

A treatise on the origin, nature and virtues of chalybeat waters, and natural hot baths. With a physico-chemical analysis, and medicinal description of the mineral waters at Tunbridge ... Islington, and Shadwell ... with others ... in England: and ... at Cleves in Germany. Likewise, directions for the preparation and use of artificial, hot, mineral-water-baths. To which is added, an appendix, on the Selter water, with ... remarks ... on it's [sic] mixture with tar-water. And also a dissertation on Baron Schwanberg's Liquid shell. With the process for preparing the same. To which is annexed, occasional remarks and queries on the Glastonbury waters / [Diederick Wessel Linden].

Contributors

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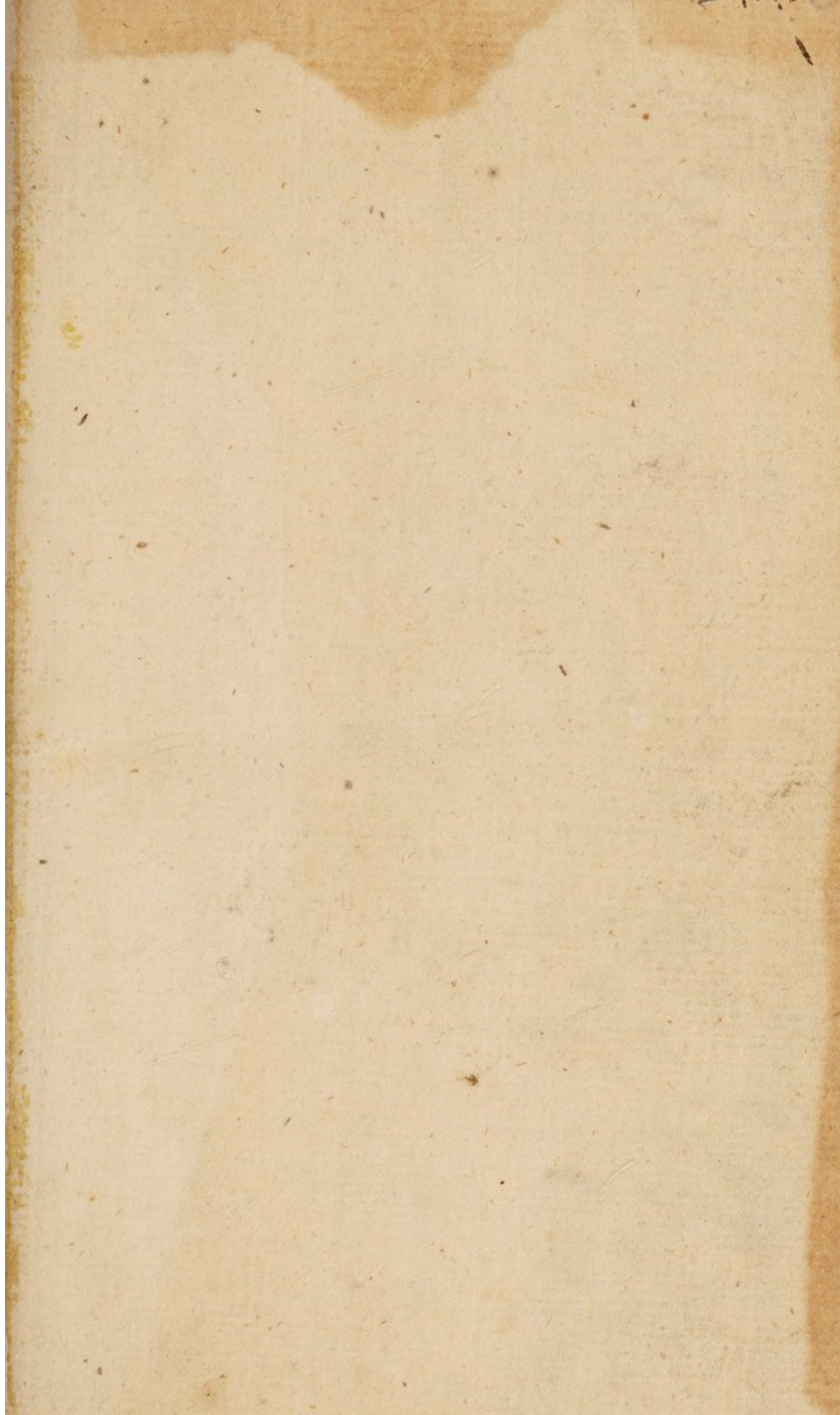
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S. Tibert Inv.

P. Rylof Sculp.

A
T R E A T I S E
 ON THE
ORIGIN, NATURE, and VIRTUES
 OF
CHALYBEAT WATERS,
 AND
NATURAL HOT BATHS.
 WITH A
 Description of several MINERAL WATERS in
 ENGLAND and in GERMANY.

LIKEWISE,
 Directions for the *Preparation* and *Use* of ARTIFICIAL,
 HOT, MINERAL-WATER-BATHS.

To which is added, an

A P P E N D I X,
 ON THE
S E L T E R W A T E R,
 WITH
 Many REMARKS, especially on it's Mixture with
 TAR-WATER. And also a DISSERTATION on
 Baron SCHWANBERG'S

L I Q U I D S H E L L;
 With the PROCESS, for preparing the same.
 To which is annexed,
 Occasional REMARKS and QUERIES on the
GLASTONBURY WATERS.

By DIEDERICK WESSEL, LINDEN, M.D.

THE SECOND EDITION.

L O N D O N :

Printed for T. OSBORNE, in *Gray's-Inn.*
 MDCCLII,

ELLCOM





TO HIS
Most SACRED MAJESTY,
FREDERICK the Second,
KING of PRUSSIA, &c.

S I R,



WITH the most profound
Humility, I beg your Roy-
al Permission to lay the fol-
lowing Papers at your Feet.
Nothing could have encouraged me to
so much Presumption, but the Know-
ledge of that *Unbounded Goodness* and
Humanity in your MAJESTY, which
Fame has resounded throughout the
World.

As a considerable Part of this Work
is intended to explain the Virtues, and

DEDICATION.

render the *Uses* more extensive, of those *Medicinal Waters* in your MAJESTY's Dominions of CLEVES, whose *Sovereign* Qualities have been render'd so notable by Experience ; I have presumed that their own SOVEREIGN was most rightfully entitled to this Humble Register of their Merits.

Your MAJESTY will, I hope, pardon this Presumption, the Effect of a constant and ardent Zeal for your Prosperity and Renown, in

Your M A J E S T Y's,

Most Obedient,

and most humbly

Devoted Servant,

Diederick Weffel Linden.

T H E
P R E F A C E.

*B*OOKS that are intended, as this is, for the Good of Mankind, need little or no Preface. They generally stand or fall by the Weight or Goodness of their Contents. But unhappily, in the Promulgation of sundry Opinions advanced in the Course of the following Treatise, I have not only inveterate Prejudices of all Sorts to encounter, but what is yet more to be apprehended, the Interests of numerous Bodies of Men to contest with : Bodies of Men, I say, to whom the Public will chiefly resort and appeal for their Decisions on a medicinal Subject, and who are evidently interested to decry, ridicule, or by any Means overthrow the Truths and experimental Practice I have laboured in the following Sheets to inculcate and establish.

T H E Chemist, the Apothecary, the Physician, has each in his respective Province strong Motives to oppose the general Acceptance and Use of Mineral Waters.

T H E Chemist must tremble for his Trade in Drugs, the Apothecary for his Trade in the Dispensatory Way, and the Physician for fear of losing the local Advantages, which he draws from his residing in the same Place with his Patient, whom he is unwilling to send from under his Hand, and out of his Way, in quest of Health.

T H U S it has often happened, that chronical Disorders, which might easily have been removed in their Infancy by a proper Application to proper Mineral Waters, or the Hot Baths, have been tampered with, or treated unavailingly by the Physician, till they have become inveterate and unconquerable; but when the Passages and Canals of Life are irremediably worn out, abraded, or destroyed; when the Juices are thoroughly vitiated, and the Hand of Death is on the poor Patient, the Physician then indeed will order the Mineral Waters in dernier Resort; by which Means they have often been accused of Inefficacy in Distempers, only because those afflicted by them resorted to them too late, when all Hopes of Cure ought to have been given up. And these Examples have been drawn thus into false Conclusions against them. Patients are indeed too often sent to die at the Mineral Waters; as it was, I am told, once a Fashion to pronounce Sentence of Death on them, by advising them to go to Kensington Gravel-pits, for a Change of Air.

T H E

THE Choice of Mineral Waters is also a Point of great Consequence ; for as they vary ad infinitum, and are in great Abundance, all over this Kingdom especially, it would prove of great Advantage to the public Health, if a regular Pursuit of the Study of them, and Courses of Experiments and Lectures were set up by public Encouragement, for acquiring a more perfect Knowledge of the abstruse Wonders of these great Magazines of Nature's Dispensatory, and chemical subterranean Laboratories.

I MAY have a just Apology to make for the Language throughout the Book, which the candid Reader will forgive, when he is acquainted that I am a Foreigner, of no long Sojournment in this Country, and have attempted to write in its Tongue ; because the Gentlemen, who I may say have forced me on this Publication, would not permit me to wait the Time necessary, to have it translated from any other that I was more versed in. I hope then that any Errors of Diction, Phrase, or Stile, will not be made the Objects of Censure ; since I have taken all possible care of the Choice and Exactness of the fundamental Points, experimental Truths, and physical Reasonings throughout the same.

AS I have received singular Marks of Favour and Distinction from many Gentlemen of Worth and Character, who connected their Encouragement of me with their Well-wishing to the Good

of their Country; I shall be extremely solicitous, before I leave it, to repay them in the Way they will most like, by communicating certain beneficial Hints and Improvements in the Mineral-lurgy and Metallurgy of this Kingdom, which as I have before observed, in my Letter to Mr. Hoofon, is a Science in its Infancy here, or at least far from being arrived at the Perfection it is, in some other Countries; important as it is to all, and to none more than this Nation, which, to a Moral Certainty, abounds with many undiscovered Natural Secrets in the Mineral Kingdom.

BUT as I have here mentioned, with due Sense of Gratitude, my Obligations to many generous Gentlemen; and in my Preface to Mr. Hoofon's Letter, as well as in this present Work, hinted at the Severity of my Enemies; insomuch, that I apprehend a more particular Explanation thereof might be now expected from me, I conceive this to be an improper Place to expatiate thereupon; and shall in a particular History, which I am now preparing for the Press, lay before the Public an impartial Account of all the Transactions, I have had here in England. In the mean Time I remain the most zealous and affectionate Well-wisher and Devotee to this Nation.

ADVERTISEMENT.

The following Pieces being sent to the Author by some of his Friends and Well-wishers, he hopes it will pass for no Mark of Vanity, that, yielding to his Desires of giving them this public Proof, how much he holds himself obliged to them, he sacrifices to his Gratitude the Danger of the Public misconstruing his Motives; to whose Candour therefore he humbly recommends himself.

D. D. DIEDERICO WESSELO LINDENO,
Philosophiæ & Medicinæ Doctori.

Ἀριστον μὲν ὑδῶρ.

Q U A M celebrem LINDENUM ominor !
 sperare salutem

Qui docet ex lymphis quas DEUS ipse dedit,
Anglia quas fundit, *Germania*, *Prussia*, vel quas
Clivia largitur, terrave tota tenet.

Maximus hic MEDICUS *Naturæ* condita pandit,
 Et mira mundum divitat arte sua.

JACOBUS PATERSONUS, A. M.

*To the Learned Dr. Linden, on his
 Treatise on Chalybeat Waters.*

W I T H healing Wings, intent on *doing
 Good,*

An *Angel* visited *Bethesda's* Flood ;
 Quick as the Morning Ray, or Ev'ning Beam,
 Himself diffusing through the vital Stream :
 The Sick who drink, the Impotent who lave,
 Dive from Diseases, and deceive the Grave.

Tho' *Miracles* be ceas'd, yet All confess,
 Your *Work* and you are—*only something less.*
 So much is to your Worth and Learning due,
Bath is *Bethesda* ; the *Good Angel*, you.

Bath, Oct 8,
 1748.

WILLIAM THOMPSON.

To Dr. Diederick Wessel Linden, on
his Publication of a Treatise upon
Medicinal Mineral Waters.

TOO long had Physic lagg'd in Fetters
bound
Of empty Forms, Grimace, and senseless Sound ;
Each new *Hypothesis* enjoy'd its Day,
Whilst Deaths unnumber'd mark'd each Ty-
rant's Sway ;
When now at length a few like *thee* arose,
By Genius fir'd, th' Usurpers to depose,
And put to death the Errors of the Schools,
Whilst only *Quacks* are left to kill—by Rules :
For now *Hippocrates* revives again,
His Spirit breathes afresh in *Pæan's* Train ;
'Midst whom the *Muse* selects thee for Ap-
plause,
Pleas'd to observe thee true to *Nature's* Laws ;
Pursue her with *Experience* for your Guide,
Through each Recess, where coy she strives
to hide.
The *Mineral Kingdoms* are, by Conquest,
yours,
Where Earth in vain her choicest Stores
observes ;
To Public-View you drag the hidden Hoard,
Nor let one useful *Mine* lie unexplor'd,
You praise no Waters but have stood your Test,
And under chemic Tortures Truth confess'd.
Your Wand of Knowledge strikes the *mystic*
Rocks,
And *Moses-like* the saving Springs unlocks ;
Whilst

Whilst *Rules* so clear your just Instructions give,
 Like *his* your Follow'rs need but *drink* and *live*.
 Proceed then! learned *German*, o'er our Land
 To spread thy Labours with a lib'ral Hand;
 Nor fear that *Britain* will ungrateful prove,
 To Merits which 'tis *Britain's* Boast to love;
 A Love that *Foreigners* have well repaid,
 Whose *Arts*, rewarded, rich Returns have made;
 Encourag'd here, *Discov'ries* daily spring,
 And gain *Perfection* under *Freedom's* Wing;
 And who should more the public Favour share,
 Than such as *thee*, who make its *Health* their
 Care?

St. James's Place,
 Oct. 1, 1748.

J. C.

To my Friend, Dr. Linden, on his
 Treatise upon Medicinal Mineral
 Waters.

GREAT Nature various *Talents* gives
 Mankind,
 To some a peaceful, some an active Mind;
 With this, she bids to hostile Fields prepare
 Each dire Attendant of destructive War,
 With that, her choicest Blessings to bestow,
 Well pleas'd, she gives the *Lib'ral Arts* to know.
 Kindred of these, is what thy Studies claim,
 In tracing which, you tread the Paths of Fame.
 Great Parent-Nature! Physic's surest Guide,
 Bids you by what she dictates still abide;

Bids

Bids you explore the *Secrets* Earth contains,
 Pierce her hid Wonders thro' her varying Veins;
 By Trial skilful, prove what you assert,
 Strike dumb each envious, 'wake each gen'rous
 Heart.

To thee is dealt the bounteous *Gift* to show,
 How *Streams* of Health in *Min'ral Waters* flow,
 While all, their wond'rous Virtues counting o'er
 Thy strict Essays, their healing Pow'rs explore;
 What direful Ills, by this, or that's remov'd,
 On Truths firm-fix'd, and by Experience
 prov'd.

Thy Labours various, various Ways proclaim,
 Mankind's chief *Good* is thy peculiar Aim;
 For which my *Muse* unskill'd, in artless Lays,
 Yields thee the grateful Tribute of her Praise.

Temple, Sept. 25,
 1748.

T. L.

To his learned and ingenious Friend,
Dr. Diederick Wessel Linden, on
his Treatise of Mineral Waters.

OUR *Springs* and *Speech* may some Re-
 semblance claim;
 They change their Conduits, but preserve their
 Name.

OUR *Language* has from its first Fountain
 sprung,
 Thro' *British, Saxon, and the Norman* Tongue;
 Refining

Refining, as, from Age to Age, it rolls,
 'Till the clear Mirror images our Souls ;
 'Till Periods, sometimes so harmonious fall,
 Their very Cadence is Rhetorical :
 Our *Waters* so, form their *meandrous* Course,
 Thro' *Salts* and *Sulphurs*, and *Chalybeat* Ores ;
 Thro' echoing Caves, their tinkling Progress
 take,
 To their own *Musick*, their Procession make ;
 Reflecting, as, from Scene to Scene they stray,
 Each Object on their Surface, they survey ;
 Digesting the Ingredients NATURE lent,
 And *Cordials* grow, that were mere *Element*.

