendi deploratæ fere ſortis tabidos conſignare, quorum curationes conſummarunt, ſudores artificioſe præſtiti. In poſterum ut frequentius imperentur optarim, & ut ſenſuum placitis, auſcultare dignetur medicorum hæſitantium turba. Exerc. 30. p. 78. Which as it ſeems agreeable to the known *Conſenſus* between the Lungs and the Skin, may be well worth conſidering; as indeed all other Methods of Derivation are; nor is *Briſtol*-Water to be defrauded of the Part it bears in anſwering this Indication, inaſmuch as it is a diuretick, and may poſſibly contribute greatly to the Relief of the Lungs by this Means. But the main Difficulty is ſtill behind: To correct Acrimony, and to derive it from within outwards, is no ſuch difficult Task, provided we have Strength to work upon: But here ariſes, for the moſt part, a hectick Fever, which ſo confounds the natural Indications of Cure, that without great Regard had to the proper Management of it, nothing we can do, becomes effectual; and herein conſiſts the Difficulty of curing a Conſumption. What this Hectick is, and how it is to be ma-

managed, I have already declar'd; and that I know of nothing ſo effectual towards the Cure of it as *Briſtol*-Water. And thus ſhall I finiſh what I have to ſay, on the Diſtempers which are more eſpecially benefited by it.

PART III.

Of the Nature of BRISTOL-WATER, *ſo far as it is diſcoverable by Experiments.*

I Now proceed to examine the Water itſelf, whoſe Spring riſes within the Channel of the River *Avon*, on the North-ſide, about ten Feet above Low-water Mark, at the Bottom of a very high craggy Rock, through which the River runs, and by which it is bounded on both Sides.

This Rock runs through the whole Country round about, on both Sides of the River, and conſiſts of a hard Marble Stone, of different Shades, from a dusky red, to a light grey. The chief Properties of it are as follows.

I do not pretend to deſcribe the Nature of every different *Stratum* that may be found in this Rock, only ſay in general, that it is hard as Marble, and receives a Poliſh

Poliſh like Marble; as may be ſeen in ſeveral Chimney-pieces made of it, particularly that in the Pump-room, which is beautifully variegated. Add to this, that like all other Marbles it burns into Limeſtone, which is particularly good in its Kind, and ſerves the Town in a double Capacity, both for Stone and for Mortar. And yet in one reſpect it does not agree with other Marbles; all which are ſaid to raiſe an Effervescence more or leſs with *aqua fortis*; but this upon trial did not anſwer to this Characteriſtick, whole, or in Powder; and a ſmall Piece which I kept ſteep'd in it for ten Days, was as hard as when firſt put in.

Any two Pieces of this Rock being rubb'd againſt each other, ſend forth a ſtrong ſulphureous Smell; and if you ſtrike any of theſe Stones with a Hammer, they ſtrike Fire, and ſend forth the ſame ſulphureous Smell; and yet upon reducing a Piece of this Stone to Powder, and throwing it upon *Sal. Nitr.* in Fuſion over the Fire in a Crucible, not one Spark of Sulphur appear'd.

This Stone when broke, appears full of bright luminous Sparks, which gliſter in the

the Sun, and which ſome have taken for metallick Particles; but if ſo, I ſhould think they would yield to *aqua fortis*, and therefore believe them to be Spar. Several Parts of this Rock, eſpecially where the Fiſſures are, ſeem tinged with ferrugineous Earth; but the Metal which abounds moſt in theſe Parts, is Lead.

The Fiſſures of this Rock, are full of ſparry Chryſtallizations of different Colours, ſome few clear as Chryſtal, but for the moſt Part opake and dusky *. (Dr. *Woodward* ſays, theſe different Colours are owing to the different Proportions of ferreous Corpuſcles uniting with the chryſtalline in the Concretion.) Others there are of a fine deep black Water. Some of the beſt of them receive a pretty good Poliſh, but not to be compared with thoſe Chryſtals, which generally are ſold under the Name of *Briſtol*-Stones; though *Camden* ſays, that they vie with Diamonds for tranſparency, and yield not to them in any reſpect ſave Hardneſs, and that it is the great Plenty of them that leſſens their true Value †.

* Natural Hiſtory of Foſſils, p. 160.

† *Cambden*'s *Britannia*—County of *Somerſet*, towards the End, p. 75. Edit. 1695.

The current Opinion of this Rock being a Lime-ſtone, has given Occaſion to a Notion, that the Water flowing from it is a Kind of Lime-water; and ſome who have never ſeen the Place, and know very well that Quick-lime is made of Chalk, have imagined this Rock to be Chalk alſo; and that the Spring is nothing more than a clear tranſparent Water, replete with the Virtues of ſuch Chalk; which latter Opinion is confuted by what I have ſaid of the Rock already: And the little Ground there is for the former, will appear from what follows. And thus much ſhall ſuffice to ſay of the Rock, which if I believed communicated any Virtue to the Water, might merit a farther Examination.

The Water as it comes from the Spring, is clear as the fineſt Spring-Water, riſing up with Force from beneath upwards, and ſending forth, as is computed, about 40 Gallons in a Minute: It appears very briſk and ſparkling in the Glaſs, and is ſo very full of ſmall Air-bubbles, that the Water receives, as it were, a whitiſh Hue from them.

In

In Taſte and Smell, it differs not from other Water, unleſs that it is peculiarly ſoft and agreeable; though it is found upon Experiment to be really a hard Water, not lathering kindly with Soap, nor taking ſo full a Tincture of Tea, as Rain-Water will.

Its Warmth raiſes the Mercury in *Farenheyt*'s Thermometer to 76, and never varies upon any fair Trial I have ſeen made with it. My Lord *Macclesfield* made the Experiment daily, for ſeveral Weeks together in 1744, and never found the Variation of above one Degree, tho' all the Company imagined it to be very different at different Times, and accordingly it has been thought that the Water is not ſo warm *now* as it formerly was; which Opinion cannot be abſolutely confuted, becauſe our Fore-fathers had not the ſeveral Degrees of Heat adjuſted by a Thermometer, as we now have. Ever ſince Thermometers have been in Uſe, the Heat has been the ſame; and *Guidot* ſpeaks of it in his Time, as a Water whoſe Warmth *ultra* ** *teporis gradum non aſſurgebat*: Nay,

* Guidot de Thermis Briſtolicis.