VARIOUS Complexions then our Eyes en-
 thrall ;
 She wears all Colours, and she cures in all.
 When, from her *Veins*, the brilliant *Nectar*
 teems,
 Her Entertainments made of *Liquid Gems* ;
 A richer Draught than *Cleopatra's* was,
 We think dissolved *Diamonds* in the Glass ;
 And when it sparkles with *Cærulean* Blue,
 That she its Tincture from the *Sapphire* drew ;
 Or, when in *Shadwell* Streams, our Cup she
 dips,
 The molten *Topaz*, flowing at our Lips :
 Cou'd *Midas* at that *Golden Stream* arrive,
Midas might wish, yet *Midas* drink, and live.

SUCH precious Banquets NATURE makes
 her Guest,
 But You prepare, and order all the Feast.

Who

Who spreads her Dainties, is her Darling
 crown'd,
 Charm'd most with those, who most her
 Charms resound.
 Hence *Quarries* open, hence her *Fountains*
 flow,
 With *subterraneous Treasures*, kept for you.
 You delve the *Mines*, and multiply our
 Wealth;
 You dive the *Waters*, and recruit our Health.
 Such *Volatiles*, by you, so fix'd we find,
 You'd fetter Floods, that *Xerxes* cou'd not
 bind.
 Had you *Alpheus* been, who long in vain
 Coy *Arethusa* chac'd, to heal his Pain;
 Your close Pursuit wou'd soon have stopp'd her
 Path,
 She soon turn'd River, but to be your Bath.
 The *Naiads*, tho' long buried and unknown,
 Summon'd by your enchanting Arts alone,
 Rise from their Graves, to keep us from our
 own.
 Long may he live, who by such Arts combin'd,
 Illustrates N A T U R E, and relieves M A N -
 K I N D.

A N D when no more these *Earthly Streams*
 afford
 That Health to him, to others they restor'd;
 When *Galen's* Sons shall his sad Loss deplore;
 His Skill, in Consultations, reap no more:
 When the *Castalian* Nymphs, in mournful
 Tale,
 The *Universal Friend's* Departure wail;
 Seraphs

Seraphs, to deck them, and emblaze his Fame,
 Shall o'er the Skies bespangle LINDEN's Name:
 In glittering Characters, it there shall shine,
 A *Constellation* in the *Watry Sign*:
 While, bath'd in Bliss, he wafts at full Content,
 In *Heavenly Streams*, above the Firmament.

Gray's-Inn,
Sept. 20, 1748.

W. OLDYS.

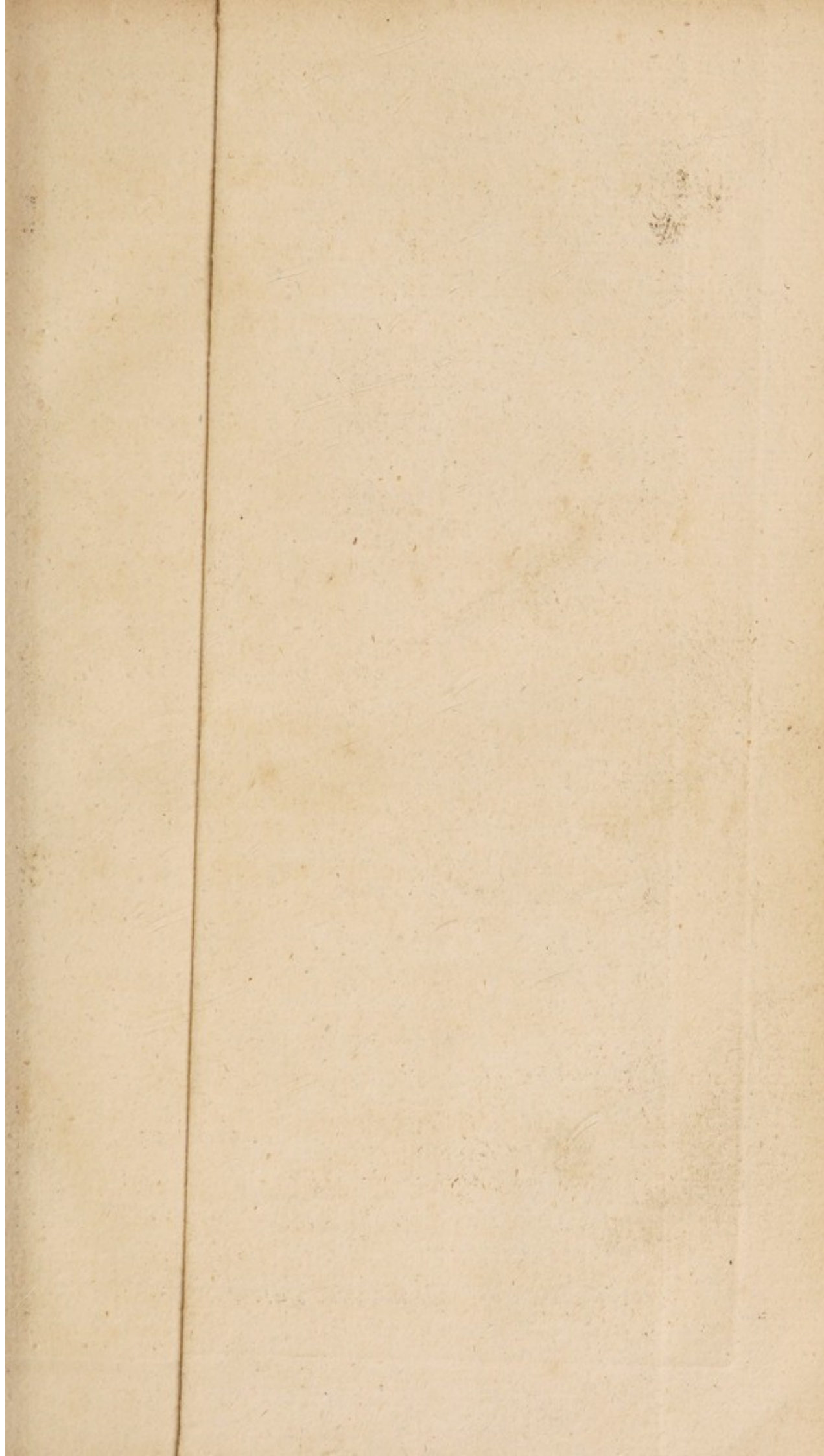
Ad clarissimum Medicum & ingenio-
fum Chemicum, Diederick Wessel
Linden, M. D.

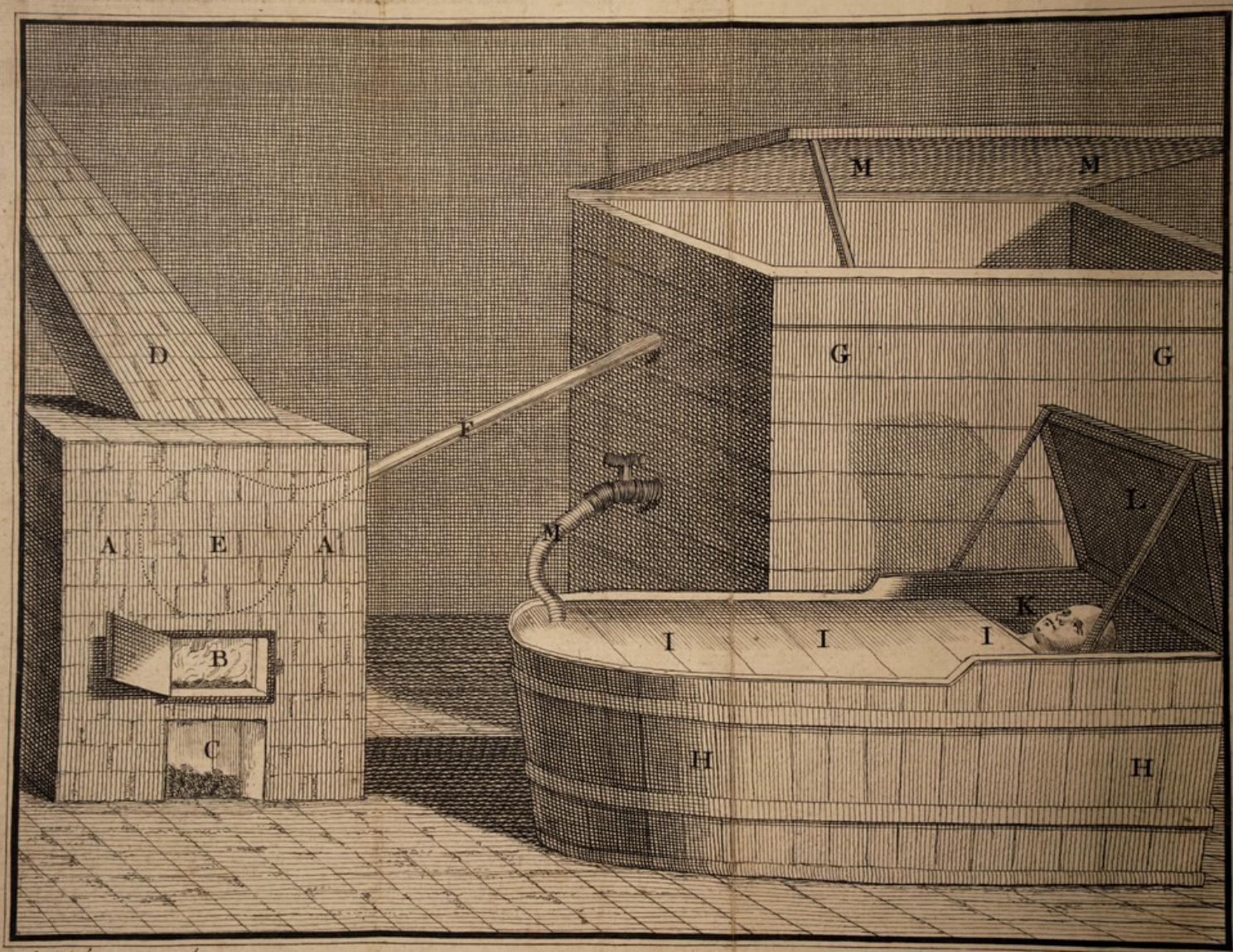
F O E T A salutifero tu pocula fonte mini-
 stras ;
 Mittimus, e contra, nos *Heliconis* aquas.

Limpfield,
Octob. 2, 1748.

J. JONES, A. M.







P. Tibert Inv.

P. Rybot Sculp.

CHAP. I.

The Chalybeats, or Spaw-Waters in General, considered; what they contain, and from whence their Origin and Generation are derived.

C*halybeat, or Spaw-Waters*, by the Ancients called *Acidulae*, are sufficiently known; and, to the best of my Information, no less than forty or fifty different Authors, in this Kingdom, have wrote upon them, and the warm Baths, by the Ancients called *Thermæ*, within these last Hundred and Fifty Years. Several of these Authors have examined these *Chalybeat* Waters, and have given us some Analyfations of their constituent Parts; but so imperfectly, that they have, either by supposing some Ingredients which are not, or disregarding others, which are in their Composition, drawn such erroneous Conclusions of their Virtue or Application, that I dare venture to say the Advice frequently given to the Afflicted, for the Use of these Mineral Waters, is not, to this Day, built upon a rational System, but chiefly founded upon an Emperical Notion, That they frequently before have removed, or given Relief in such Diseases, wherewith the Patient

is supposed to be afflicted, and therefore he must go on in the same Road: And this is chiefly the Foundation for the Advice to, and Use of the *Chalybeat Waters*.

Or if it should happen that the Physician, under whose Care the Afflicted is, should, upon the Credit of famous Writers, suppose a certain Ingredient in this Water Concrete, fit to remove his Patient's Distemper; and this same Ingredient is judged, in some other Distemper he may be at the same Time grieved with, very pernicious or prejudicial; and yet both Diseases may perhaps, and have been, at different Times, removed by the *Mineral Waters*: And at last it shall be found the supposed Ingredient cannot possibly exist in those Waters, I will in this Case leave it to the Decision of impartial Judges what Mischief these Misconceptions may occasion.

To prove this my Assertion, I have a very modern and eminent Example before me. My famous Countryman Dr. *Hoffman* positively affirms, That *Chalybeat Waters* contain a great Share of *Alkaline Salts*. His learned and ingenious Translator has not rectified this Error, but rather supports Dr. *Hoffman's* Notion in this Respect. I doubt not in the least, that several Physicians who read these two Great Men's Works, take it at once for granted; and such Patients, whose Cases they suggest require that imaginary natural *Alkaline Medicine*, are ordered to these Waters. They may sometimes have the Happiness to restore such Patients, which then is immediately

immediately attributed to this whimsical natural *Alkaline* Salt, and called a self-evident Proof, without further Search for the real Cure; but as there is not a Grain of *Alkaline* Salt in all the *Chalybeats* or *Spaw-Waters* in *Europe*, which I shall prove hereafter; I appeal to the Judicious, if this is not going too far upon Trust, and therefore, whether it is not forthwith necessary to make such further, or different Examination of these Waters, as may enable us to account for their Efficacy from other Principles, to which their Virtues may be more truly attributed.

There are some other ingenious Gentlemen who have fancied the *Chalybeats* to be impregnated with Nitre or Salt-Petre, and with many Salts more. A learned and eminent Physician gives us, in his History of Mineral Waters, several Sculptures, representing the Crystals produced out of the Waters he has examined, in which he seldom forgets the Nitre or Salt-Petre, as one of them; but he has so many Salts, that he hardly can find Names for them all. Therefore, to prevent any further unnecessary Trouble therein, I shall endeavour to demonstrate the Impossibility of any Nitre or Salt-Petre existing in the *Chalybeat* Waters.

It has always seemed an Impropriety to me, to name one Part of a certain Mixture by a Name that is due to a Compound, where this is only but Part thereof. And so improperly do those Authors write, who assert that there is a Vitriol in the *Chalybeats* or *Spaw-*
B 2
Waters,

Waters, when the *Acid* of Vitriol alone is to be found therein. How unreasonable is it then to call this *Acid* a downright Vitriol? Would not the Brewer be laughed at if he called Water Beer, though Water is the chief Ingredient? But it cannot be called Beer, unless the whole Mixture is compleat: I think the same of Vitriol.

Other Writers deny the Assistance of the Air in the Generation of the *Mineral* or *Spaw-Waters*, as being unfit for conveying the Acids and other Volatile Spirits, and uniting them with the Water. An eminent Gentleman of the Faculty, for whom I have a great Esteem, confesses himself at a Stand in this Respect, and complains that he is at a Loss for an Examination of this *Acidum vagum*, as it is sometimes called: To render it therefore sensible to the Public Ideas, I shall endeavour, by a few Experiments, to give some Light herein.

It is also by others imagined that *Sea Salt*, conveyed in subterraneous Channels to the *Chalybeat Waters*, is the chief Cause of the Neutral Salts, a common Ingredient of Mineral Waters: And it is supposed that these Salts are resolved into the Neutral State by Help of the subterraneous Fire, and that this Fire performs its Operation as that over which the Cooks boil a Kettle of Broth, or a Piece of Meat. Many other Imaginations have been indulged of these Mineral Waters, too extravagant to be here mentioned, as tending absolutely to cloud any reasonable System that
possibly

possibly might be framed for the rational and beneficial Use of them.

I will not enter into any Disputes concerning those different Opinions; but only briefly relate, for what Reason the above-mentioned and many other Ingredients cannot possibly exist in the *Chalybeats*; and then will set forth those Parts that may be reasonably expected in these Waters, hoping by this means to gain some small Step towards settling the Contents, Nature, and Virtues of them upon a more rational Foundation, so as to render them of more extensive Service, and less liable to Abuse, than they have hitherto been.

As to the *Alkaline Salt* that *Hoffman* asserts to be in the *Chalybeats* or *Spaw-Waters*, they are very smartly denied by *Dr. Short*, and his Arguments are reasonably supported upon this Topic. In this Particular he has been absolutely more exact in his Experiments than *Dr. Hoffman*, and if he happens sometimes to divert himself with the Professors of Chemistry, I suppose he means only the *Chemists*, and not any of the true Adepts or regular Brethren of the Profession; because it would be impossible to produce one Grain of Salt, or any other Matter, out of the Mineral Waters, if it were not for the Assistance of Chemistry; and without this Art it would be impossible to come at any true Knowledge of the *Salts*; and the most expert Chemists assert, it is impossible to arrive at any Perfection in this Art, without a thorough Know-

ledge of the Salts; which they consider as one of the chief Supporters of this Science.