ſays

ſays further——*In morbis iſtis in quibus* infimus *caloris gradus requiritur thermas has præ cæteris, neceſſarias exiſtimo.*

One peculiar Property this Water has above any other Water known, that it carries pure and uncorrupt round the whole World, and never receives a Taint in any Alteration of Climate, or Length of Time.

And it is further to be obſerv'd, that no Change of Weather or Seaſons affects this Spring, but that the Water flows always the ſame, in Quantity and Quality, at all Times of the Year; nor is there any ſenſible Alteration has ever been obſerv'd in it, when freſh from the Pump, except when it is foul'd by the Tide.——And thus much for thoſe Qualities of *Briſtol*-Water which are moſt obvious and apparent; we now proceed to thoſe which are diſcoverable by Experiments.

The common Method of examining a *mineral Water* has been, either by various Mixtures made with it as it comes from the Spring, or by analyſing it (as they call it) into its compounding Parts.

Thus if any *vitriolick Salt* is in the Water, it is diſcoverable by the Mixture of *Galls*, *Oak-leaves*, *Green Tea*, *Balauſtine Flowers*, and other aſtringent Plants, which will turn it of a purple black.

If any *Acid* is predominant, it will ſhew itſelf by the ſame Properties other *Acids* do, ſuch as turning *Syrup of Violets* red, fermenting with *Alkali's*, and not with *Acids*.

If *Alkali* prevails, then on the contrary it will appear, by turning green with *Syrup of Violets*, fermenting with *Acids*, and not with *Alkali's*; as alſo by turning a Solution of *corroſive Sublimate* yellow. And this is the chief of what is diſcoverable by Mixtures made with mineral Waters at the Spring.

The Trials made with *Briſtol*-Water are as follows.

With *Galls* I could perceive no Colour ſtruck, any more than with common Water, tho' I put half a Scruple of the Powder into a half-pint Glaſs, and let it ſtand 24 Hours;

Hours; nor is any Thing of this kind produced by other aſtringent Plants.

With volatile *Alkali's*, ſuch as *Spir. Corn. Cerv. Spir. Sal. Armen.* no Fermentation at all, nor with any other fix'd *Alkali*, except that *Ol. Tart. per deliq.* cauſed a whitiſh Cloud to ariſe in the Water; but as this is common to almoſt all mineral Waters as well as this, nothing can be collected from it. *Omnes ferè Aq. Minerales*, ſays *Hofman*, *cum Ol. Tart. per deliq. obſcurantur & lacteſcunt ob ſalis communis vel terræ calcariæ connubium.*——So that this Water is no Acid.

With the ſtronger Acids, ſuch as *Ol. Vitrioli*, a brisk Fermentation was raiſed, but the weaker ones, made little or no Alteration, except that they ſeem'd to deſtroy the little Air-bubbles, ſparkling up and down in the Glaſs, and made the Water appear more clear and tranſparent. This Experiment declares the Water to be of an alkaline Nature; which was farther confirm'd, in that it turn'd of a greeniſh Colour, by the Admixtion of *Syrup of Violets*, tho' with *corroſive Sublimate* it did not turn yellow.

But before we proceed any further, it may be proper to conſider what we are about, and inform ourſelves what Knowledge is to be gain'd by theſe Experiments; and firſt, as to the Infuſion of *Galls*.

Though the Way of trying mineral Waters by the Change of Colours that *Galls* produce in them (ſays Mr. *Boyle*) be uſeful, and recommended by being eaſy, cheap, and expeditious; yet I do not take it to be either of that *Extent*, or of that *Certainty*, that 'tis vulgarly preſumed to be of; for as its main Uſe, is only to diſcover whether the Water has any Thing in it of a ferrugineous Nature, it cannot be very extenſive, becauſe there are divers metalline Ores, and other mineral Bodies not participating of *Iron*, which will not be diſcoverable this Way, and yet may ſtrongly impregnate the Water: As for Inſtance, ſays he, to try whether if *Arſenick* were mingled with Water, *Galls* would diſcover it by producing with it a dark Colour, I put ſome of the Powder of them, into a Decoction of *Arſenick*, but did not perceive that it gave the Liquor any deeper Colour than it would have done to common Water.

And

And as the *Extent* of this Experiment is not very great, ſo neither, ſays he, do I find the Informations it gives to be ſo *certain* as they are preſumed; for I found upon trial purpoſely made, that another Body of a metalline Nature, and that did not partake of *Iron*, would, with Infuſion of *Galls*, afford a very dark Colour, that might eaſily, among ordinary Beholders, paſs for the Colour produced by a martial Water; and I ſomewhat doubt whether all Liquors impregnated with *Iron*, will be diſcovered to be ſo, by the Colour they afford *Galls*; for I have ſometimes made ſuch a Liquor, with no mineral Subſtance in it ſave *Steel* or *Iron*; but I did not find it would turn the Infuſion of *Galls* either blackiſh, or purple. *Boyle's Memoirs for the Nat. Hiſt. of Mineral Waters.*

Moreover, it is very well known, that many mineral Waters, which give this Tincture with *Galls* at the Spring-head, will not give it after ſtanding ſome ſmall Time in the open Air; which ſhews that this *vitriolick Salt*, ſuppoſed to be diſcovered this Way, is not of a fixed Nature, but volatile; nor can this Salt be ſaid to

be acid, becauſe, upon Experiment, theſe very Waters are all found to be alkaline; but if the Idea we are to have of a *vitriolick Salt* has nothing in it, either acid or fixed, how can we call it Vitriol? Much leſs can we argue its Effects upon the Human Body to be the ſame as Vitriol, and practice upon ſuch precarious Principles.

Again, there are many *mineral Waters* which turn Colour with *Galls* of ſo very different Natures, that were we to judge of the Virtues of them from this Experiment, we ſhould know but very little about them. And others there are, which anſwer to this Trial, of no Virtues at all, but rather unwholſome: So that no great Matter is to be learnt from this Experiment, though a capital one, and that on which great Streſs has been laid.