Indeed we should be here careful to distinguish the Character and Province of a true and solid Chemist; and not reckon, that the Business of his Art consists in the minute Speculation, or Mensuration of the smallest Particles; or that, by magnifying and disproportioning of Atoms, or other Objects, like the *Virtuoso*, through his Spying-Glasses, he is to make his Judgment, and Conclusions proportionable. Thus to amplify the Shapes, Forms, and Figures of Aquatic Productions, as they happen in *Crystallization*, with Geometrical and Mathematical Instruments, and to give Tables or Sculptures of them accordingly, and thereupon to pronounce the Quality of the Matter in Question, is too apt to amplify also our Conceits of, and Reasonings upon them, beyond their due Limits: So that they are often rejected, as amusing Delusions, as meer Speculative and *Closet Chemistry*, which will not answer the Ends of more substantial Experiments. For true Chemistry is *Scientia demonstrativa*; and therein we permit no other Decision of this Art's *Subjēta & Objēta*, than that which confirms itself by the established and regular Practice. In short, we admit Nothing of that Corpuscular Philosophy, which is so spaciouſly advanced, and extended, in pompous Prints of Crystallized Salts, and such like, which serve for little more than Ocular Amusement, the Employment of Engravers,
and

and the Consumption of Paper. When after all, without true Chemistry, which only, here, ought to come under our Cognizance, it is impossible to perform any true *Analysis*, or frame any solid Judgment of the *Chalybeats*; and in this Particular Dr. *Hoffman* is in the right, however others less versed in the true Practice of Chemistry may not relish it.

But from this Digression to return to my Topic, concerning the *Alkaline* Salts in the *Chalybeats* or *Spaw-Waters*; it is very well known that Nature furnishes us not with any Native *Sal Alkali*, either Fixed or Volatile. Such fixed *Alkaline* Salts as make *Soap* run easily in the Fire, &c. and have the other Qualities correspondent with this Salt, too extensive to be repeated here, and such Volatile *Alkali's* as precipitate a Solution of Copper, even in the smallest Quality *Blue*; I say such *Alkaline* Salts are nothing more than Artificial Productions, and no where to be met with in Nature. I should be very glad to see these Native *Alkaline* Salts, and as soon as I have seen, examined, and found them to be true *Alkaline* Salts, I shall be very ready to correct myself, and make my Apology to those Gentlemen whose Assertions I may have made any Doubt of in this Particular.

All that I have hitherto understood of Nature's producing, that may in any Degree deserve the Name of *Alkaline*, has appeared to me in no Shape whatsoever as a *Salt*, being nothing else but *Alkaline Earths*, which we

may divide into two Sorts, the one coarse, and the other fine. One is the *Creta*, under which Denomination is all *Chalks*; these are the *coarser*; and the *finer* Sort is the *Alkaline* Earth of the *common Salt*; which gives the Texture to this *Salt*, or properly speaking, the Volatile *Acid* of this *Salt* is detained by this *Alkaline* Earth, which is so fine, and so closely united with the *Acid*, that they pass through the Filtre when the *Salt* is dissolved. These are the *Alkali's* that properly may be called *Natives*, and yet they deserve not the Name, because there are many Qualities wanting which are requisite to constitute a true *Alkali*.

The coarser Sort of these *Alkaline* Earths are never found *pure* and *clean*; but we always find them upon Examination to have a Mixture of *Acid* Salts, which resemble not in any Shape an *Alkali*; and, for the Truth of these my Assertions, I appeal to Experiment itself, as the only Touch-stone whereby this Controversy can be decided.

But if there is sometimes found in the *Chalybeats* or *Spaw-Waters* any Matter that will occasion an Effervescence with Acids, it is nothing else but the *Alkaline* Earth of common Salt, or another absorbent Earth, that is commonly the Basis of the Neutral or Purg-ing Salts of those Waters, or it is Chalk itself; which two latter are such frequent Ingredients, that there are hardly any without it; but the *Alkaline* Earth of the common Salt is more rare in these Mineral Waters;
and

and for the Truth of this I appeal again to Experiment, and strict Examination.

As to what might be further said in Answer to Dr. *Hoffman's* Opinion of the *Alkaline* Salts, it may be unnecessary for me to make any more Animadversions thereupon, since they have already been so amply exhibited by Dr. *Short*, that I need only here refer the judicious Reader to what he has said upon this Occasion *.

Now

* I shall here make Use of Dr. *Short's* own Words, and recite that Part of his Animadversions upon Dr. *Hoffman's* Doctrine of *Alkaline* Salts in the *Spaw Waters*, which is in the *Preface* to his Book of *Mineral Waters*, Page VI, VII, VIII, and IX, as followeth: " Let us descend to an Author of still greater Note, viz. Dr. *Frederick Hoffman*; he says, the Proofs of an " Alkaline Salt in Mineral Waters are, 1. Their Conflict with " Acids. 2. The Solution of their Salt in Water turns Syrup " of Violets green. 3. The same Solution with Spirit of Vi- " triol makes Tartar vitriolated. 4. This Solution turns a So- " lution of Sublimate Mercury yellow, &c." Here we are to try these Experiments with the Sediment in the Gross, a great Part whereof is Lime-stone Powder, which cannot possibly fail to ferment with Acids, nor to turn Syrup of Violets green. He says, " Three Pints of *Pymont* Water exhaled, left only 40 " Grains of Sediment, which was an Alkaline Salt, and fermented violently with Oil and Spirit of Vitriol." I took Care to procure a Bottle of this Water genuine, exhaled three Pints of it, and had 72 Grains of Sediment, whereon I poured warm Water, then gave it a double Filtration, and procured 30 Grains of beautiful white Salt, which fermented neither with Oil, nor Spirit of Vitriol, nor Oil of Tartar, nor Spirit of Hartshorn; Spirit of Salt poured upon it, after they had been mixed a Moment or two, it smoaked; this Spirit poured upon clean China, or its Bottle uncorked, did the same; so that we cannot allow this for a Fermentation, though any of the Acids, dropped upon its Earth, caused a vehement Ebullition. This is the Effect of examining Sediments by the Lump, only to save a little Labour and Time. It is evident that, this Water containing so much Salt, a large Quantity of it drank must open the Belly, only from its Salt, and not the Doctor's Philosophy. Now the fixed Contents must be the same in *England* as at the Spring, the Water having

Now let us proceed to the Hypothesis of those

having not been corrupted or spoiled. In another Place he tells us, that all the *Acidulae* contain a pure Alkaline Salt, which raises a Conflict with any Acid; from which it is very plain, he either tried few, or made his Experiments on the whole mixed Sediment. Nor can I find that he has been at the Pains to crystallize any one Salt, but taken their Genus's on slight and unsatisfactory Evidences; for I have seen few or none of the refined Salts of those Springs, that would raise a brisk Ebullition with Acids. His whole History is too short, his Experiments too few, his Conclusions meanly grounded, and not fully established. He says the Waters of *Egra* are *Chalybeat*, yet neither Salt nor Earth ferment with Acids, then it cannot be Alkaline, though not common Salt. It must be owned that *Hoffman* affords more Truth and greater Certainty toward a Natural History of Mineral Waters, than all his Predecessors together; for, tho' a Chymist, he retains the least of their Dialect of any, and, tho' a good Philosopher, yet advances the fewest, and is the least attached to Hypotheses and Speculation, of all that have wrote on this Subject; but it is to be wished he had been more consistent with himself: For in one Place, "he lays the Mistakes of preceding Writers on Mineral Waters on their Want of Knowledge in Chymical Operations," and that he must have Recourse to Chymistry; but afterwards, "he gives the Chymical Analysis of Mineral Waters for one of the four Cardinal Errors, which have prevailed to their Discredit." Where he explains the Origin of the Mineral Spirit in Waters, he says, "this extream moveable, subtile, and elastic Spirit is a Portion of the universal Spirit, the Fountain and Cause of all particular Spirits in other Things, whether in the Vegetable, Animal, or Mineral Kingdoms." But this Spirit has its principal Seat, and exercises its Powers chiefly in Sulphur. Which Distinction and Account of the Origin of the Spirits in the Mineral Waters, in this diffusive and unlimited Sense, are manifestly ridiculous. But when he lays aside his Chymical Cant, and talks intelligibly, then he tells us, "that this Spirit is the Vapour that arises from heated or burning Marcasites. Spirit of Vitriol poured into the Water of *Egra* raises a manifest Ebullition, but when he had exhaled the Water of *Egra* and poured Oil of Vitriol (which is a stronger Acid than the Spirit) upon its unseparated Sediment, there ensuing no Struggle or Effervescence." This is surprizing, that the Water should ferment with a weaker Acid, and not the Sediment with a stronger. But he is still more out in what follows, *viz.* "Which shews this Water contains no Proportion of common Salt; now Oil of Vitriol dropped on common Salt raises a very great Effervescence."

or Spaw-Waters in General. II

those Gentlemen who fancy that *Sal Nitre*, or *Salt-Petre* is contained in the *Mineral Waters*. When these are reminded, that they are to consider, all *Nitre* and *Salt-Petre* are only *Artificial* Salts, they will perceive the Mistake to have lain, in their following, too implicitly, the Doctrine of those who have represented the *Salt-Petre* and *Nitre* to be *Native* Salts. But Nature without the Assist-

“Effervescence.” Take this Hint once for all, that whenever he separated the Earth and Salt, then found the last ferment with Oil of Vitriol, it is an Alkaline Salt with him, when in Truth it is a certain Mark of common Salt; and this Mistake he could not avoid, except he had crystallized the Salt. He says, “the Virtue of all purging Waters depends upon a certain neutral cleansing Salt.” But the Waters of *Swalback* ferment with Acids, are therefore Alkaline, and yet purgative; but this Quality depends upon his Philosophy, *viz.* the fine Mineral Spirit, and subtile irony Principle; but let him separate the Salt, and if it purge with the other Principles, and his Philosophy into the Bargain, except drank in unreasonable Quantities, I will own myself fairly in the Mistake; or otherwise all these Waters highly impregnated with a mineral Spirit and irony Principle, but very little Salt, should purge, which is true of none of them. He is very sanguine against the Existence of solid or fixed Vitriol in Mineral Waters, “is positive it can be proved by no Arguments nor Experiments, that a Grain of it cannot be procured from a hundred Pints, and to assert the contrary is an Error in the Examiner from his Want of Knowledge in Chymistry.” It might be a sufficient Answer to this, should I say, I know of no Difference betwixt Fixed and Volatile Vitriol, but the Smallness of their Parts, one consisting of such small Particles as are capable of Elevation in the Air, either upon being long exposed thereto or warmed by the Fire; the other being grosser endures the Force of Exhalation or Distillation, but the Principle is the same; but more directly, there are Mineral Waters which contain fixed Vitriol, a pregnant Instance whereof we have in *Malton* Waters, and all the Coal Waters in this Country contain fixed Vitriol only. And as there are different Degrees of Volatility of this Principle to be met with in Mineral Waters, I do not apprehend the Absurdity of saying it sometimes exists in so large Particles, as to endure the Force of Heat in Exhalation.

ance of Art never can produce one single Grain of *Salt-Petre*. *Salt-Petre* or *Nitre* is a Compound, and consists at least of four or five different Ingredients, of which Nature accidentally, or by Design of the Artist, generates one Part. The Foundation of this Generation consists in Putrefactions, Animal and Vegetable, in a peculiar Earth, which may accidentally exist, but frequently, in many Countries, is adapted by the Artist for this Purpose; and, when properly managed, may produce a considerable Quantity of *Salt-Petre*. This first and single Ingredient of that Compound, called *Salt-Petre*, is properly called *Hali Nitrum*, or *Aphro Nitrum*; when this *Hali Nitrum* is obtained, then Art must again assist, not only to lixivate it out of the Matrix, which is the proper Earth above-mentioned, but also to add the three or four remaining Articles, and then properly reduce the whole into a substantial combustible *Salt-Petre*, fit to make Gunpowder, and for other Purposes suitable to the Qualities that are peculiar to this Artificial Concrete Salt.

This first Product of Nature, in this Concrete, the *Hali Nitrum*, wherein Nature must be assisted to bring it forth, either accidentally, or by Design, such as the placing of Vegetable or Animal Excrescencies in proper Places for Putrefaction, can never penetrate deep enough into the Bowels of the Earth to mix with the *Mineral Waters*; for that Generation, which is so purposely occasioned, cannot penetrate deeper into the Earth, than
about

about four Yards. Then it is, in its own Nature, unctuous and greasy, far from any saline Resemblance, and it can no where in the Earth meet with those Ingredients that can render it in any Shape of a Salt Texture. I therefore ask how *Sal Nitre* can possibly be expected in the *Chalybeat* or *Mineral Waters*?

That Salt-Petre is artificial I appeal to publick Enquiry, whether it is not only made in *Russia*, *Prussia*, *Germany*, &c. in very great Quantities, and to very considerable Advantage; but also in the *East-Indies* itself, from whence it is brought and paid for with ready Money; so that it is a National Deficiency, and Detriment of great Importance, that this Commodity is not made in *England*, and therefore at least deserves a publick Enquiry.

As I have hitherto not brought my Patent into Execution that is granted me from the Government for the making of *Salt-Petre*, I think it is my Duty to inform the Publick that this Delay is owing to my Enemies, who have taken all possible Means to frustrate this my Undertaking for the General Benefit of the Nation, because it did not immediately coincide with their Interest; and for the Truth hereof I also appeal to a Publick Enquiry, by which it may appear what Pains these Adversaries to the Publick Welfare have taken to distress me, in order to invalidate my Endeavours, when, if I had not been obstructed in the very Work itself, I should have been able, by this Time, to have produced, Weekly, several Tons of *Salt-Petre*,

Petre, as good as any that is imported from the *East-Indies*; and if this my Assertion can be proved untrue, I am willing to suffer Publick Censure.

But to return to my former Topic, the *Sal Nitre* in the *Chalybeat Waters*; it must be here observed also, that such *Nitre* as generates accidentally, lies never deeper than on the Surface of the Earth; and it is also very well known, that which generates accidentally, is always near, or in some old Buildings, particularly where the Excrements of Animals are collected. So that it is not reasonable to suppose that this *Hali Nitrum*, or one Ingredient of the *Salt-Petre* Compound, can be of any Service to the *Chalybeats* or *Mineral Waters*; for if this *Hali Nitrum* by strong Rains, or any other Means, should be elixivated, it is not possible that it can penetrate deeper into the Earth than ten or twelve Inches, and therefore utterly impossible to meet with the *Chalybeats* in the Bowels of the Earth, which is the only Place where this Water Concrete arrives to its full Perfection.

There might be also other Arguments used; as that the *Chalybeat Waters* spring up in the Mountains remote from, and above the Communication that might flow from Houses, so as to be incapable of receiving any of their Drains into the Mineral Water-Well; nor are any other Materials suffered that can conduce to the Generation of *Hali Nitrum* in the Limits of these Waters to putrefy, nor are there any *Salt-Petre* Works erected near the Spring-head of the *Spaw-Water*: I therefore ask how it is possible
that

that any *Salt-Petre* can be supposed in these Waters?

But suppose it should happen that any where this *Aphro Nitrum* did mix with the Mineral Waters, what could they be the better for it? At least we should not have this Water Crystal clear at the Fountain-head, but greasy and dirty: But I know very well that these Gentlemen tell us of, or fancy a natural and compleat Subsistence of *Nitre* or *Salt-Petre* in the Principles of these Waters, and not that it has accidentally or in Part flow'd in upon them, which Impossibility will appear evidently to those who shall duely digest and consider this Matter.

There has been a great deal written upon this Subject, and many Authors of Repute, as I have observed, have maintained the Doctrine of *Salt-Petre* Waters, and *Salt-Petre* as an Ingredient of the *Chalybeats*, as a Certainty beyond Contradiction; therefore I shall endeavour to set forth here what it is that has occasioned this great Error.

The first Foundation of this Notion is, that when such Waters as contain a Share of earthy or chalky Substance are inspissated in Cover'd-Boilers such as Tea-Kettles, &c. then these terrene Parts separate themselves, and settle at the Bottom, or Sides of the Vessels; and it frequently happens that these Sediments partake some small Share of common Salt, which with the Earth mixed in them taste somewhat bitter, and are thereupon immediately called *Salt-Petre*; but this Notion is fallacious, for if those Authors had separated the terrestrious Parts from the
Salts,

Salts, and crySTALLIZ'd them so as Dr. *Short* has done, they would find that these Salts were no *Salt-Petre*, but that they either consisted of the *Acid Vitriol*, or of the common Salt itself and fine Chalk. And as much as I can learn, these have been the chief Experiments whereby the Salts in the *Chalybeat* Waters have been examined, notwithstanding the Caution given in this Respect by several eminent natural Philosophers, such as Mr. *Boyle* &c. so that Dr. *Short* very justly observes it to be insufficient to examine those Things by the Lump.

Though Dr. *Short* himself is indeed full of *Nitre* or *Salt-Petre* in the *Mineral Waters*, yet it must be confessed that he is the most exact Examiner of *Mineral Water*, in this Respect, I ever met with; and though there may be other ingenious Writers, who have not had that ample Experience in Chemistry, as to judge exactly, or have a compleat Knowledge of *Salts*, yet may they discharge themselves, not only excuseably, but commendably herein, by registering the Variety of their Experiments so fully, and faithfully, as he has done, that a Proficient in the Art may easily guess or apprehend the real Nature of them, though under Names and Distinctions, different from those which have been authenticated and commonly received.