In the next Place, we will conſider what Knowledge is to be obtained from the ſeveral Mixtures of *Acids* and *Alkali's*. And *firſt*, we will ſuppoſe that we diſcover an Alkali by theſe Trials: How does it appear what Sort of *Alkali* it is, earthy or ſaline, fixed or volatile, from this Expeririment? And yet all theſe are of very different

ferent Virtues. And if we allow this *Alkali* to be ſaline and fixed, ſuch as may be made viſible to the Eye, and extracted from the Water, how can we tell what other Subſtances may be in Conjunction with it, and how its Virtues may be affected by ſuch Conjunction? It is well known that *Iron* itſelf will ferment with *Acids*, and yet its Virtues are not from *Alkali*, but rather from its oppoſite, an acid vitriolick Salt. And if you take a little *Alum*, and diſſolve it in Water, you will find, upon Experiment, that it turns green with *Syrup of Violets*; which we ſhall be told, ariſes from an alkaline Earth contained in it; but will any Body ſay, that *Alum-Water* is not an *Acid*. Again, are not the Virtues of moſt Waters far beyond the Power of any alkaline Salt? At leaſt that ſmall Quantity of it which is diſcovered upon Evaporation? And has not *Hofman* proved, that all mineral Waters are impregnated with ſuch Salt, more or leſs? Now what is common to *all*, cannot be the diſtinguiſhing Mark of any *one*.

And as to *Acids*, they are liable to the ſame Objections. Theſe Experiments can inform us only in general, that an *Acid*

is

is in the Water, but not ſpecify what particular *Acid* it is, and conſequently convey no Knowledge, only that as there is a greater Variety of *Acids* than *Alkali*'s, there is ſtill greater Uncertainty in determining Particulars; and if this could be known, we ſhould ſtill be ignorant what Share this Acid might have in giving Virtue to the Water; whether in whole, or in Part, or indeed at all: And if in Part only, a very little Obſervation will teach us, that one and the ſame *Acid* may have very different Effects, as it is in Conjunction with different Subſtances. Thus we are told by the Chymiſts, that *Alum*, *Sulphur*, *Vitriol*, have all three one and the ſame *Acid*, and yet they are of very different Virtues.

I am not ignorant that other Experiments have been made, with Mixtures with the Water as it comes from the Spring; ſuch as with a Solution of *Silver* in *Aq. Fort.* which, if there is any *Sea-ſalt* in it, turns white and milky; if any *Sulphur* black. But as all theſe labour under the ſame Objections as the former, I need not take up my Reader's Time in examining particularly into them; only conclude, that if all theſe Experiments are ſo limited and uncer-

uncertain, the Knowledge conveyed by them muſt be very ſlight and ſuperficial; and can by no means anſwer, to that exact and ſatisfactory Enquiry, which is generally profeſs'd by thoſe that make them.

But although no great Knowledge is to be obtained, from any Mixtures made with the Water at the Spring, yet ſurely, ſome uſeful Diſcoveries may be expected, from the *Analyſis* of the Water into its compounding Parts. Now the Method of *Analyſis* is this; *firſt*, to draw off the Water by Diſtillation, or open Evaporation, and then examine the *Reſiduum*. If the Water is drawn off by Diſtillation, it may be examined by various Mixtures as above: But this, to very little Purpoſe, becauſe, after it has undergone the Fire, there is an Alteration made in its Properties, ſo that all Experiments labour under greater Uncertainties than before; nor do I know of any Body that has in the Examination of this, or any other Water, laid any great Streſs upon them, as made in this Manner; but they are extremely minute and particular as to the *Reſiduum*. Now the *Reſiduum* is examined two different Ways; *firſt*, in the groſs, as it is found remaining; *ſecond-*

ly, by ſeparating the ſaline from the earthy Parts, and examining them diſtinctly.

They who profeſs to have gone through this Method of Experiment, with the greateſt Exactneſs, do by no Means agree, either as to the Quantity, or Quality, of the *Reſiduum* found in *Briſtol*-Water.

Dr. *Guidot* ſays, one Gallon of it contains 50 Grains of *Reſiduum*.——Dr. *Wynter* ſays it contains 36 only.——Dr. *Keir* 34.——Mr. *Shebbeare* 56. All which Differences may indeed be accounted for, it being almoſt impoſſible they ſhould agree exactly, by Reaſon of the different Veſſels uſed, the different Times ſpent in the Evaporation, and the different Dryneſs to which the *Reſiduum* may have been reduced; tho' from 34 to 56 is a greater Difference than one can well believe theſe Accidents ſhould occaſion.

The Experiments made upon the *Reſiduum*, they are pretty well agreed in; and they are the ſame, that were made upon the Water before; *viz.* *Acids* being pour'd upon it, there ariſes an Effervescence; but no ſuch Thing appears upon the Affuſion

Affuſion of *Alkali's*, either volatile or fixed——That it turns green with *Syrup of Violets*, and has all the Signs of *Alkali*, except that it does not turn yellow, with a Solution of corroſive Sublimate.

But when they come to ſeparate this *Reſiduum*, by Filtration, into its ſaline and earthy Parts, they differ more than ever. Dr. *Guidot* ſays, the ſaline Parts are to the earthy, as 1 to 4.——Dr. *Wynter*, as 1 to 5.——Dr. *Keir*, as 11 to 15.——Mr. *Shebbeare*, as 11 to 13: And each has his particular Opinion, as to the Nature of this Salt and Earth. Dr. *Guidot* ſays, that in the *Reſiduum* of *Briſtol*-Water, he diſcovers chiefly, a *ferrugineous Earth*, with a ſmall Proportion of *Lapis Calcarius*, and ſome nitro-ſulphureous Salt.——Dr. *Wynter* thinks that it conſiſts principally of *Chalk*, *Lapis Calcarius* and *Calaminaris*, and ſome lixivial Salt.——Dr. *Keir*, that it is a Compound of Nitre and *Sea-ſalt*, intimately united with a *calcarious Earth*. ——Mr. *Shebbeare*, that it conſiſts of Alum and Lime ſtone, or rather Quick-lime ſlaked.