Let us now proceed to that other Ingredient, the *Vitriol*, which many eminent Writers have asserted to be in the *Medicinal Chalybeat* Waters. In Answer to this, I say, that there is no where any Native *Iron Vi-*
triol,

triol, pure by itself, without Copper ; because, without some *Phlogiston* *, it is impossible both for Nature and Art to compose a true genuine *Iron Vitriol*, without any other Mixture whatsoever ; and a *Copper Vitriol*, I am sure, they will not permit in the *Chalybeat Waters*, as this Ingredient Copper is manifestly a Poison to all Animal Machines. Then as Nature hath not provided the *Iron Ore* with the *Phlogiston*, in the Bowels of the Earth, it must be supplied with it in every Shape by Art, and therefore when we will produce an *Iron Vitriol*, we must take old Iron for this Purpose, which is provided with the *Phlogiston* ; though it is partly destroyed again in the Solution, or Manufacture of the said *Vitriol*. I therefore ask, how, in these Circumstances, an *Iron Vitriol* can be expected in the *Chalybeat Waters* ?

I do not deny a Native *Vitriol*, and even such as is for the most Part of Iron ; but there are none which do not contain so much Copper, that it is impossible to make any Medicinal Use of them, not to mention the other Ingredients, which these Native *Vitriols*

* The Word *Phlogiston* was first introduced into *Metallurgy* by Dr. *Stahl* ; who calls it, *Causa Metalleitatis Malleabilitatis, ductilitatis, et splendoris Metallici*. A l'Ordinaire, φλογιστόν, which signifies as much as *Principium Inflammabile*. Doctor *Becher*, very skilful in true *Metallurgy*, upon which Dr. *Stahl* further improved, reduced the two Ingredients of the Metals into three *Terræ Principales* ; as *Terra Mercurialis*, is *Terra Prima* ; *Terra Inflammabilis*, is *Terra Secunda* ; and *Terra Vitrescibilis*, is *Terra Tertia*. And according to this System, which is confirmed by Experience, as these *Terræ Principales* happen to meet and mix, so the Metals or Mineral Concretes exist, even Bitumens, Salts, &c. &c.

commonly contain, which render them also unserviceable in Medicine. But these real *Vitrioline Waters* are no where to be met with, but where the Bowels of the Mountains are exceeding rich of Sulphur; and these Waters are extream sharp and corroding, infomuch that the Miners are obliged to preserve themselves in such a particular Manner from their ill Effects, as not to receive any Hurt by them. Such are the Waters that really contain *Vitriol*, and not the Medicinal *Chalybeat Waters*; but some Criticks of those *Vitriol Waters*, when they condemn the same for Medicinal Use, think it sufficient Distinction to say, "That they contain too gross
" a Vitriol Salt, which is not homogeneous
" to the Animal Oeconomy." Which in my Opinion is but an Expression, according to the Mysterious Art they profess, that gives no satisfactory Explanation of the Matter in Question.

If there was any real *Vitriol* in the Mineral or *Chalybeat Waters*, it must have appeared somewhere; yet several have inspissated these Waters according to Art, and by these Means crystallized the Salts they contain; one would think that by these Operations at least there might have remained a small Part of this so much talked of *Vitriol* in the Crystallization. It is true that Dr. Short calls some of his printed Crystals by the Name of *Vitriols*, but I am afraid that upon Examination they would not be found to answer, in their Nature and Properties, to those
which

which may appear in *Vitriol*. And I do not remember any of the other Authors who have thus anatomized, or distinctly investigated the Nature and Contents of *Chalybeat Waters*, who have pretended to produce *Vitriol* out of them, but, on the contrary, have ingenuously confessed they could not do it. The Reason they give for this their Disappointment is, that their pretended *Vitriol* is so volatile, that it is impossible to produce it corporeally in any Shape whatsoever. Now I appeal to the Judicious, whether it is not reasonable to question, if the Matter in Debate is so volatile, or spiritual, that it can in no Shape be made sensible, or perceptible, how they can judge of its Nature and Quality?

The Foundation which they build their Conclusions upon, that there is *Vitriol* in the *Chalybeat Waters*, consists in the Property they have of turning Galls and several other Vegetables into a Purple Blue Colour. And this Discolouration they attribute intirely to the *Vitriol*, without which they also say that there can be no Colour produced. But how wrong they are in their Judgment, the following Experiment will prove:— “ Take
 “ *Iron Vitriol*, dissolve it in common Water,
 “ so much as to bring it as near to the Taste
 “ and Strength, as possible, of that *Chalybeat*,
 “ against which you try it; then try this
 “ Solution with an equal Quantity of Galls,
 “ and *Mineral Waters*, against one another;”
 and in this Experiment you will find, That,

with the *Chalybeat* Water, you will not be able to produce any other Colour than deep Purple, but the Galls will at once, without any Variety, turn the Solution of Iron into a deep Black; and if there was a real *Iron Vitriol* in the *Chalybeat* Waters, it would without Doubt do the same as in the Solution of *Vitriol*, without any Intermiffion whatsoever; and this may be enough to say here upon the Non-existence of *Vitriol* in these Waters.

I will now address myself to the Gentlemen who deny that the Air is an Assistant in the Composition of Mineral Waters. They assure us that every Thing, which the *Chalybeat* Waters as well as the warm or hot Baths contain, is produced by the *subterraneous Fires*, and therefore that they are very nearly related to one another. The Spirits or the volatile Acids in the *Chalybeat* Waters are, according to this System, in the same Manner produced by Nature, as the Chemists make their strong Waters, such as Spirit of Salt, or Nitre; and the Phænomena that are produced of an equal Quantity of Filings of Iron and Brimstone must be the Occasion; or the subterraneous Fires are inflamed by these Matters, and so they boil, distil, alkalyze, sublimate, &c. as a Chemist in his Laboratory: In short that every Thing is performed, after this Manner, Mechanically by Nature in the Bowels of the Earth, according to the contracted and imperfect Proceedings of Art.

But,

But, as to the Mistake of these subterraneous Fires, I will shew more at large in the next Chapter, that they can have but very little Share in the Production of our Medicinal, and none, in the Existence of the *Chalybeat* Waters; because that will be a more suitable Place to discuss this Point, as I shall there treat of the hot Waters by the Ancients, called *Thermæ*, and shall here intirely confine myself to the *Air*, and what Share the same has in the Product of the *Chalybeat* Waters concrete.

But, before I proceed any further, I shall be glad to satisfy an ingenious Author who seems to doubt the same, that there is an Acid in the Air which is not improperly called *Acidum Vagum*; and for the Proof of this I would offer the following Experiment:

“ Take any *Alkaline* Salt, that is pure, clean,
 “ and void of any *Acid*, or other Mixture
 “ whatsoever; expose it to the Air, in a Gar-
 “ ret, or other Place that is dry, where no
 “ Damps, Vapours, or Sun can come to it,
 “ but the Wind or Air may fully work upon
 “ it; and when this *Alkali* has lain about an
 “ Inch thick, it will in the Space of five or
 “ six Months Time, without any other Mix-
 “ ture, and only by the Contributions of
 “ the Air, generate into a perfect *Tartarus*
 “ *Vitriolatus*.” Now the Question is, From
 whence this *Acid* is derived, and if it is not
 manifestly imbibed from the Air into the
Alkaline Salt? Then it is very well known,
 that the *Alkaline* Salt can in no other Manner

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transform

transform itself into the *Vitrioline* Tartar, than by the Help of a strong *Acid Vitriol*; and in my Opinion it admits of no Doubt but it is conveyed into *Alkali* by the Air, from the same *Acidum* it naturally possesses: For the Truth of this I appeal to the Experiment or Trial itself.

I could give many Experiments more, how to attract the *Acidum* out of the Air, but I take the above-mentioned Example to be sufficient for a convincing Proof that not only all living Animals, who breathe upon this Globe, daily receive this *Acid* from the Air, but also the Vegetables themselves partake of it, as is particularly demonstrable in the Fern, Polypody of the Oak, all green Shells or Teguments of Fruits, &c.

But to return to the Matter in Hand; I will relate here some Instances, from whence it will evidently appear, that the *Air* has not only a Share in the Mineral Water Product, but also in all Mineral Concretes; and is instrumental to their Changes in the Earth, as far as they are subject to them: From whence I shall have also an Opportunity to relate my Conjectures in what Manner the Air may be supposed to contribute to the Medicinal Waters.

On this Head we ought to consider, that though the Metals, Mineral Concretes, or Fossil Bodies in the Bowels of the Earth, were, at the first Creation of the World, ordained and mixed in that Compound, which is necessary to constitute such Metallic or Mineral

Mineral Bodies they resemble; yet, at the same Time, it is possible, by an artificial Maturation, to elevate Metals and Minerals, and to improve them considerably in their Splendor and Magnificence: And we are assured that Nature is not less behind-hand in this Respect, than the Mineral Fumes in the Bowels of the Earth are fully imbibed with the *Phlogiston*, as the *Causa Metalleitatis*; and it is also known, that the same is highly serviceable to heighten the Minerals in their Splendor; as it is likewise the true Cause hereof.

For the Truth of these Assertions, I refer myself to the skilful Metallurgist for the artificial Maturation to improve the Metallic Splendor. As to the Mineral Fumes, that they are inflammable, is sufficiently known; and even so substantially preservable for this Purpose, that they are collected in Bladders in the Coal-Pits two-hundred Miles distant from this Metropolis, and brought hither to the *Curiosi*; and, when the Bladders are opened near a Fire or a Candle, those Fumes will immediately catch Fire; which both discovers of what Nature they are, and that they are serviceable to heighten the Splendor of the Minerals or Ores they encounter in the Bowels of the Earth, is confirmed by daily Experience in the Mines. But when it happens, by the Discovery of a Mineral Vein, that has received a Share of these Fumes, that the Ore upon Trial proves poor in Me-

tal, then a skilful Miner orders it to be shut up again, as not having had its due Ventilation to concoct it till the interfering or transpiring Air has had its prevailing Operations upon these Furnes; and as in such Veins there is supposed to be a sufficient Share of *Vitrifying* Earth, daily Practice confirms, that, in a short Space of Years, the Metal in those closed Veins will prodigiously increase.

It is evident that, 1. These cannot be the Product of Fire; because, where they meet with Fire, they burn. 2. That these *Fumes* are the Product of a Mixture, seems to be proved by Experience. 3. That there can be no Mixture without Motion; and 4. No Conveyance of Matter, without an expulsive or dispersing Power. It is therefore reasonable to suppose, that the Air, here, is the chief Agent, both in moving, constituting, and conveying, or dispersing these Fumes through the Bowels of the Earth; which sufficiently proves itself, by the great Affinity, Affection, and Readiness of the same, in uniting with the Air.

To prove that these *Fumes* are the chief constituting Parts of the Medicinal Mineral Waters, and that the Air is not only highly serviceable, but also a necessary Adjunct, or Agent in the Composition thereof, without the Assistance of the subterraneous Fires, I have a modern Instance before me, which is related by Dr. *Hoffman*, after the first Account given thereof by *Lic. Andrea*, as follows, *viz.* That a *Chalybeat* Well in the Dukedom

dom of *Wirtemberg*, in the *Kitzingerthal*, that was for many Years of great Virtue and Efficacy; but, all on a sudden, it lost its good Qualities. The Reason of this Change was found upon Enquiry to be owing to some Stone-cutters, who, digging for Stone near this *Well*, had accidentally broke through a Cavity in the Rocks, out of which issued a strong Mineral Fume. By this Opening, the Course of those Vapours being diverted, the Water was deprived of its efficacious and sovereign Supply. Hereupon it was immediately ordered that this Cavity should be carefully closed; and soon after this *Chalybeat* recovered its good Qualities again *.

I have another modern Instance of the same Nature, which is related by the ingenious and most learned Dr. *Seippius*, the present Physician at *Pyrmont* in *Germany*; under whose mature Directions, the Waters of this Place are administered. This Gentleman lately obliged the World with a new *History of the famous Pyrmont Waters*; in which he gives us, Page 48, the following Account: "That, about eight-hundred Paces

* This *Chalybeat* Water-Fountain, where this Accident but lately happened, is of long Standing, and was, in the Reign of Queen *Mary* of *England*, in great Repute. For then Dr. *William Turner*, an *Englishman*, who was an Exile in *Germany*, in this Queen's Reign, takes Notice of this *Chalybeat* in his Book of *The Natures and Properties, as well of the Baths in England, as of other Baths in Germany and Italy*, annexed to his *Herbal*, printed, the last Edition, at *Coln*, Folio, 1568, Page 4. And he intitles the same, *The four Bath*, in the Dukedom of *Wirtemberg*: In those Times the *Chalybeats* are frequently called *Baths*.

“ distant from that excellent Mineral Water-
 “ Well at *Pyrmont*, the Labourers, who
 “ break or dig Stone in the Rocks, were fre-
 “ quently drove away by the Mineral Fumes
 “ that exhaled out of the Cavities thereof;
 “ and that he once, near the Breaches made
 “ in the same Place, found many dead Ani-
 “ mals, as Birds, Mice, Snakes, &c. whom
 “ he very justly presumes to have been suf-
 “ focated by the Mineral Vapours which ex-
 “ hale out of these Rocks.” And, Page 79,
 he tells us, “ That, when this famous *Chaly-*
 “ *beat* Water-Well is near exhausted, then
 “ the People, who will draw Water out of
 “ it, become intoxicated by these Mineral
 “ Fumes; and when, at this Time, Geese,
 “ Ducks, Fish or Frogs, are thrown into
 “ the Well, they die immediately of these
 “ Fumes.” From hence it is evident, how
 richly the *Pyrmont* Waters are impregnated
 with these active Mineral Vapours; or else
 it would have shared the same Fate with
 those above-mentioned in the Dukedom of
Wirtemberg: And these may be sufficient
 Proofs of the Air’s having a considerable
 Operation in the Production of these Medi-
 cinal Waters. It is indeed frequently sug-
 gested that there is an *Universal Acid* which
 exists, or is originally generated in the Sea,
 or great Ocean of the World; and that from
 thence this *Acidum* was attracted into the
 Bowels of the Earth, by the subterraneous
 Fires: A very surprising Attraction indeed!
 by which Doctrine, they bring in the Sea,
 or

or common Salt, as a constituting Part of the *Chalybeat* Waters. I do not deny that there are several Medicinal Waters that contain common Salt; but the grand Mistake lies here, that the *Vitrioline Acid*, which is generated in the Bowels of the Earth, is the *Universal Acid*; and the *Acid*, which is contained in the Sea Salt, is actually, from its Origin, an *Acid Vitriol*. And it seems also to be more consistent with Nature, that the Sea Water receives its Salt Mixture from the Globe or Earth, than to suppose a Generation of it in the Water: Tho' it may possibly alter, in some Respect, the first Texture, by the Motion of the Sea: But however, this Alteration cannot be called an Origin, or Generation.

For the Truth of this my Assertion, that the *Acidum Vitriol* is the *Acidum Universale*, and that its Birth or Generation is in the Bowels of the Earth, and not in the Ocean, I must refer the Judicious to the most learned Drs. *Stahl's* and *Neuman's* Writings, wherein, is sufficiently, and even superabundantly, by Experiments proved the Truth hereof. But since it would enlarge this Work too much, to insert them here, it may suffice to instance that very well known Experiment, to prove that the *Acidum* in the common Salt owes its Birth and Existence to the *Vitrioline Acid*: viz. That when common Salt is smelted with the simplest *Phlogiston*, that is destitute of any Salt or Acid, then may some Brimstone and even a little Vitriol be thence produced; an Experiment so well known and so sure in its Kind, that it will not admit of

of any Doubt whatsoever. Thus far of the erroneous Doctrine; I will now proceed to what I have found the Mineral Waters contain, by Experiments, and how their Generation or Origin may most rationally be accounted for.

All Medicinal Mineral Waters differ so much from each other, that it hardly is possible to find two of these Springs that are, in every Particular, of Taste, Weight, Salts, Spirits, Quantity, &c. equal; but, on the contrary, that in one Property or other, some perceptible Difference is to be found in every one of them; for though many, and especially the *Chalybeat* Waters, may contain a great Equality in them, or have the same Ingredients, yet are they so irregularly dispersed by Nature, that an exact Distinction of each of them cannot easily be made.