And thus being left under great Uncertainties as to theſe Matters, it may be expected that I ſhould carefully examine into theſe ſeveral Experiments; and, upon an accurate and exact Survey of every Particular, endeavour, as much as in me lies, to ſet Things right: But as I deſpair of diſcovering any Thing more, than thoſe which have gone before me, and think that very little is to be learnt from this Method of *Analyſis*, I muſt beg leave to be excuſed; at the ſame Time giving my Reaſons, why I think all this great Labour and Pains, little better than a needleſs Piece of Curioſity.

The Principles upon which the Virtue of any mineral Water depend, muſt be either of a volatile, or fixed Nature, or a Mixture of both. If of a volatile Nature, it is very plain it cannot be diſcovered by this Method of Analyſis; becauſe in the Evaporation, previous to this Kind of Examination, it muſt neceſſarily exhale and fly off. And that this is the Caſe as to moſt of them, appears, in that if they ſtand ſome Time in the open Air, or are warm-

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ed by the Fire, they loſe their Virtues, and ſoon become vapid and of no Effect.

Neither do I think the Virtues of a mineral Water diſcoverable this Way, if they conſiſt of that which is fixed: For as it is the Nature of Fire, to unite ſome Particles which were not joined together before, and disjoin others that were, we cannot make any certain Judgment, whether what is found in the *Reſiduum*, did exiſt under the ſame Form, in the Water before Evaporation. In ſome Springs indeed, where there is a large Quantity of fixed Salt, as in *Scarborough* and *Cheltenham* Waters, this Method of Examination may take place; but then it is to be obſerved, that theſe Salts are miſcible again with Water, and in ſome Degree imitate the Virtues of the original Spring, which gives us ſome Proof that they are not much altered in the Proceſs; but when the Salt procurable by this Means, gives no Virtue to other Water mixed with it, what are we to conclude then? And as to the Earth, which remains after Evaporation, it is certain it has undergone ſome new Combination, becauſe it will not mix and incorporate with the Water as before: Not to mention that

all Spring-Water yields Salt and Earth, upon Evaporation, and that generally more in Quantity than mineral Waters.

If the Virtues of any Water depend upon that which is of a mix'd Nature, partly volatile, and partly fixed, it is plain the ſame Objections will hold as above: And tho' ſome of the fixed Parts ſhould be diſcover'd, yet ſo long as we cannot tell how they may be altered or affected, with being in Conjunction with the volatile, we can never reap any Thing certain from this Method of *Analyſis*.

Laſtly, I cannot think the Quantity of the *Reſiduum* found in *Briſtol*-Water ſufficient, to expect any medicinal Virtues from it. Fifty-ſix Grains to a Gallon, which is the very higheſt Computation, and the greateſt Part of this *Earth*, muſt leave but a very ſmall Proportion of *Salt*, to impregnate ſo great a Quantity of Water, and ſuch as cannot be of any Significance, becauſe no natural Salt whatſoever, in that Proportion, is ſo; nor do we find, upon re-mixing it with Water, it has any Effect at all: And indeed, did the Virtues of any Water depend upon the *Reſiduum*, or any Thing of a fixed

a fixed Nature, it would be very eaſy for us to imitate them, and exhibit ſomething of like Virtues; which as we have never been able to do in any Shape, it is better to confeſs our Ignorance, than pretend to that which we cannot attain to.

But although it muſt be allowed that mineral Waters are ſo nicely compounded, that it is impoſſible, by the moſt accurate Analyſis, to diſcover the exact Proportion of the ſeveral Ingredients, on which their Virtues depend; yet (it will be ſaid) theſe Experiments may not altogether be uſeleſs: For if we can hereby obtain the Knowledge of the fixed Parts, though we cannot ſay how they are improved by the volatile, yet we may in ſome meaſure gueſs at the Baſis. As for Inſtance, *Scarborough*, and other purgative Waters, do by this Method of Analyſis, diſcover the Salt on which their Virtues principally depend: And though we cannot ſay the whole Virtue of the Water reſides in this Salt only, yet is it the principal Baſis of all that is to be expected from it. I anſwer, that I am for evaporating every mineral Water whatſoever; but when it manifeſtly appears, upon repeated Trials, that the Quantity of the

Reſi-

Reſiduum is inſignificant, and ſuch as re-mixed with Water imparts no Virtue to it, or, upon Experiment made, gives no Inſight at all into the Virtues of the Water, but on the contrary we have great Reaſon to think, that it is ſomething of a volatile Nature which gives Efficacy to it, to what Purpoſe is it to ſeek where nothing is to be found, and buſy ourſelves in extracting Sun-beams out of Cucumbers *? We have been told, that the End of making Experiments upon *mineral Waters*, is either to give us a more comprehenſive View, of the true Nature and Virtues of them, or to enable us to imitate the like. Now if neither of theſe Ends can be obtain'd this Way with any Certainty, and much Pains is required in the Search,

Cur tam ridiculum, tam carè, Prodigus, emam?

Are then Experiments of no Uſe? And is all that has been writ, and ſaid, of *mineral Waters* examined by them, to be laid aſide? I think not: All that I am concerned for, is to ſee People ſo eager after them. They are of more Uſe in ſome

* Vid. *Gulliver*'s Travels.

Waters than in others; as for Inſtance, ſuch whoſe Virtues depend upon a fixed Salt; or if upon any Thing volatile, ſuch as have it plainly diſcoverable in them, as ſome *chalybeate* Waters; and in all others, though they do not *poſitively* prove what is in the Water, they may *negatively* what is not. Thus, for inſtance, when I ſee *Briſtol*-Water give no Tincture to *Galls*, it is a negative Proof that that *volatile Chalybeate*, which appears in many other Waters, is not in this. And here I ſhall take Occaſion to examine into the Opinion which is ſo generally receiv'd concerning this Water being a *Lime-water*; and endeavour, by a few Experiments, to prove that it is not: Which may ſerve, by way of Specimen, to ſhew what I mean by negative Experiments, *viz.* ſuch as do not indeed inform us what the Water is, but may ſerve to rectify Miſtakes, and tell us what it is not.

It has been generally believ'd, that this Water is a natural *Lime-water*: An Opinion which might perhaps firſt ariſe from the Rock, out of which it ſprings, being called a *Lime-ſtone*, and be favoured by ſome imagined Reſemblance in their Virtues; nay, ſome have gone ſo far as to ſay,

its Warmth ariſes from *Quick-lime*, in the Act of ſlaking. This Notion in regard to the Warmth of a *mineral Water*, however new it may appear, is as old as *Democritus*, and has been confuted long ago, by ſaying that *Quick-lime* is an artificial, not a natural Body, and ſuch as was never found in the Bowels of the Earth. Nor do I conceive it poſſible for it to continue in this State, under Ground, if it was; becauſe of the natural Moiſture of the Earth, with which it would ſlake, and turn into a dead *Calx*. But we will ſuppoſe that it is there; and moreover, that Nature deals it out in proper Quantities, as it is wanted, for the proper Heat and Imprægnation of the Water; what is to become of it after it has done its Work, and where ſhall we find Room for this encreaſing Quantity of dead *Calx*? How is it that the Water appears ſo clear and tranſparent, and not foul'd by the Admixtion of *Quick-lime*, as Water generally is, till it has ſtood ſome Time and ſettled, which it cannot do in a running Spring?

But as this Opinion of the Warmth of the Water, is not held by many who yet believe it to be a *Lime-water*, we proceed

ceed to Experiments; though as I have no Notion of a *Lime-water* without *Quick-lime*, what is already ſaid, may be urged againſt this latter Opinion, as well as the former.

Both *Lime-water*, and *Briſtol*-water, turn green with *Syrup of Violets*, and both Waters ferment with the ſtronger *Acids*, tho' in *Lime-water*, the Effervescence raiſed, is not ſo viſible to the Eye as in *Briſtol*-Water. Both theſe Waters therefore, have what is called an *Alkali* in them; and I really thought once, there was ſome very great Reſemblance between them; for upon making theſe Experiments, I found that *Lime-water*, upon the Admixtion of *Oyl of Vitriol*, (about a Tea-ſpoonful to a Wine-Glaſs) raiſed a conſiderable Heat; ſo that upon ſtirring it with my Finger, I could not well bear the Heat felt at the Bottom of the Glaſs: And this I found did the ſame with *Briſtol* Water, both warm from the Spring, and cold, after it had ſtood ſome Days. I then made trial of it upon ſeveral different Springs of common Water, as alſo upon Rain-water, and found it to be exactly the ſame: So that however there may poſſibly be ſome ſmall Difference in

the Degree of Heat generated, if nicely examined, no Concluſion can be drawn from this Experiment, for the Similitude between theſe two Waters.

Lime-water, upon ſtanding expoſed to the open Air for a ſmall Time, throws up a glaſſy *Scum* to the Top, which if you take off, it is ſoon covered with it again; but no ſuch Appearance is to be found in *Briſtol*-Water.

Lime-water, incorporates readily with *Oil*, ſo that it will turn into a Kind of Conſiſtence like Butter; but *Briſtol*-Water, refuſes all Admixtion with *Oil*, the ſame as common Water.

No *Salt*, of any Kind, is to be extracted from *Lime-water*, as the *Chymiſts* obſerve; but *Briſtol*-Water exhibits ſome *Salt* upon Evaporation, as appears by Experiment.

No Air-bubbles obſervable in *Lime-water*, as in *Briſtol*-Water.

A *So-*

A *Solution of corroſive Sublimate* turns of a deep yellow with *Lime-water*, with *Briſtol*-Water makes no Alteration.

Tinct. Mart. Mynſicht. turns red with *Lime-water*, with *Briſtol*-Water no Change in the Colour is made, any more than with common Water.

All which Experiments, and others that might be made, are enough to prove, that *Briſtol*-Water, and *Lime-water*, are two different Things; and that however they may agree in ſome Particulars, no Concluſion can be drawn from ſuch Agreement: For if they differ ſo much in others, we are ſtill in the Dark; and therefore may as well let the Compariſon alone. And thus other Experiments may be made to the ſame Purpoſe with other Subſtances, in order to prove whether the Water is imprægnated with them or not: And although it may be ſaid, that Nature may ſo blend Things together, or otherwiſe alter their Properties, that they ſhall not be diſcoverable in their natural Shape, this will not make theſe Experiments uſeleſs, becauſe, if ſo alter'd, they are not the ſame; which was all we un-

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undertake to prove by them. But I ſhall now proceed to conſider the Water in another Light, and endeavour to be a little more inſtructive.

The general Opinion concerning *mineral Waters*, has been, that they receive their Virtues from certain mineral Particles, taken up by them in their Paſſage through the Earth; and thereby differ from common Water, which receives no ſuch Imprægnation. Hence People have not only been inquiſitive into the Nature of the adjacent Soil, and into the Salts, and other mineral Subſtances, diſcoverable in theſe Waters, but have alſo taken upon them to declare, what Sort of Subſtances can imprægnate them, and what not. Thus for inſtance, they will allow of no Salts but ſuch as are foſſile, and naturally found in the Body of the Earth: And as to Metals, they tell you, that Water may be eaſily imprægnated with *Iron*, and *Copper*, becauſe the *Vitriol* of theſe Metals exiſts naturally in the Earth; but that *Gold*, *Silver*, *Lead*, *Tin*, &c. cannot communicate any Virtue to Water, becauſe there is no Vitriol of theſe Metals exiſting, but what is made by Art: And

Metals, unleſs they be firſt converted into Salt, *niſi ſolutis principiis*, as the *Chymiſts* ſpeak, cannot yield any Virtue to Water. They alſo allow, that Water may take up Earths, and Sulphurs; which latter, they ſuppoſe to be the Cauſe of all that Volatility and Heat which is obſervable in theſe Springs. And this is in ſhort the current Theory concerning mineral Waters; but labours with ſo many Difficulties, that I really wonder People have ſat down ſo contented with it.

For *firſt*, If Waters are imprægnated, from what they take up in the Channels though which they paſs; how is it that this is done ſo conſtantly, and ſo equably? Water having once found its Way, flows naturally in the ſame Channels, which muſt be ſoon exhauſted of every Thing that is ſoluble in it: And if it were not ſo, it is not to be conceiv'd, how it ſhould be equably ſupplied, at all Times, with that which gives Virtue to it; much leſs can the Heat of *mineral Waters* be accounted for, this Way: For if it ariſes from the Effervescence of Subſtances, which we find upon Experience to generate Heat, the Difficulty encreaſes upon us, how they can be *equably* heated.

heated. Add to this, that all ſuch Fermentation is but for a Time, whilſt the Conflict laſts; after that is over, the fermenting Parts remain dead and unactive, which makes the Thing incredible; becauſe we muſt not only conceive in this Caſe, a conſtant Generation of new fermenting Subſtance, but ſome Proviſion muſt be made, to convey that which has done its Work away, as waſte Rubble, and of no farther Uſe.