Notwithstanding all these nice and distinct Differences, we may divide the Medicinal Waters, the *Thermæ* or warm Baths excepted, under five capital Titles, viz. 1. *Chalybeat Waters that are come to some State of Maturity*, and have been so duely digested in the Bowels of the Earth as to bear Exportation; such as the *Pyrmont*, and the *Pouhon Spaw*. 2. *Chalybeat Waters that lose their Texture*, and become dirty or feculent in a short Time after they are exposed to the Air; such as the Waters at *Cleve*, the *Geronster Spaw*, *Schwelm*, and other Places in Germany, and doubtless also here in *England*, which bear no Exportation. 3. *Chalybeat Waters that have plentifully imbibed an Iron Earth*, and do not contain any purging Salts, but are in their Operation as a *Crocus Martis adstringens*; which strengthen

strengthen the Stomach, and are very beneficial in such Distempers, where Medicines prepared of Iron are safe to be administered: These Waters are very salutary in Artificial Baths, such as the *Tunbridge Wells* in *Kent*, those at *Issington* near *London*, and some Springs discovered by me near *Holywell* in *Flintshire*; also the *Radebergische* by *Dresden*, and many more. 4. *Chalybeate Waters that contain a bitter purging Salt*; which are very beneficial in Dropsies; such as I take to be the *Scarborough* in *Yorkshire*, the *Epsom* in *Surry*, the *Sedlitzer* in *Bohemia*, and others. And 5. *Such Medicinal Waters as the Selter Water*; which is a rare Concrete, and I have neither met, or heard of the like any where else, but at *Selter*, of which I shall more copiously discourse in the Appendix hereunto annexed. To these I may add a 6th. which is also a most rare Mineral Water Concrete, and which I have never met with the like elsewhere; I mean that at *Shadwell* near *London*; I cannot very well range it under its proper Head, but to express it most significantly I would call it an Hermaphrodite between the *Acidulæ* and *Thermæ*, whereof I shall be more particular in a proper Place.

But as those *Chalybeate Waters*, that are described under the second Article to lose their Texture soon after they are exposed to the Air, are the most universal, and the most suitable to most Constitutions and Distempers, I will therefore intirely confine myself here, in this Part of my Treatise, to them; and therefore at this Time, to avoid Prolixity, dismiss all the others,
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except the *Tunbridge Chalybeat Waters*, which are in *Kent*; those at *Islington*, *Shadwell*, and *Holywell*, especially remarked by me; and therefore I shall take particular Notice of them in their respective Chapters.

It is already observed that the *Iron Earth* is the Matrix in which the *Vitrioline Acid* is generated; but yet it is a known Truth that neither all Iron Minerals, nor the same at all Times, are provided with this *Acidum*; for so, all our common Waters would be partly *Chalybeat Spaws*: Besides, there are hardly any common Waters used, which have not in some Part or other of their Passage had an Intercourse with *Iron Minerals*, and yet we see they do not partake thereof, or if they do, are deemed to be unfit for common Use. But when a *Chalybeat Water* arises, then it must meet with such an *Iron Ore Vein*, that contains a small or moderate Quantity of the *Acidum*: And when this is mixed with the *Iron Ore Vein*, the abovementioned *Mineral Fumes* or Vapours must also be imbibed and concentered in this Water; and then the *Chalybeat Spaw* is complete. Nevertheless, when it meets with the *Acidum* too plentifully, it is thereby rendered useless for a *Chalybeat Spaw*.

These *Mineral Fumes* may be supposed to exist in this Manner: As it is evident by many known Circumstances that the Air penetrates through all the Globe, and is frequently met with in Mines; when the Air meets with that *Sublimate*, which *Basil Valentine* calls the Seed of Metal, but I call it the *Metallic Nutriment* which is in a soft State, just like Butter of Antimony,

timony, and very plentiful in the Bowels of the Earth, then this Matter is brought by the *Acidum* in the *Air* into Agitation, by which it receives more Mixtures of Bodies and Additions. Then the *Fumes*, as the Quintessence thereof arises, are conveyed through the Bowels of the Earth by the Air, and this ascends in some Places more abundantly than in others *.

For the Truth of this my Assertion, I have an Experiment that is convincing; and can with that *Sublimate* itself produce these Mineral Fumes or Vapours in every Respect, and may boldly here assert that I know the said *Sublimate*, and am in a great Measure acquainted with its Nature; but as I have not yet met with any body in this Kingdom who have any Knowledge thereof, I will for certain Reasons forbear to mention both the Name of it here, and the Manner how the same is to be collected in the Mines.

* The famous Dr. *Teichmeyer*, Professor of Physic in the University of *Jena*, relates an Experiment performed by himself, which proves the great Power of the Air and the *Acidum* therein contained, viz. That he hath taken Filings of Iron, and exposed them without any Addition to the open *Air*, *Rain*, *Snow*, *Sun* and *Moon shine*; which reduced in a Year's Time these Filings into a *Crocus*, which he washed very clean and levigated to a very fine Powder. This he exposed for a Twelve-month longer, in the Manner as before, to the Air again; then he put it into a Retort, without any Addition whatsoever, and distilled it gradually through all the Degrees of Fire. When this was done, he found, in the Neck of the Retort, a black greasy stinking *Materiam Viscosam et quasi Butyrosam*, a slimy Substance, like Butter, in which was contained a good Portion of Quick-silver. This Experiment, which I could corroborate with many Instances that are correspondent therewith, evidently proves that the *Air* has Power with the primogenial *Acid* therein contained, without any other Addition, to open the Iron so that it shall yield its Mercurial Contents.

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These Mineral Waters, whereof I treat, are never without a *Neutral Salt*, which may be supposed to form itself in this Manner, *viz.* These *Spaw Waters* are frequently impregnated with the *Alkaline Earth* of the common Salt, or the common Salt itself. This *Alkaline Earth* attracts as much of the *Vitrioline Acid* as it can, and so constitutes the *Neutral Salt*, which is not any ways different in its Nature from the *Sal Mirabile Glauberi*: Or if destitute of this *Alkaline Earth*, and it contains no common Salt at all, then it happens sometimes that a grosser *Alkaline Earth*, as Chalk, &c. is contained in the *Spaw Water Mixture*, and this constitutes the *Neutral Salt*, in the same Manner as is related of the *Alkaline Earth* of the common Salt; and sometimes these *Neutral Salts* are composed of the *Acid*, and the most minute Particles of the absorbent Iron Earth. But all these Salts are of one and the same Nature, and answer the same End or Purpose; and if there is any Difference in them, it consists in the Purity; some being cleaner and lighter than others. And those *Chalybeat Waters* are the best and readiest in their Medicinal Operation, where the last mentioned absorbent Iron Earth is the Basis to the *Neutral Salt* it contains.

That the Mineral *Fumes* contain a good Share of the *Phlogiston* is without Dispute; which imbibe or impregnate the *Chalybeat Waters* also, and the more they are imbibed with the *Inflammabile*, the more volatile it renders these Waters, and the more powerful and penetrating they are rendered

rendered on this Account in their Medicinal Efficacy.

To prove that the *Chalybeat* receives and partakes of the *Phlogiston*, I must relate here the Incident, that befel that most excellent Medicinal Water-fountain in the Lordship of *Cracow*, in *Poland*; which was some Time ago set on Fire by Lightning, and by this means occasion'd considerable Damage to the adjoining Forests, not being extinguished without great Difficulty. This Fountain may be kindled or inflam'd at any Time, with a Candle or Flambeaux; but it is remarkable, that if the Water is taken out of the Well, and removed at a small distance, it cannot be set on fire by any means whatsoever. The People, that live in the Neighbourhood of this Salutory Medicinal Spring, use this Water as their common Medicine, and indeed they enjoy a perfect State of Health, to an incredible Age. This single Example may be sufficient, for the Support of my Arguments in this respect; though I could relate several Methods, whereby the *Phlogiston* in the *Chalybeat* Waters can be made patent or clear to the Senses.

When in the Manner aforesaid, the Medicinal Waters exist, then the *Acid* becomes invigorated or sharpen'd by the *Phlogiston*, contained in the Mineral *Fumes*, and it dissolves the finest Parts of the Iron Earth; which Solution is at the same Time attracted and united by this *Principium Inflammabile*, and incorporated in this Water Concrete; which Iron Earth is an excellent *Crocus Martis Aperitivus*, the most salutary Medicine in most Chronical Diseases. It is very

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observable

observable that this Iron Earth or natural *Crocus Martis Aperitivus* is rendered quite limpid, or clear as Crystal, and is not in any degree to be discerned in the Water, otherwise than by the Taste only ; but, as soon as it loses its Commander the *Phlogiston*, it separates itself immediately from this its Aquatic Concorporation, and subsides visibly in its Substance.

The *Neutral Salt* receives also a Share of the *Phlogiston*, which remains therein, even when separated from the Waters ; and, for the Truth of this, I appeal to a proper Experiment for its Discovery. But this Salt receives not so much, or is not of itself so much contained in this sort of *Chalybeat Waters*, as to resist its Destruction, or prevent the *Iron Earth* from subsiding, when exposed to the *Air*. And upon the whole, according to this Examination, we may determine, that the Mixture of these *Chalybeat Waters* or their true Compounds are, 1. *Iron Earth*, or a Natural *Crocus Martis Aperitivus*. 2. A *Volatile acid Vitriol*. 3. *Sal medium fixum*, or a *Neutral Salt*. 4. The *Phlogiston*, or *Principium inflammabile*. And 5. *Common Water*: And this is all that hitherto could possibly be discovered in these Medicinal Waters.

C H A P. II.

The Origin or Generation of Natural Hot Baths considered, with the Artificial Chalybeat Baths compared, and their Power and Efficacy upon the Human Machine examined.

T H E R E have been, in my Opinion, many erroneous Doctrines concerning the Hot Baths (by the Ancients called *Thermæ*) as well as concerning the *Chalybeats*, advanced to the World; as I have evidently made appear in the former Chapter: Yet it must be confessed, that there have undesignedly slipped from those Authors, that have wrote on the Medicinal Waters, more Hints of their true Origin than has as yet ever been advanced of the Properties of the *Chalybeats* or *Acidulæ*.

I shall not now examine the different Opinions, that have prevailed, or state them here; as being too foreign to my present Design: but shall only consider here the *grand Notion*, so universally prevailing in the present Age, concerning the Origin of the *Thermæ*; and treat this Notion in my usual Manner, as the Nature of the Subject will admit.

According to the received Opinion, the Origin or Generation of the HOT WATERS is supposed, in our present Times, to be occa-

sioned by Subterraneous Fires ; which not only, agreeable to this Notion, occasion these Waters to continue boiling, through a constant and equal Heat ; but they also assure us that these subterraneous Fires, with their Smoke, convey to these Waters the Mineral Ingredients or Particles they contain ; and as the *Acidulæ* or *Chalybeat Waters* (which are cold) are sometimes found in the Boundaries or Neighbourhood of these Hot Baths ; they are also, according to this Doctrine, a Produce of the same Cause, and their Spirits and Mineral Ingredients are conveyed to them by the Smoke of these Fires, as aforesaid ; and by these means they bear a near Affinity to the *Medicinal Hot Waters*.

They tell us likewise, that these *Subterraneous Fires* exist, and are supported from Iron and Brimstone meeting together in the Bowels of the Earth, which, being moistened with Water, first create a Heat, which Heat by Degrees becomes a burning Fire itself. For the Truth of this their Assertion, they give us the following Experiment, by taking one Pound of Brimstone finely powdered, and adding an equal Quantity of small Filings of Iron, which being moistened with Water, and worked together into a Consistency like Paste, is put into a Glass for the Space of twelve Hours, which occasions so great an Ebullition, that the Glass bursts, and from its original Colour becomes black ; and the Heat being so intense, it hardens the Matter, which before was soft, like Paste ;
and

and when broke into small Pieces, and exposed to the open Air, the Heat becomes so powerful, that it bursts into a violent Flame. The Veracity of this Experiment is not to be doubted, but yet I absolutely deny the Conclusion, which they infer from it, *viz.* that this is the true Cause of the Medicinal Water's Origin or Generation, from the following Reasons.

But, before I proceed to offer my Arguments against this erroneous Doctrine, I cannot omit making Mention, that Mr. *Lemery*, the *French* Chemist, some Time ago, presented the ROYAL SOCIETY at *Paris* with a Dissertation, in which he pretended to prove, that, in the very same Manner, as these Gentlemen assure us of the Occasion and Origin of subterraneous Fires, Earthquakes are caused, and produces the above-mentioned Experiment for the Support of the Doctrine he advances; so that, if we allow him to be in the right, and acknowledge that the same Cause is the Origin of the hot and cold Mineral Waters, as these Gentlemen would persuade us, then it will follow, that these our most excellent Medicinal Waters are the most liable to Destruction of any Thing I know; but I never, as yet heard, of any Medicinal Water Spring, that was destroyed by an Earthquake. But to proceed,——

My Reasons and Arguments, that the Subterraneous Fires cannot possibly be occasioned by such a *Mixture* (as these Gentlemen pretend to prove) are as follow: (1.) Nature

never produces a compleat Iron itself, but only the principal Part of it, which is vulgarly and improperly called *Iron Ore*, out of which, *Iron* cannot be produced without the *Phlogiston*; (to which Wood-Coals are commonly used) and if it is put into a Smelting-Furnace without it, it vitrifies in the Fire without the least Resemblance of Metal. (2.) That Experiment, which they assure us of, requires a compleat *Iron*, and cannot possibly be performed with the best *Iron-Ore*. (3.) Therefore as Nature is not furnished with a ready made compleat *Iron*, which is absolutely requisite to produce the Fire, which they represent; How then can it with any Propriety of Reason be supposed, that the Subterraneous Fires are occasioned in this pretended Manner, when Nature is destitute of the principal Matter, that must occasion the Fire? (4.) In Case Brimstone meets with *Iron Earth*, we find that they are so homogeneous together, that they cannot possibly occasion an Ebullition, Effervescence, or any Heat whatever; then, as the *Iron Earth* is destitute of the *Phlogiston*, it unites and incorporates *per se*, and by these means somewhat assists the Metallification, though not able to compleat the same; and this is the Reason that we never meet with pure Sulphur by the *Iron Ore*, as we do by Copper, or other Metallic Ores; the *Hessian Minera Martis Solaris*, and many others of the same Nature, prove this my Assertion indisputably. (5.) In the Experiment for the supposed Product

duct of the Subterraneous Fires, we are directed to observe a nice and careful Exactness, such as Quantity, Purity, Mixture, &c. &c. without which this Experiment will not succeed; so that if Nature (we will suppose) was provided with a compleat *Iron*, it cannot be imagined, that this requisite and strict Exactness can be performed, or such an *Æquilibrium* of Matter can be observed in the Bowels of the Earth; and therefore upon this Consideration, it will appear, that these Fires cannot exist, as are represented. (6.) Suppose again, that the Medicinal Waters do assume their Origin or Birth from Subterraneous Fires, it will inevitably follow, that these Waters will never appear to us in any regular State; but will at some Times, and on some Occasions, be stronger or weaker, and continually liable to several changing Circumstances more, because Fire, and every Thing that hath an immediate Dependence thereon (as in this Case the Medicinal Waters must have) are naturally subject to an unavoidable Irregularity. This my Assertion is constantly proved by the burning Mountains, which frequently alter their Conditions, and never remain in one Regularity. (7.) Therefore if this was the Case, we could not expect any Continuance of the Medicinal Waters. Then again, how many Burning Mountains are known, that are extinguished, when the combustible Matter is intirely consumed and destroyed? Which would consequently be the Cause of the Destruction

of Medicinal Mineral Waters. (8.) Suppose again, that these Waters do derive their Generation from Subterraneous Fires, then they could not be expected to be found in any other Place, but in the Neighbourhood of these Burning Mountains: And again, as Fire cannot subsist or continue without a sufficient Quantity of Air to keep it alive, it is naturally impossible, but it would inevitably burst out near the Hot Baths: Besides, there is not Air sufficient in the Bowels of the Earth to nourish such a Mass of Fire, as is absolutely requisite, for the Production of the Medicinal Water. (9.) That the Fire so near the Surface of the Earth, cannot contain itself long without bursting out, is evident from the Burning Mountains and Coal-Mines; which Fire sometimes unavoidably forces itself *through the Cavities of the Earth*, and becomes a general Flame; which Cavities when locked up, and Air excluded, the Fire suffocates, and immediately ceases to burn; the Fire-feeding Matter in the burning Mountains is nothing else, but Fossil Combustibles, such as Pit-Coal, &c. the Truth hereof needs no Explanation, since it appears to ocular Demonstration. (10.) The Kingdoms of *Great-Britain* and *Germany* are furnished with great Numbers and Varieties of Medicinal Water-Fountains, both *warm* and *cold*; yet neither of these Kingdoms are provided with burning Mountains, or do either of them contain any Subterraneous Fires, as have yet been discovered, so as to give the least Foundation to
imagine,

and Artificial Chalybeat Baths. 41

imagine, that these Waters do owe their Origin to Subterraneous Heats. (11.) Again, suppose, that these Medicinal Waters were occasioned from the above-mentioned Causes, it would follow, that all these Waters would inevitably contain in them a smoaky, fetid Taste; since they assert that the Mineral Parts that these Waters contain, are imbibed by the Damps of the Fire; but that they do not contain in them a smoaky Taste, is too well known, to contest the Truth of. (12.) Fires, which these Burning Mountains contain, properly speaking, are not real Subterraneous Fires, as being not locked up and confined under the Surface of the Earth: But subterraneous Fires, properly understood in their strict Sense, are those Fires that we are to suppose to be confined in the Center of the Globe or Earth, and therefore cannot reasonably be imagined to be of any Assistance to the Production of our Mineral Waters or *Fossils*.

This may suffice, to convince us, that Medicinal Waters cannot derive their Origin from these pretended Subterraneous Heats.

There is also this Notion prevailing among the Learned, that these Hot Waters contain in their Principles, *Nitre*; or that *Nitre* is a Principle of these Waters. It is true, and cannot be confuted, but that *Nitre* greatly partakes of the *Principium Inflammabile*; but this is not a Reason sufficient to prove, that it can therefore be of any Service or Assistance to this Medicinal Water Concrete, or is
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by any means able to convey the *Inflammable* into the Water, so as to cause an Alteration of Warmth, or violent Heat.

I have, in the first Chapter, clearly proved the Non-Existence and Impossibility of the *Nitre* in Medicinal Mineral Waters; so that it is needless to dwell longer upon that Subject here. But, however, I cannot omit observing to these Gentlemen, that if they will please (for the Sake of Self-Conviction) to add *Nitre* in the Mixture of the Experiment above-mentioned (wherewith they endeavour to prove the Existence of warm Waters) they will not only find, that it will baffle their Experiment, but also produce another Concrete foreign to their Intention; or if *Nitre* is added to warm Water, produced by this Experiment, or a natural Bath Water, they will find such an Alteration in it, as will render them considerably different from their original Quality; which I think sufficient to prove, that *Nitre* cannot be a Principle of these Waters, or by any means capable of promoting the Generation or Existence of the same.

Among all the Writers of this Age, that I have been conversant with, a certain learned Gentleman of the *Faculty* in this Nation has, in my Opinion, offered to the World the nearest Hints of Truth, that I have as yet met with; and it is a great Misfortune to the learned World, that he has not fully explained himself, and given us his real and firm Opinion of the true original Cause, that
creates

creates Heat or Warmth in these Waters, in the Bowels of the Earth ; but has, in my Opinion, rather attributed it to many, and more than two Principles.

Dr. *Sympson* has, in my Judgment, many Truths in his Book, and is not deserving of that ill Treatment, which he has met with from some Gentlemen of the Faculty in their learned Works ; yet it must be confessed, that he is very erroneous in his Opinion of the Origin and Existence of the Hot Waters, because in his *Hydrologia Chemica*, Page 154, he agrees with *Kircher*, that these Hot Waters are boiled in the Bowels of the Earth, by the often mentioned Subterraneous Fires ; but yet he appears to be a Man of *sound* Judgment, setting aside his Sanguine Temper and Partiality, which appear *too visibly* in his Writings against his Antagonist ; he seems to be convinced, that this Subterraneous-Fire Doctrine cannot be universally embraced ; but allows that some of these Waters may be occasioned by these *Fires*, and others by *Calx Viva*, which, in my Opinion, *is a Doctrine* as erroneous as the former *.

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* If Authors had clear or distinct Ideas of the Subject they treat of, or were duly possessed of it, they would not fall into such an Inconsistency, as I here quote of Dr. *Sympson*, who, after his Publication of *Hydrologia Chemica*, in which he admits, amongst the Causes of the Hot Natural Baths, the Subterraneous Fires, in another Treatise of his, called *Zymologia Physica*, appeals to (*N. B.*) his own identical Book *Hydrologia Chemica*, for Evidence of his having exploded this Notion, and closes with Dr. *Jorden's* Opinion of their being occasioned by the Fermentation of Mineral Juices, though he differs with him as to the Fermenting

There is again a Notion very prevailing among

Fermenting Contents. This Dr. Jorden wrote, early in the Reign of King Charles the First, a valuable Discourse of *Natural Baths, and Mineral Waters*.

But the above-mentioned Inconsistency, for Caution sake, I here insert in Dr. Sympson's own Words, *Hydrologia Chemica*, Page 154. Some other Causes there are of Hot Springs, viz. Subterranean Fires, set on Work by the Flagration of *Bitumen*, or Sulphur; which being kindled in some Parts of the Earth, where being close pent up, not finding Vent, causeth Earthquakes; but when it breaks forth, it sometimes forceth with that Violence, as that, if it break forth under the Sea, it throws up Stones and Earth in such Abundance, as that a new Island is thrown up of a sudden in the Middle of the Sea; and that, for Many Leagues together, the Sea is at that Time covered over with the spongy Pumice-stone, which is the *Caput Mortuum* in the Flagration of that Mineral. Other Places there are, which, as Chimnies or Flews, the Subterraneous Fire finds Vent in, as *Ætna, Vesuvius, Strongilo, Vulcano, &c.*

These Subterranean Fires the ingenious Kircher, in his *Mundus Subterraneus*, calls *Pyrophyllacia*, which being conveyed by several subterranean Pipes or Channels to those Cisterns or Receptacles of Water, called *Hydrophyllacia*, which thereby become heated, and that in Places not far from Day, I mean the Superficies of the Earth, breaks forth in hot Springs. These *Pyrophyllacia*, it is very probable, are the Cause of some Hot Springs, as the Kindling of *Calx Viva* are of others. And in his *ZYMOLOGIA PHYSICA*, or Philosophical Discourse of Fermentation, Page 19, 20, 21, viz. Amongst the Causes assigned by divers Authors of the Heat in *Natural Baths*, those of *Subterranean Fires* are not the least, which because we have by sufficient Arguments at large, exploded in our *Hydrologia Chemica*, shall now therefore wave: But the great and most authentic Opinion is, that of Dr. Jorden, in his Book of *Natural Baths*, which by many learned Persons, hath (and that not unworthily) the kind Acceptance, and the most general Applause, which is grounded upon a *Fermentation* from a *Seminary Spirit* of *Minerals*, in the Bowels of the Earth, meeting with convenient Matter, from which Spirit acting upon the Matter in *Generation* of *Minerals*, is caused that *Heat* which perpetuates *Hot Baths*.

It would be too tedious a Task, for this intended short Tract, now to wade into a deep Examination of the *Hypothesis* of this learned Man; I shall only say (leaving the rest of that Doctrine in its own Worth) that had that judicious Person been better acquainted with the Understanding of the true and genuine Sense of

and Artificial Chalybeat Baths. 45

among another Party of Gentlemen, which would persuade us to believe, that these hot Waters are occasioned in the Earth by Fermentations.

Dr. Jorden, though he is one of the Par-

of *Fermentation*, he would, no Doubt, have polished his Notions much better, than we find them; and would have told us wherever *Fermentation* was found (in whichsoever of the Triplicity of *Nature's Kingdoms*) that there necessarily must concur the *Principles of Fermentation*; and that *Sulphur*, or Bituminous Matter (being a-kin to *Sulphur*) must be one of those Principles, as to the *Mineral Kingdom*, and consequently be an indispensable Ingredient in all *Hot Baths*: For *Fermentation* can no more exist without its own Principles, than *Fire* can without *Combustible Matter* (or the Principles of Firing) nor than *Animal Bodies* can be sustained without their peculiar *Ferments*, which, what Analogy these, viz. *Vegetable* and *Animal Juices* in their *Fermentations*, as to their constituent Principles, bear to those of *Minerals*, we may elsewhere give an Account.

Only here we shall take Occasion to answer that grand Objection, the aforesaid ingenious *Author* makes against *Sulphur* being the Cause of *Heat* in *Baths*: For though we do not assert, that *Sulphur*, singly considered, is the Cause of *Fermentation* or *Heat*, but that it is one of the Principles of *Fermentation*; yet we judge that Objection toucheth upon the Verge of our *Hypothesis*, and is therefore worthy of our Solution. The Objection is, That if *Sulphur* can give actual *Heat* to our *Baths*, it must burn; the like he saith of *Bitumen*, that, unless it be kindled, it can yield no *Heat* to our *Baths*. I answer, That hereby it is obvious, that the aforesaid *Author* did not thoroughly understand the true *Efficients* of *Fermentation* in *Mineral Juices*; for if he had, the Question had been beyond Dispute; for though *Sulphur*, or common *Brimstone*, in its concrete Substance, is not the sulphureous Principle *Nature* useth in the producing of *Fermentation* in the primary disseminate Juices, where such Things are in *Embryo*, or in *Solutis Principiis*; yet even that very concrete Body, whether in the Form of *Brimstone*, or complicated within the Texture of other *Minerals*, *Pyrites*, &c. is by the Supervening of a powerful *Acid*, capable of *Fermentation*, and thence of imparting its more subtile *Apporrhoea* or *Stream* (by the Communion of the aforesaid *Fermentation*) and susceptible of the Virtues hereof: So that it appears, that *Sulphur* may be one of the *Efficients* of *Heat* in *Baths*; and yet its *Flagration* not requisite at all: The same we may safely say of *Bitumen*.

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tizans of Fermentation, must notwithstanding retain his due Praise and Value, for having exploded many grand Errors of Opinions concerning the Origin of Hot Natural Baths, in the *xiiiith Chapter of his Treatise of Natural Baths, and Mineral Waters*; where he has handled his Subject, like a true Natural Philosopher; especially where he evinces the great Impossibility of these Waters, owing their Warmth to subterraneous Fires; inso-much that I am much surprized, that some of our most eminent Physiologists of the present Age, should give into so gross a Mistake, in this Object of Natural Philosophy, and attribute the Heat, or Calefaction of these Waters, against all Propriety of Reason, to the Subterraneous Fires kindled by Sulphur and Iron, in the Bowels of the Earth, and in the Teeth of so early and so just a Refutation of its Possibility.

But notwithstanding that Dr. *Jorden* makes Use of the Word *Fermentation*, yet he conjoins such clear Definitions, as explain him to mean by it, a Motion or Mixture of the Fossils in the Bowels of the Earth, creative of the Heat proper to these Mineral Waters, resembling rather a Fermentation, than Fermentation itself absolutely and essentially so taken; and it is therefore but doing Justice to that celebrated Work, to rectify a Mistake, that lies more in the *Word*, than in the *Thing*. Had Dr. *Jorden* been acquainted with the Discoveries made since his Time,
he

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he would probably have substituted another Word to that of *Fermentation* *.

For

* Here I think, it may not be improper to insert Dr. *Jorden's* own Words, in Proof, that he did not use the Word *Fermentation* in the present literal definite Sense thereof, but as the best Term that occurred to him, for expressing that Motion, which I have more scientifically distinguished under the Name of *Vapours*, or *Mineral Damps*, which plentifully contain the *Phlogiston*. But as to what he asserts of the Foundation of this *Motion* being the constant Generation of Metals, it is a Deception he gives into, for want of knowing or considering, that the Cavities, or Veins, when they yield a second Time Ore, must contain *Terra Vitrescibilis*, of which I have largely treated in my first Chapter. My Quotation from Dr. *Jorden*, as follows, is taken from his XIVth Chapter, Page 104, &c. “ I have, “ in the former Chapter, set down mine Opinion concerning the “ Generation of Minerals, that they have their Seminaries in “ the Earth replenished with Spirits and Faculties attending them ; “ which meeting with convenient Matter, and adjuvant Causes, “ do proceed to the Generation of several Species, according to “ the Nature of the Efficient and Aptness of the Matter. In this “ Work of Generation, as there is *Generatio unius*, so there “ must be *Corruptio alterius*. And this cannot be done without “ a superior Power, which, by Moisture dilating itself, worketh “ upon the Matter like a Ferment, to bring it to his own Purpose. This Motion between the Agent Spirit and the Patient “ Matter produceth an actual Heat (*de motu fit calor*) which “ serves as an Instrument to further this Work. And this “ Motion being natural, and not violent, produceth a natural “ Heat, which furthers Generations, not a destructive Heat. “ For, as Cold dulls and benumbs all Faculties, so Heat doth “ quicken them. This I shewed in the Example of Malt. It “ is likewise true in every particular Grain of Corn sown in the “ Ground, although, by Reason they lie single, their actual “ Heat is not discernible by Touch ; yet we find that external “ Heat and Moisture do further their Spiring, as adjuvant “ Causes, where the chief Agent is the generative Spirit in the “ Seed. So I take it to be in Minerals, with those Distinctions “ before-mentioned. And in this all Generations agree, that “ an actual Heat, together with Moisture, is requisite ; otherwise there can neither be the Corruption of the one, nor the “ Generation of the other. This actual Heat is less sensible in “ small Seeds and tender Bodies, than it is in the great and “ plentiful Generations, and in hard and compact Matter ; for “ hard Bodies are not so easily reduced to a new Form as tender “ Bodies

For the Word *Fermentation* is restrained to
three

“ Bodies are, but require both more Spirit, and longer Time
“ to be wrought upon. And therefore, whereas Vegetable
“ Generations are brought to Perfection in a few Months, these
“ Mineral Generations do require many Years, as hath been
“ observed by Mineral Men. Moreover, these Generations
“ are not terminated with one Production, but as the Seed ga-
“ thereth Strength, by enlarging itself, so it continually pro-
“ ceeds to subdue more Matter under his Government : So as,
“ where once any Generation is begun, it continues many Ages,
“ and seldom gives over, as we see in the Iron-Mines of *Illva*,
“ the Tin-Mines in *Cornwal*, the Lead-Mines at *Mendip*, the
“ *Peak*, &c. which do not only stretch further in Extent of
“ Ground, than hath been observed heretofore, but also are
“ renewed in the same Groves, which have been formerly
“ wrought, as our Tinnors in *Cornwal* do acknowledge, and
“ the Examples of *Illva* and *Saga* before-mentioned do confirm.
“ This is a sufficient Means for the Perpetuity of our Hot Springs,
“ that if the actual Heat proceed from hence, there need be no
“ Doubt of the Continuance of them, nor of their equal Tenor
“ of Degree of Heat.

“ Now for the Nature of this Heat, it is not a destructive
“ Heat, as that of Fire is, but a generative Heat, joined with
“ Moisture. It needs no Air for Eventilation, as the other doth.
“ It is in Degree hot enough for the hottest Baths that are, if it
“ be not too remote from the Place where the Water issueth
“ forth. It is a Means to impart the Qualities of Minerals to
“ our Waters, as well as Heat, by Reason the Minerals are
“ then in *Solutis Principiis*, in their liquid Forms, and not con-
“ solidated into hard Bodies. For, when they are consolidated,
“ there are few of them that will yield any Quality to Water,
“ unless they be the concrete Juices, or any actual Heat, be-
“ cause that is procured by the Contiguity of Bodies, when
“ one Part lieth upon another, and not when they are grown
“ in *Corpus continuum* ; as we see in Malt, where by turning
“ and changing the Contiguity, the Heat is increased ; but, by
“ suffering it to unite, is quenched. But, before Consolidation,
“ any of them may yield either Spirit, or Juice, or Tincture
“ to the Waters, which, by Reason of their Tenuity (as is said
“ before) are apt to imbibe them. Now, if actual Fire kindled
“ in the Earth should meet with those Minerals, whilst they
“ are in Generation, it would dissipate the Spirit, and destroy
“ the Minerals. If it meet with them after Consolidation, it
“ will never be able to attenuate them, so as to yield their
“ Qualities to Water. For we never find any Metals or Mi-
“ nerals melted in the Earth, which must be, if the Heat of
“ actual

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three Divisions : *Fermentatio spirituosaf, acetofa, and putredinofa.*

The first (spirituofa) is appropriated to Wine, Beer, Spirits, and the like.

The second (acetofa) to Vinegar, or other Acid Vegetable Juices.

The third (putredinofa) is the common Putrefaction, univerfal to all *Animals* and *Vegetables.*

Fermentation, therefore, cannot with Propriety, find a Place in the Mineral or Foffil Kingdom, though the Motions occafioned by Foffil Mixtures, are frequently called *Fermentation.*

Dr. *Sympfon* has indeed laboured to beftow his Animadverfions on the Errors of Dr. *Jorden*, on Fermentation ; but without much understanding the Matter himfelf.