Secondly, as Salts are more ſoluble in Water, than any other Subſtances, it is reaſonable, upon this Suppoſition, to think, that thoſe ſhould be imbibed oftneſt, and in greateſt Quantity, which abound moſt, which is the *acid foſſil Salt*; and yet *Hoffman* ſays, no ſuch Salt is predominant in any *mineral Water* known. *Primus ego omnium fuerim, qui evidentiſſimè & momentoſis rationibus docui, quod in acidulis, minimè acidum, qua tale, ſed potius acido contrarium, alkalinum nempe, (tam terreum quam ſalinum) elementum, quod cum acido promptiſſime confligat, reperiatur* *.

* Hoffman de viribus fontium medic.

Thirdly,

Thirdly, As all theſe Subſtances, with which they ſuppoſe that Water is impræg-nated, are of a fix'd Nature, how is it that they do not appear upon Evaporation, or at leaſt in ſo ſmall and inſignificant a Quantity? Why it may be ſaid, they are volatiliz'd by the Admixtion of *Sulphur*; but although two or more Subſtances fermenting together, beget that which is volatile, yet as the whole is ſuppoſed ſoluble in Water, it is very ſtrange that nothing of theſe Subſtances ſhould be diſcoverable in it, either in a volatile, or fix'd State, and that *Sulphur* itſelf ſhould not be found in it, which the above-cited *Hofman* ſays, is ſeldom or never the Caſe.

What I believe has given great Occaſion, to this unſatisfactory Theory concerning *mineral Waters*, has been an Opinion that all *Springs* are from *Rain*; which if true, then theſe Waters muſt receive their Virtues in their Paſſage from the Surface of the Earth, to the Springs whence they ariſe. And this they think they are very ſure of, not only from the Laws of *Hydroſtaticks*, which forbid any Water to ariſe from beneath upwards, above the Level of the

Place from whence it comes, but alſo from *Experiment*; whereby they undertake to prove, that there is a Quantity of Rain falling yearly, ſufficient for the Supply of all *Springs* and *Rivers*, though we allow two Thirds of this Quantity, to be conſumed by *Vegetation* and other *Evaporation*.

And this indeed ſeems to anſwer one conſiderable Objection made againſt *Springs* being from *Rain* only, *viz.* that the Rain was not ſufficient for the Supply of them; and by the generous Allowance they make for Evaporation, of two to one, it is not to be wonder'd that the candid Reader is convinc'd. But this *Experiment*, upon a cloſer Examination, will not hold; for it is proved by *Gualtieri**, that the Quantity conſumed in Vegetation only, is more than the whole of what they obſerve to fall: Nay, that upon a moderate Calculation, the Rivers which run into the Sea, exceed this Quantity two to one; not to mention the Article of Evaporation ſingly, excluſive

* *Reflеſſioni ſopra l'Origine delle Fontane*; publiſhed at *Lucca*, 1725; printed in the *Journal des Scavans*, and tranſlated in the *Memoirs of Literature* for *Auguſt*, 1725.

of

of *Plants*, which he alſo proves to exceed the Quantity of Rain which falls, and thereby entirely overthrows the Force of this Experiment, however plauſible it may ſeem at firſt Sight: And indeed if Rain deſcended according to the Laws of *Hydroſtaticks*, in Supply for *Springs*, and this was the only Cauſe of them, I cannot ſee how the higher Parts of the Earth could be ſupplied with Water. By the higher Parts of the Earth, I do not mean *Mountains* and *Hills*, but thoſe Parts near the *Equator*, where, according to late Obſervations, the *Diameter* of the Earth is greater than elſewhere, and the Land too high to receive Water from other Parts, though it needs it more than any. And as I think I have greater Authority than any Philoſopher can bring, to be of a contrary Opinion, I ſhall proceed upon the old Doctrine, of an *Abyſs* in the Centre of the Earth, and Waters coming from thence, againſt all the Laws of *Hydroſtaticks*, and declarative of the Almighty Hand which has ſo ordered it.

I do not mean that *God* is here the immediate Agent, but that it is performed by natural Cauſes, far beyond the Reach of

what is to be learnt from *Hydroſtaticks.* And here I cannot but take Notice, of the modern Way of explaining the grand Operations of Nature, by the common mechanical Principles, eſtabliſhed in Arts and Sciences; and from theſe low limited Appearances, accounting for the moſt wonderful *Phænomena* in Nature, and ſo giving Laws to God, inſtead of *Glory.* If theſe Gentlemen would return to the firſt *Elements*, and not deſpiſe what has been taught from all Antiquity——* *Quod initia vel elementa rerum ſunt* aer, ignis, aqua, & terra; *è quibus* aer, & ignis, *movendi vim habent, & efficiendi: reliquæ partes,* (*nempe* aqua & terra) *accipiendi, & patiendi;* they might be nearer the Truth, at leaſt not liable to that moſt juſt Rebuke, which *Cicero* gives the Philoſophers of his Time,——† *Quod cùm in rerum naturâ duo quærenda ſint,* unum, *quæ materia ſit, ex quâ quæque res efficiantur:* Alterum, *quæ vis ſit, quæ quidque efficiat: de materiâ quidem diſſeruerunt, vim & cauſam effi-*

* Ciceron. Acad. Quæſt. Lib. 1.