And, indeed, the ftrongeft, and cleareft Light that has been thrown upon the Subject of Fermentation, we owe to the Care and Improvements of the moft learned Dr. *Stahl*, whofe Treatife on *Fermentation*, it is much to be defired, fhould be tranflated by an able Hand ; for the Good of the Public : And certain it is, that the *Brewers, Bakers*, and in general all *Mechanics*, who have their Buſinefs any ways depending on Fermentation,

“ actual Fire were fuch, as is imagined ; neither do we ever
“ find any Stores of Metal fublimed in the Earth. This natu-
“ ral Heat is daily found by our Mineral Men in the Mines ; fo
“ as oftentimes they are not able to touch them, as *Agricola*
“ teftifieth ; although by opening their Groves, and Admiſſion
“ of Air, it ſhould be well qualified : Whereas, on the other
“ Side, it was never obſerved that any actual kindled Fire was
“ ever ſeen by Workmen in the Earth, which were likely to be,
“ if theſe Fires were ſo frequent.”

might receive notable Benefit and Improvement, from the Discoveries and Hints therein suggested and contained.

In short, there are so many Differences in Opinions, and so many different Notions entertained, concerning the Origin and Existence of these Waters, that it would be both needless and useless to instance more of them here; but yet I cannot omit mentioning the Opinion of Dr. *William Turner*, who, in my Judgment, has excelled in Truth all the Writers, that have as yet treated on this Subject: In his Observations on this Head, he clearly and concisely, without any Equivocation, or Philosophical Art, expresses himself thus, speaking of the Waters at *Bath* in *Somerſetſhire*: “ The chief Matter, says he, “ whereof these Baths in this City have “ their chief Virtue and Strength, after my “ Judgment, is Brimstone, &c. &c. (Page 1.)” That this Assertion of the Doctor’s is agreeable to Truth, I will make appear in my following Discourse on that Head; and I will likewise mention, in what Manner Brimstone may be supposed to warm these Waters, of which Dr. *Turner* tells us nothing.

As I shall endeavour to prove, that the Hot Waters, or the Principles that occasion the Heat in them, are owing only to two Causes. I think it will be first necessary, in Order to prevent any Misconstructions that may arise, to acquit myself, that I neither say or mean that these Waters are destitute of other Mineral Particles or Contents, beneficial

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cial and useful in many Diseases ; but I only exclude these Mineral Spirits, Mixtures, or whatever they contain, intirely out of the Question ; as Principles that occasion Heat in these Waters, or are in any Shape instrumental or assisting to this Water Concrete, to its becoming warm or hot.

We all know, that Brimstone or Sulphur consists of nothing else but *Phlogiston*, and *Acid Salt*, or *Acid of Vitriol* ; and that this Sulphur continually generates in the Bowels of the Earth ; which may be supposed in this Manner ; wherever it happens that the *Phlogiston* meets with the strongest *Acid of Vitriol*, it impregnates the latter so long, till it becomes a substantial Brimstone ; but if it happens that a constant Current of Water passes upon this Mixture, before it is consolidated and compleated, then this Water becomes hot, as it always will do, when mixed with the Oil or *Acid of Vitriol* ; and much vehementer hot, when this *Acid* is strongly imbibed with the *Phlogiston*. Thus the Hot Waters are occasioned ; and their Continuance may be accounted for, thus : The *Acid* is supplied by its own *Matrix*, and partly from the *Acidum vagum* in the Air, which is constantly circulating through the Globe ; and the *Phlogiston* is constantly supplied by the Mineral Fumes or Vapours (of which I have been more particular in the first Chapter) when by these Means, or in the aforesaid Manner, the hot or warm Waters in the Bowels of the Earth are compleated, then they

rise to the Surface, and break out in that Manner, which the Atmosphere will permit.

I suppose it may be here objected, that, if these Medicinal Waters received their Origin and Existence in this Manner, then the same would contain an *Acid* Taste in them, as it is well known they do not. To this I answer, that, if it happens that the *Acid* hath a small Quantity, or not any *Phlogiston*, then these Waters would contain in them a sour or *Acid* Taste and Smell; but, as the *Acid* has a good Share of the *Phlogiston*, the *Acid* Taste and Smell is thereby prevented, and changed into another Nature. The Truth of this Assertion will appear from Brimstone, which consists of nothing else (as I have before observed) but of the strongest *Acid* and *Phlogiston*; and though a whole Pound of Brimstone contains no more than one Dram of *Phlogiston*, the remaining 15 Ounces and 7 Drams being nothing else, but the strongest *Acid* of *Vitriol*; yet, as long as this small Quantity of *Phlogiston* remains, we cannot taste the *Acid* in the Brimstone; this very same Cause occurs to the Hot Waters, which prevents the *Acid* from becoming perceptible to the Taste.

Since, perhaps, it may be enquired into, upon what Foundations my Notions of this Doctrine are built and supported (as Nature does not permit an ocular Inspection into it) I will state the Motives that have led and confirmed me in this Opinion, which are the

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two following. (1st,) I, or any other Chemist, can produce a Brimstone from these Waters, that will be almost compleat; and which, by adding a very small Quantity of *Phlogiston*, will constitute a compleat Brimstone. (2^{dly},) A soft Brimstone, where the *Phlogiston* is partly destroyed, by adding thereto cold Water, will create a hot one, which partakes very much of the same Nature, as the Natural Hot Waters; which the Mixture of Iron and Brimstone, as has been asserted, never can do: These, in my Opinion, are very strong Proofs of the Origin and Cause of the Existence of the Hot Waters.

In these, or such Parts of the World, where Nature had not supplied with Hot Waters, the Gentlemen of the Faculty oftentimes, in particular Cases, endeavour to imitate Nature by preparing Artificial Hot Baths, to answer the Purposes of the Natural Hot Waters; and, for this End, they commonly prepare them by the often-mentioned Method, *viz.* with Filings of Iron and Brimstone: But, as it will appear, by a strict Examination, that this Mixture cannot possibly occasion such a Hot Water, that will serve the Purposes of the Natural Hot Waters, I intirely recommend the Method of making these Baths with Brimstone only, where the *Phlogiston* is partly separated from it; and I venture to affirm, that Hot Waters, so prepared, will have their desired Effect, and answer all the Ends of Natural Hot Waters, so as not to be

even distinguished from them, in their Virtue and Quality, by a nice Examination.

It perhaps too might be enquired into, what Power or Share the Atmosphere has, in this Mineral Water Concrete, since it has been observed, that these Waters are warmer in the Winter, than in the Summer; for which I assign the following Reasons: As the Atmosphere, in the Summer, is naturally of an attracting Quality, and exhales a *Pblegma*, or Moisture from the Globe; by these Means, the Hot Waters are in some Shape interrupted, and, by the attracting Power, some of their Spirits evaporate; but, as the Atmosphere, in the Winter, is not of that attracting Power, and as the Bowels of the Earth are, at this Time, in a Manner closed up, the Spirits of this Water cannot evaporate, and therefore consequently must be warmer from the Bowels of the Earth at this Season of the Year, than in Summer. But though Hot Waters differ from each other in Quality, as well as the *Chalybeats*; yet, all hot or warm Mineral Waters in General proceed but from one and the same original Cause, as related above.

The Waters at *Aix-la-Chapelle*, those of *Bath* in *England*, *Charles-Bath*, and several other Baths in *Germany*, which differ from each other in several particular Respects, and act upon the same Bodies in different Manners, are manifest Instances of the considerable Differences of Qualities, that are contained in, and are incident to these Waters;
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all which Differences are owing to the Quantity of the *Phlogiston*, of which some contain more, and some less. And again, a great many of these Waters are occasioned from an *Acid*, that has not so much *Phlogiston* in it, as is requisite to constitute a Brimstone: On the other Hand, there are many Hot Waters occasioned by an *Acid*, which possesses a greater Quantity of *Phlogiston* than is necessary to constitute a Brimstone: Then, again, when the Mineral Vapours continue to imbibe Brimstone that is compleat, it will become soft again, and will make cold Water hot: For the Confirmation of these Truths, I have made many successful Experiments; agreeable to which, I will divide these Waters into three general Heads, and, according to the System and Rules prescribed, speak of them separately, and in Order, *viz.*

(1.) *Hot Waters*, that are occasioned by an *Acid*, which wants a very small Quantity of *Phlogiston*, for the Perfecting and Complicating a Brimstone. (2.) *Hot Waters*, that are occasioned by an *Acid*, that possesses a very great Quantity of *Phlogiston*, more than is necessary to constitute a Brimstone. And (3.) *Warm Waters*, that are occasioned by a weaker *Acid*, that contains a very small Share of *Phlogiston*.

The *first Waters*, that are occasioned by an almost compleat Brimstone, are the hottest, such as are those at *Aix-la-Chapelle*, *Charles-Bath*, *Wissbaden*, and many others in *Germany*; the very Steam of these Waters is so

strong and powerful, that it will stain and discolour Metals in the same Manner, as the Smoke of Brimstone will do. The Waters at *Aix-la-Chapelle* I deem the hottest of them, or perhaps of any other Bath in the World; as the Fumes of these Waters will reduce themselves into a perfect Sulphur, or rather Flours of Sulphur; so that we may from hence justly conclude, that the Matter, which is the Cause of Heat in these Waters, is almost a compleat Sulphur.

The *second* Waters, that are occasioned by an *Acid*, which possesses more *Phlogiston* than is requisite to constitute a Brimstone, are such as those Waters at *Bath* in *Somersetshire* in *England*, *Xerxes* in *Portugal*, *Toplizer* in *Bohemia*, and many more, which Waters do not give or emit a dirty, or smoaky Colour upon Metals, as the first Waters do; but, on the contrary, create a fine and beautiful yellow Colour, which, with many other Instances, convince us of the Plentifulness of the *Phlogiston*, which abounds in them; these Waters are also very hot, though not considerably so, as the first mentioned.

The *third* Waters, that are occasioned by a weak *Acid*, that contains a small Quantity of *Phlogiston*, are those that possess a Heat in them, from the Degree of Milk to Blood, and something warmer; under these the *Buxton* Waters may be comprehended, of which the learned and ingenious *Dr. Short* has given us a distinct Account.

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The Medicinal Uses of the Hot Waters are so well known, that it is not requisite for me to be particular here, in this Respect. It seems indeed, that the *Baths* in ancient Times were in greater Use than at present, as appears from *Hippocrates*, who mentions them as very common in his Time; and that the *Romans* learned the Use of the Baths from the *Grecians*, seems to be without Dispute, as they named every Thing that belongs to these *Baths*, in the same Manner as the *Grecians* did. We also find that the *Baths*, I mean the Natural Hot Waters, as *Dionis* informs us, were first built by the *Lacedæmonians* into proper Reservoirs, and other necessary Buildings, which, in Space of Time, became to be abused, and not only made Use of as a Medicine, but as a Cosmetic to preserve their Beauty, &c. for which however they paid dear: Then the too constant and immoderate Use of these Waters exhausted the Vitals, and infeeble the Nervous System, softening them almost to a perfect *Mucus*, and in a short Space of Time utterly destroyed Nature itself.

In Consideration hereof, I think it necessary to observe here in general, that though all Natural Hot Waters have but one original Cause, yet each of them contain their particular Virtues, and are more or less efficacious in some Distempers, than in others: Consequently, these Waters ought not to be made Use of, without the Advice of a Physician, who is well acquainted with the Nature

ture of them, and with the Distemper of the Patient, that intends to use them.

All Persons under 50 Years of Age, will do well to avoid the Use of these Natural Hot Waters; unless the Case is such, that the whole Machine is contracted, so that the Vessels, either by Labour or other Circumstances, are rendered callous, and that a sufficient Circulation of the Blood cannot possibly ensue: In these Cases, indeed, the Hot Waters may properly and safely be used. But then, such as are under 50 Years of Age, who are of a robust Constitution, and have undergone great and heavy Labours, whereby they only have contracted Obstructions in the most extensive Vessels, and many other Diseases of the like Nature, that require Baths, ought to use the Artificial *Chalybeat* Baths. As there is no one Thing in the whole *Materia Medica*, that I know of, which can be administered, that is so effectual to penetrate through the small and minute Vessels, and to pass through the whole Machine, without any Disturbance to the Mass of Blood, as the Mineral Spirits of the *Chalybeat* Baths: Because the fixed Mineral Spirits in the Natural Hot Waters are too powerful and heavy for these Patients upon the Nervous System, and promote a too rapid Circulation of the Blood, or too violent, as, by Means of the extreme Velocity occasioned thereby, not only endangers the smaller Vessels, so as to split; but also they force and separate too much *Serum* from the Blood,

Blood, and oftentimes produce many other fatal Consequences. Again,

There are many Distempers, such as where the Nerves are contracted by a Scorbutic Matter, Barrenness, and other Obstructions incident to Women, where the *Chalybeat* Baths are the only Relievers; the Truth of this Assertion has been demonstrated by frequent Experience, and also by many Persons, in several other Chronical Distempers, who, not finding any Relief by the Hot Waters at *Aix-la-Chapelle*, or elsewhere, have gained a perfect Recovery by the Artificial *Chalybeat* Baths at *Pyrmont*, *Wildunge*, *Schwelm*, &c. &c. These Instances have been so very common, that both Practice and Experience has convinced many of the most eminent Gentlemen of the Faculty in *Germany*, that the Artificial *Chalybeat* Baths, in all Distempers where Bathing is requisite, are far preferable to the Natural Hot Baths, for which they assign the following Reason:

“ When the *Chalybeat* Waters are made
“ warm into Baths, according to Art, the
“ volatile Spirits of these Waters, penetrating
“ through all the small and minute Vessels,
“ are more powerful Removers of so much
“ resistible hardened Matter, as is the Occa-
“ sion of many Disorders; and are in general
“ of much greater Service to the Human
“ Body, than Natural Hot Baths are, be-
“ cause it is supposed, that these Waters by
“ their constant Heat lose these excellent Mi-
“ neral Spirits.”

But,

But, though the Artificial Chalybeat Baths, in many Instances are found to be so very useful and serviceable, yet the Natural Hot Baths are not for this Reason to be neglected or exploded, as in their Nature and Properties they contain their particular Virtues and Qualities, and by proper Application are instrumental to many good Purposes : But the Benefits that are derived from either of these excellent Waters, depend wholly upon the proper Uses made of them ; and it is the Abuse or wrong Application that has occasioned great Prejudices against Mineral Waters in General. It is therefore highly incumbent upon all Persons that are obliged to make Use of these Waters, to advise with such Physicians as are well acquainted with their particular Qualities and Natures, and with the Constitution of the Person, that designs to use them. If this Regimen was more carefully observed in *England*, than it really is ; we should not see so many return helpless from the Natural Hot Baths, and by improper Uses made of them, attended with fatal Consequences.

But with Respect to the Artificial Chalybeat Baths, I think it necessary to be more particular : Since I find by all Inquiries that I have been able to make, that these Baths are hardly at this Time known in *England* ; at least not made any Use of, though the Island abounds with many of them. And as some Rules are required necessary for the Preparation of this Water for Bathing, I will give a
short

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short Account thereof, which I hope may not be unacceptable :

In *Germany* these Chalybeat Baths are commonly prepared in this Manner :

They put about three Pails of Chalybeat Water into a Copper-Boiler, closely covered, which, with a quick Fire, they make near boiling hot ; this is poured into the Bathing-Tub, adding to it about two Pails more of the same cold Water : When by these Means the Bath is come to that Degree of Heat, as the Physicians approve of, the Patient goes into this Bath.

As these manual Operations are required to compleat these Waters fit for Bathing, I think I call them, not improperly, *Artificial Chalybeat Waters*.

In these Bathing-Tubs is made a Seat of Linnen Rags, upon which the Person that bathes seats himself; when so seated, so as the Water does not reach or come above the Stomach, the Bathing-Tub, together with the whole Body of the Patient (the Head only excepted) is covered, as described in the Figure, that no Steam can evaporate.

In this Situation the Patient remains as long as the Physician thinks proper for his Disorder, and if more hot Water should be required, the Bathing-Tub is supplied at the Feet-End.

In these Baths, the Head of the Patient has been frequently uncovered, and, by Cloths bound close to the Neck, prevented from receiving any of the Steam or Mineral Spirits ; but this Practice is proved by good Authority

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ty to be prejudicial to the Patient, as by these Means the Humours of the Body were thrown up to the Head, and thereby have occasioned many incurable Diseases, such as Deafness, Blindness, &c. &c.

I have therefore made an Addition to the Bathing-Tub (as explained by the Figure) that the Head may receive as much of the Mineral Spirits or Salts as the rest of the Body, which will be an effectual Method to prevent all dangerous Consequences, that might ensue from the Want of it: And this Rule I recommend to all Persons that make Use of any Baths whatsoever.

There is another Method to heat or prepare the *Chalybeat Waters* for Bathing, in my Opinion, much preferable to the former, which, as it is not commonly known or made Use of, I shall mention here.