† Cicero de Finibus, Lib. I. towards the beginning; the whole Paſſage is well worth reading.

ciendi

ciendi reliquerunt; which, he ſays, was then (as now) the *commune vitium.*

But to proceed; if we believe that there is a Collection of Waters in the Body of the Earth, which gives Supply to Springs and Rivers, as the *Scriptures* teach, we are no longer confined to the ſcanty Drainings of what Rain can bring, in its Deſcent from the Surface of it, but we have the whole Globe to range in; whence we may with greater Probability expect Supplies, both conſtant and ſufficient, for the Impræg-nation of *mineral Waters*; and that not, as I conceive, in the Manner which has been imagined, by the Water being imprægnated with *Salts*, and other mineral Subſtances, but chiefly by Means of *imprægnated Air.*

But before I proceed, I muſt beg Leave to obſerve, that this Doctrine of the Cir-culation of Waters, from Center to Cir-cumference, is of great Antiquity; inſo-much that * *Homer* and † *Plato* expreſly

* μέγα σθένος Ὠκεανοῖο
Ἐξ ὕπερ πάντες Πόλαμοὶ καὶ πᾶσα θάλασσα
Καὶ πᾶσαι Κρῆναι καὶ φρείατα μακρὰ ῥέουσιν.
Il. φ. 195.

† Εἰς τοῦτο τὸ χάσμα συῤῥέουσί τε πάντες οἱ Πόλαμοὶ,
Καὶ ἐκ τούτου πάλιν πάντες ἐκρέουσι.
Plato in Phædon. ad finem.

declare

declare it; which I the rather mention, becauſe it looks as if they had it from Tradition; for had they been left to their own Imaginations, it was very natural for them to conceive, as many do now, that all Springs were from Rain; but they could ſurely never have thought of an *Abyſs*, and Waters coming up from thence, unleſs they had been told ſo.

That Air penetrates, and paſſes through the whole Body of the Earth, is proved by * Dr. *Woodward*, that it pervades Water, and circulates with it, appears partly from the Nature of Springs, which are for the moſt part very full of it, and partly from what is obſerv'd by *Miners*, that they never want a Supply of freſh Air, where there is a Flow of Water, even at the greateſt Depths; and it is well known, that *Fiſhes* live at the Bottom of the Sea, which they could not do, without Air. Nor indeed can I well conceive, how Water ſhould be preſerv'd from Corruption without it: For ſo far as we can judge by Experiment, Air is the Life of Water, and what chiefly conſti-

* Natural Hiſtory of the Earth illuſtrated; *vid.* Letters in the Preface.

tutes

tutes the Difference between that which is wholeſome, and that which is not.

But if Air pervades Water, and circulates with it, it is plain that if this Air is imprægnated with any mineral *Effluvia*, the Water will be ſo too, by Reaſon of the Air included in it. That theſe mineral Fumes are here and there to be found in great Quantities, in the Body of the Earth, appears from divers *Exhalations*, *Exploſions*, &c. obſervable both above Ground, and below: And as we obſerve that *Stones*, and *Ore*, at the Bottom of deep Mines, are very hot; and that the lower we go, the hotter it is: As alſo, that *Vapours* ariſe with greater Force from beneath, upwards; it is reaſonable to think, that Heat is diſſeminated thro' the Body of the Earth, and moves from within, outwards; and that this is the Power by which Waters riſe, and Minerals are put in Action: And as this Heat is in ſome Places encreaſed to a very high Degree, by Means of inflammable Matter, which if it meets with, is eaſily actuated and put in Motion by it, and might endanger an Exploſion, were not ſome Vent provided for it, this Inconvenience is

prevented by Means of Springs, which ſeek their *Exit* from within outwards, and convey with them vaſt Quantities of Air, which, by being pent up in the Body of the Earth, might otherwiſe be of evil Conſequence: So that the Channels thro' which Springs flow, may be conſidered as ſo many Vent-holes, (*quos aquæ ſubeunt et auræ*) ſerving to give Paſſage to that which would otherwiſe be deſtructive of the Whole.

It is highly probable, that common Springs, carry nothing but common Air. Mineral Springs, Air replete with Mineral *Effluvia*, though not of ſufficient Activity to communicate any Heat to the Water: But others, there are, which are not only imprægnated, but alſo heated from this Cauſe; and neither of theſe, I ſay, receive their Virtues, or their Heat, from Salts or other Subſtances ſoluble in them; but from Air, replete with Mineral *Effluvia*, which inſinuates itſelf into them, and intimately unites with them, and very often heats them; ſo that we are no longer confined, to a few natural Products of the Earth, diſſolvable in Water, and ſuch like unactive Principles; but are open to all that Heat itſelf can produce, from any mineral Body whatſoever.

But

But it may here be asked, how I account for the *equable Heat* and Impregnation of theſe Waters, and whence it is that I expect a continual *Supply*? But as I do not exerciſe myſelf in great Matters, which are too high for me, I do not pretend to a full and ſatisfactory Anſwer, only ſhall propoſe what appears to me to be moſt likely, leaving it to the Judgment of the Reader.

Firſt then, as to the continual *Supply* of this mineral Matter, I think it may in ſome meaſure be conceiv'd, by what is obſerved of Mount *Ætna*, *Veſuvius*, and other burning *Volcano's*, which continually ſmoke, and ſend forth, at all Times, large Quantities of combuſtible Matter. Theſe are what I call dry *Vent-holes*, and are ordained for the ſame Purpoſe as the *watry ones*; and if theſe are actually ſupplied at all Times, and in all Ages, with ſuch large Quantities of mineral Matter, may it not be conceiv'd from hence how *Springs* may be conſtantly ſupplied with much leſs Quantities of it?

But altho' the conſtant *Supply* may be thus accounted for, it is well known that theſe *Volcano's* ſend forth very different

Quantities of this combuſtible Matter, at different Times; and therefore a further Queſtion will ariſe, how Springs are *equably* ſupplied, and thereby equably heated? And here I beg it may be obſerv'd, that I do not conceive *mineral Waters* to be imprægnated in the narrow Parts of their Channels, as they paſs along; but by Means of ſome *cavernous Hollow*, through which they run, and in which they receive their Virtues; which *Caverns*, being ſuppoſed full of mineral *Effluvia*, I ſay, the Water will be equably imprægnated, either if the Air encloſed, is kept in an equable Degree of Heat, or the Water is ſaturated; both which are poſſible Caſes. By *Saturation*, I mean the taking up as great a Quantity as the Water will bear; in which Caſe, as here is mineral Matter ſufficient, the Water will be always ſaturated, and ſo carry a like Quantity at all Times.

All *mineral Waters*, then, ariſe either from imprægnated *Water*, or *Air*, or *both*. By imprægnated Water, I mean Water imprægnated with any Subſtance ſoluble in it; and under this Head may be rank'd all ſuch as owe their Virtues to Salts, tho' Air is probably aſſiſting to moſt of them. By im-

imprægnated Air, I mean Air imprægnated with any Fume which Air can take up, and intimately united with the Water; which is the Caſe of the *Thermæ*, and all other *mineral Waters* not of the ſalt Kind. And as all the Appearances obſervable in theſe Waters, anſwer to this Account given, better than to any I have yet heard of, the Recital of a few of them, may give ſome additional Proof, to what has already been advanced.

Hence then we learn, why that which gives Virtue to mineral Waters, is of ſuch a volatile untenable Nature, that it ſo eaſily evaporates, and can by no Art be drawn forth, and exhibited to View. Did the Virtues of theſe Waters depend upon any Subſtances ſoluble in them, one would imagine ſomething of a fixed, or volatile Nature, might be extracted from them, in which we might perceive the like Properties; but if Air is the Agent, the *Chymiſt* will never be able to analyze it into its compounding Parts.

Hence alſo we learn the Reaſon why we can by no means imitate theſe Waters, by any Compoſition of our own making;

even where, from divers concurring Circumſtances, we can give a good Gueſs at the Mineral predominant in them. Thus, for inſtance, in *chalybeate Waters*, tho' we are pretty well aſſured they are imprægnated from *Iron*, yet they contain nothing of Iron, *qua tale*, but only a volatile Fume of the chalybeate Kind, which we cannot equal by any Preparation of it whatſoever.

Hence alſo appears the ſuperior Virtues of theſe Waters to other Medicines; we not being able to ſubtilize Bodies, much leſs enliven and imprægnate Air, as Nature does. And when I conſider *mineral Waters* as giving Vent to heated Air, which would otherwiſe be our Ruin; and at the ſame time pouring forth upon us, the ineſtimable Bleſſings of Health, I cannot help looking up to Him, in whoſe Hands are the viſible and inviſible Parts of this Globe, and of whoſe Wonders it may be ſaid, in a much ſublimer Senſe than the Poet,

Quantum vertice ad auras
Æthereas, tantum radice ad tartara
tendunt.

Laſtly,

Laſtly, we learn from hence the Cauſe of the great elaſtick Force of many of theſe Waters; inſomuch that they cannot be bottled immediately from the Spring, for fear of burſting the Bottles: And indeed I know not of any one *Phænomenon* they exhibit, which is not fairly accountable from Air within them, *eas occultè exagitans & medicans.*

But it is now time to make ſome Application of this to *Briſtol*-Water, which I believe to be a moſt pure light Water, as free from Recrements as any Water whatſoever; which appears from its carrying uncorrupt round the whole World, and receiving no Alteration, as other Waters will, from hot Climates; nor do I think its Virtues depend upon any Imprægnation of the Water, but upon *imprægnated Air*, which it is very full of, as may be obſerved at the Pump, by the numerous Air-bubbles that are in it. What it is that imprægnates this Air I do not pretend to ſay, and therefore have taken a different Method of declaring my Sentiments of it, chuſing rather to enquire what its Virtues really are, than on what Principles they depend.

And

And thus having finiſh'd what I had to ſay, I ſhall conclude with obſerving, that as the Parts of *Animals* and *Vegetables* found in the Body of the Earth, bear Witneſs to the Scripture Account of the Deluge, ſo *mineral Waters*, which cannot be explain'd without Circulation of Water from beneath, upwards, ſeem to me to be a ſtanding Evidence, among other Things, of the Truth of *Holy Writ*, in regard to what it ſays concerning the Bleſſings of the Deep, againſt thoſe *Naturaliſts*, who teach that all *Springs* are from Rain only; and ſo pronounce upon God's Works, without attending to his Word, even in thoſe Matters in which it is clear and expreſs.

My Deſign in the foregoing Treatiſe, has been to acquaint *Phyſicians* with the true Virtues of *Briſtol*-Water; who, as they live at a Diſtance, and cannot inform themſelves in many Particulars, muſt depend chiefly on the Relation of others. Were there any Thing extant on this Subject that gave me Satisfaction, I ſhould have ſpared myſelf this Trouble; but when I found, that the Books wrote for this Purpoſe, were very deficient in many Points, and I was

ſettled in this Place, and owed my Life, in great meaſure, to this Water; I thought it might be commendable in me to take ſome Pains in this Matter, and employ my leiſure Hours upon a Subject, in which my buſy ones were like to be ſo very converſant. I know the World too well, to commence Author out of Intereſt; nor am I Fool enough to have any Vanity this Way; If my Readers will accept of what I have done, as a *tabula votiva*, given out in Acknowledgement of the Eſcape I have had, the Thing ſpeaks itſelf, *Hoc ego* putabam *eſſe omne ingenui atque liberalis animi officium.*

I have examined into the Virtues of *Briſtol*-Water, according to the Plan laid down in my Preface; and have gone through this Subject, in a manner which has indeed been pointed out by many before me, but never as I know of actually purſued, by any; and which, I hope, may ſerve as a Direction to others, who ſhall take upon them to explain the Virtues of other mineral Waters.

I have in the Courſe of this Treatiſe, conſider'd a *Genus* of Diſtempers, ariſing from

from Acrimony; and have ſhewn that it is the latent Cauſe of *Hectick*s, *Diabetes*, *Conſumption*, and ſeveral other different Species of Diſorders.

I have alſo taken Notice, that it is not Acrimony, as ſuch, which is the Cauſe of theſe Diſeaſes, but that Sort of Acrimony only, which tends to quicken the Circulation, and encreaſe the Secretions: And in ſo doing have, I hope, ſettled the true Uſe of *Briſtol*-Water, by declaring the very ſpecifick Caſe which it is good for, *viz.* *Acrimonia cum ſecretionibus auctis*; or what I call in *Engliſh*, a *Hectical Acrimony*.

The Freedom I have taken in cenſuring the Opinions of others, will not, I hope, be imputed to any Inclination I have to ſhew my Diſlike and Diſapprobation of what they have ſaid, but rather to the Nature of my Subject, and the *Enquiry* which I profeſs to make in my *Title-Page*.

F I N I S.