According to this Method, the *Chalybeat Waters* are made hot in a wooden Machine, with a Globe and a Pipe fixed thereto; the Machine is filled with Water, so high, that the Globe becomes also full; under this Globe (which is bricked up in a Furnace or Oven) is the Fire made, which almost in an Instant makes the Water hot in the Machine; or the Machine is filled with Water under the Reach of the Pipe that is fixed to the Globe, so that these last are left entirely empty: Then the Machine that contains the Water, is covered as usual, and the Fire made under the Globe, from whence the Heat condenses upon the Water in the Machine, and by these Means

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Means heats the Water very quickly, and at the same Time prevents the Evaporation of the Mineral Spirits : For the better Explanation of this Machine, I have here annexed a Figure of the same.

Places referred to in the Plan of the Bathing Machine.

- A. A square bricked Furnace.
- B. The Fire-place.
- C. The Ash-hole.
- D. The Chimney.
- E. A Body of a globular Form, capable of containing nine Gallons.
- F. A Cylinder Pipe, extending from the said Body or Globe to a large wooden Bath or Cistern that contains twenty Hogsheads of the *Chalybeat Waters*, marked G, G, the Back of which is secured in the Joints with a strong Clay, and kept covered when the Water is made hot.
- H, H. A Bathing-Tub, large enough to contain one Person, which must be covered over the Top I. I. I. leaving sufficient Room at the upper End K, for the Patient to get into the Bath.
- L. A Frame covered with Canvas, or any other Matter of an open Texture, sufficient to admit Air to prevent Suffocation, which is let down when the Patient is bathing, and continues so, as long as can be endured. This Bath is supplied with the hot or warm *Chalybeat Waters* from a Pipe marked M.

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The Globe and Pipe are made either of strong Clay (as the Crucibles are) or of Iron. Copper-metal is not so proper for this Use: Because it will instantly attract that *Acid* from the *Iron-Ore*, by which this Mineral Ingredient is dissolved in these Waters, and by these Means will separate and destroy, or diminish, these Chalybeat Principles. This Machine is far preferable to a Boiler, not only because it heats a greater Quantity of Water at once; but as it likewise preserves a greater Quantity of the Mineral Spirits, than those Waters contained in a Boiler, as being too much exposed to the Fire.

There are most commonly two Sorts of Baths prepared of the Chalybeat Waters: of which one Method is to preserve so much of the volatile Spirits as is possible, which is done in the Manner abovementioned; the Bath, so prepared, is then made Use of, when these Spirits are in Action, for being then capable of penetrating through the *Skin*, *Sinews*, *Nerves*, and *Muscles*; it irritates the same, and by these Means braces and elevates the laxed and weak Vessels, and restores them to their natural Strength and Substance; when the Nervous System by this Method receives its natural Strength again: The peccant Matter and all prejudicial Juices are expelled by the Power or Actions of this System, and by the Circulation of the Blood, and so carried off by Perspiration.

These Baths are chiefly used for weak and decayed Nerves, and Experience has convinced

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vinced us how extremely beneficial they are in these Maladies; but then they never ought to be made Use of, without the Advice of a skilful Physician, who is well acquainted with the Constitution of the Patient, and the Disease he is afflicted with; together with the Nature of the Waters, of which the Baths are prepared.

But, before any Use is made of these Baths, all undue Juices ought to be first discharged (as far as the Case will admit of) either by *Emetics* or *Cathartics*. The *second* Method of preparing these Baths, is to make the *Chalybeat* Waters almost boiling-hot, and to let them stand in the Bathing-Tub, till all the Spirits of them are evaporated, and the *Iron-Earth* it contains, is precipitated or settled to the Bottom: The Patients using these Baths, so prepared, have often found great Relief from them. This Method of Bathing is of a very mild Nature, and as by Experience we find, that by this Method the Salts penetrate through the Human Machine, it has proved itself of great Efficacy to soften and destroy all hard Humours, such as *Cancers*, *Schirrus's*, &c. &c. &c. and to revive and moisten such Nerves, as are too dry and contracted, &c. &c.

Many other Methods are invented, for the Preparation of these Baths, but I think them too insignificant to mention here.

All *Chalybeat* Waters, without Exception, are proper for these Baths; but such as are

found at *Tunbridge* in *Kent* (more particularly mentioned in its proper Chapters) are the best and most useful for these Artificial Baths. I am really surprized (according to the Information given me) that these Artificial Baths are so little known, and made Use of; notwithstanding the many excellent *Chalybeat* Water-Fountains, this Island is blessed with.

As I take this Neglect to be a great Loss and Detriment to the Community, I would persuade all Proprietors of these Wells; but particularly of those at *Tunbridge* in *Kent*, to erect these Baths without farther Loss of Time; and if any Assistance, that is in my Power to lend, is wanted thereto, I should be very happy in giving my Advice and Direction, for the Completion of a Work so instrumental to the public Good.

I shall here conclude my Discourse on the MEDICINAL WATERS in General, and proceed to the PHYSICAL HISTORY of these *Chalybeat* Waters, I designed to treat of in particular; and of this in the succeeding Chapters.

C H A P. III.

*Of Tunbridge-Wells in Kent, and
their Chalybeat Waters ; with in-
structive Observations on their pre-
sent Use.*

AS I have, in the two former Chapters, only occasionally mentioned in General that salutary *Chalybeat Water at Tunbridge*, and laid down the Manner, and Means of rendering it of more universal Use and Service to Mankind, by framing Baths of it ; I will dedicate this whole Chapter to an *Exposition* of my Sentiments on these MEDICINAL MINERAL WATERS, and the Use at present they are in.

Not having had an Occasion to make a Course of regular Experiments, or other than by Intervals, and at different Times, I cannot here give the *Analysis* of these Waters ; but my having drank them myself has supplied me with Judgment enough to authenticate, what I shall here advance of them : And, if ever, as is much to be wished, *Artificial Baths* come to be erected at *Tunbridge-Wells*, a compleat *Physical History* of these celebrated Waters, with a regular Series of *Experiments*, could not but be acceptable to the Public, as well as important, not to say, highly necessary.

The only Author, who has wrote on these Waters, that I can meet with at least, is Dr. Rowzee : Dr. Pratt and Dr. Medan have also wrote on this Water, but I never could see their Works. Dr. Rowzee, having wrote early, is rather more forgotten, than he deserves ; and at this Time scarcely known.

He has given Directions for drinking these Waters, but none for bathing with them : And, as they are now only used for drinking, I will here transcribe, what he has advanced particularly relating to the *Chalybeat Waters* of those Wells ; to which I will subjoin a few Observations of my own, in Hopes they may not be unserviceable to such as take those Waters.

This Treatise bears the following Title :

The Queen's Wells, or a Treatise of the Nature and Virtues of Tunbridge-Water. Together with an Enumeration of the chiefest Diseases, which it is good for, and against which it may be used, and the Manner and Order of taking it. By LODOWICK ROWZEE, Doctor of Physick, practising at Ashford in Kent.

The Title-Page is dated 1671, without Mentioning of its being the second Edition ; and yet licensed the Third of June, 1637, by William Bray, Chaplain to the Bishop of London ; so that I am apt to think, that the Copy in my Possession is either a second Edition, or its Date a Mistake of the Press ; for it is
not

not very likely the Author would let the Manuscript of this little Work lie dormant, and unpublished for 39 Years, after passing the *Licenser*.

But, though the above Title of this small Treatise supposes no other Subject, than the *Chalybeat Waters*; yet our Author launches out into five introductory Chapters, which have no Relation to those Waters, under the following Heads. *First*, Of Water in General. *Second*, Of the Differences of Waters. *Third*, Of the Original of Springs and Rivers. *Fourth*, Of Waters of a strange Nature and Effects. *Fifth*, Of Mineral and Medicinal Springs. Leaving then these five Chapters, as foreign to my Purpose; I shall only select the following, which treat of the *Tunbridge-Waters* alone.

Of Tunbridge-Water.

“ The Water commonly known here amongst us, by the Name of *Tunbridge-Water*, are two small Springs contiguous together, about some four Miles Southward from the Town of *Tunbridge* in *Kent*, from which they have their Name, as being the nearest Town in *Kent* to them. They are seated in a Valley, compassed about with stony Hills, so barren, that there groweth nothing but Heath upon the same. Just there do *Kent* and *Sussex* meet, and one may, with less than Half a Breath, run from those Springs into *Sussex*.

“ It pleased our gracious Queen *Mary* to
 “ grace this Water by her Prefence, two
 “ Years ago ; so that those Springs may just-
 “ ly be called, as some do call them now,
 “ *Queen Mary’s Wells*. The Taste of the
 “ Water is not unpleasant to those, who have
 “ a while been used to it, and it is a sure
 “ Thing, that no Man is able to drink half
 “ so much of any other Liquor, though never
 “ so pleasant unto him, as he may of this.
 “ What other Minerals it runneth through,
 “ besides Iron, and the *Rubric* of Iron, which
 “ is seen on the Ground, over which the
 “ Water runneth, is not yet well known ; for
 “ there hath been as yet no Digging near
 “ about the same. The greater Part of those
 “ that drink of it, are purged by Stool, and
 “ some by Vomit, as well as by Urine, which
 “ perhaps should argue some other Minerals,
 “ besides Iron. The same may peradventure
 “ be discovered in after Time. Howsoever
 “ though there were no other Minerals there-
 “ about besides Iron, yet Iron being a Metal,
 “ and all Metals, according to the Chymics,
 “ proceeding of two Principles, *Sulphur* and
 “ *Mercury*, wheresoever there are any Metals
 “ bred, there must also of Necessity their
 “ Principles be.”

Observation the First.

We see here, that our *Author*, by his lit-
 tle Skill in Chemistry, an Art in his Times
 very short of the Advances it has since made,
 was unqualified to examine these Waters by
 this

this Art, its infallible Touch-stone : No Wonder then, that he mistook in his Conjectures, that the *Tunbridge* Mineral Waters were impregnated with other Metals or Minerals besides Iron, and thereby occasioned their Vomiting and Purging Qualities. It is well known, that these Operations, or Actions in the human Body, are owing to the Salts that these Waters contain, which ever occasion Vomiting, when taken into an over-loaded, foul, or slimy Stomach.

Agreeable, however, as it may be to Reason and Probability, that the Hills or Mountains, near or about *Tunbridge*, contain and abound in other *Metals* besides *Iron* ; yet, granting that it were so, I am clearly assured, that not they, but the *Iron-Ore* alone has a Share in the Origin or Generation of the *Chalybeat Waters* of this Place.

“ Besides this, all Metals have also their
 “ peculiar Salts ; and Iron in particular hath
 “ a great deal of *Volatile* Salt, which is it that
 “ dissolveth in the *Chalybeat* Wine, now so
 “ much in Use. Now Iron is of an astringent and corroborating Faculty, and hath
 “ an opening Virtue withal, as may be seen
 “ by the Powder of Steel (Steel being nothing
 “ but a *defecated* Iron) which is used with
 “ good Success in the Green-Sickness, and in
 “ all other Diseases proceeding from Obstructions. But here I shall seem perhaps to
 “ seem to contradict myself, in making Iron
 “ both astringent and opening, which the

“ Vulgar think to be two Qualities incom-
“ patible in one Subject; and yet they are
“ deceived, for to open and corroborate have
“ no such Repugnance, but that they are to-
“ gether in many Simples. Now, concern-
“ ing those two Springs, a Question doth
“ often arise amongst those, who are there a
“ Drinking, which of them should be the
“ better and stronger; but, being so conti-
“ guous and near together, certainly there can
“ be no manifest Odds betwixt them; and
“ though I often tasted of both, immediately
“ one after the other, yet can I not say, that
“ I ever found any perceptible Difference be-
“ twixt them. Yet will I not deny, but that
“ it may so fall out, that at some Times the
“ one may appear stronger than the other,
“ according as the Water may participate
“ more of the Virtue of the Minerals at one
“ Time, than at another; but I think that
“ there can be nothing constant in it, though
“ they may alternatively something differ one
“ from another. This shall suffice to have
“ been spoken concerning those Springs. It
“ followeth now, that we make an Enume-
“ ration of the chiefest Diseases their Water
“ may be used for, wherein we will chiefly
“ follow Experience, seeing it is an emperical
“ Remedy, and yet so as we shall not ex-
“ clude Reason. For, albeit it be *empericum*
“ *Remedium*, yet must we not use it altoge-
“ ther emperically, nor make it a *Panphar-*
“ *macon*, or a *Panacea*, a Medicine for all
“ Diseases, and send thither promiscuously
“ all

“ all Sorts of Patients, as some Physicians do
 “ to the like Springs, when they are at a
 “ *Nonplus* with them, and after a long Time
 “ can do no Good upon them in *Chronical*
 “ Diseases : For then they send them to those
 “ Mineral Waters, *tanquam ad sacram An-*
 “ *choram*. Which causeth those Springs to
 “ become infamous, and to lose the Credit
 “ they justly deserve (the common People
 “ ordinarily judging of Things by the Event)
 “ when some miscarry after the Use of the
 “ same, either because they were already so
 “ far spent that they were sent thither, or by
 “ Reason their Diseases were not to be cured
 “ by that Remedy.”

Observation the Second.

The Doctrine or Hypothesis of *Salts peculiar* to every Mineral and Metal is exploded, and we are now arrived at a more certain Knowledge in *Metallurgy*, than in this Author's Time. We know nothing of Volatile Salt of Iron : But I apprehend that he calls the Volatile *Acid* of *Vitriol* so, the chief Ingredient in the *Chalybeat Waters*. And this Volatile *Acid* so necessary in the Medicinal Mineral Waters, as it is the most salutary Property of them, the Waters of *Tunbridge-Wells* are enriched with a large Share of.

But, as for the Astringent and Opening Quality, which our Author attributes to Iron, I cannot say any Thing ; as I am (*still far from satisfactorily*) certain of the Operations of all Preparations of Iron, or Medicines made
 of

of this Metal, on the human Machine ; therefore I seldom prescribe these very precarious and unaccountable *Arte facta* ; and when I do, it is with the greatest Caution imaginable. And, if the *Chalybeat Waters* did not contain this excellent Volatile *Acid* and Neutral Salts, I should have no Opinion of them in the Practice of *PHYSIC* ; but, by Virtue of these Ingredients, the *Iron-Ore* is corrected, and becomes homogeneous, and salutary to Nature ; and consequently these Waters ever operate quite differently from those Medicines prepared of Iron ; and it is therefore more eligible to use these Waters fresh, at the Fountain-head, before they have evaporated any of their fine Volatile Spirits.

As to the Difference of the two *Chalybeat* Springs at those Wells, I can from my own Perceptions assent to it. And I humbly apprehend, that what is denominated the *inferior* Spring, might be made Use of to great and considerable Advantage ; by preparing Baths of its Waters, especially as the Spring, that is accounted *superior*, furnishes Water enough to supply for Drinking. Our Author likewise acquaints us, that he takes these Waters for *Emperic* Medicines. But in this I differ from him, for, whatever they might be in his Time, I am well assured, that they are not so at present ; since they require the being administered with as much Judgment as any Medicine whatever ; and their Operations can be as certainly accounted for. And it is an Abuse of Practice much to be regretted, and,
I am

I am sorry to say it, not to be denied, that they are too often to this Day, treated, and prescribed as an *Emperic Nostrum*, without Accuracy or Distinction.

The chiefest Diseases against which Tunbridge-Water may be used with good Success.

“ Being now to reckon up the chiefest
 “ Diseases, which *Tunbridge Water* is good
 “ for, we will not go *a capite ad calcem*,
 “ from the Head to the Heel, but begin at
 “ that, which it is most generally good for;
 “ and that is Obstructions, which are the
 “ Causes of infinite Diseases. This Water,
 “ then, doth effectually open all Manner of
 “ Obstructions, wheresoever they be lurking,
 “ and especially the Obstructions of the *Me-*
 “ *saraical* Veins, of the Spleen, and of the
 “ Liver, and that better than any *Apozemes*,
 “ or other Physic whatsoever. For these Ob-
 “ structions being stubborn, and requiring a
 “ great deal of Physic to be removed, and
 “ Physic being both loathsome and charge-
 “ able, People grow weary of it before a Phy-
 “ sician shall have run a Quarter of the
 “ Course, which is necessary for the removing
 “ of those Obstructions; and that is the Rea-
 “ son that so many are troubled with *chroni-*
 “ *cal* lingering Diseases, which, in their own
 “ Nature, are not incurable; but only re-
 “ main incured, either because the Patient is
 “ not able or willing to undergo such a Course
 “ of Physic, as is requisite for his Recovery;
 “ or because he loveth his Purse too well.

“ But

“ But these Waters being no Charges, and
“ after one hath been used a little while to
“ them, the Taking of them is not trouble-
“ some at all ; but the longer a Man conti-
“ nueth the Use of them, the more he may,
“ and being taken in a large Quantity, they
“ cannot chuse but open effectually. Where-
“ fore they are of excellent Use for all Dif-
“ eases, which have their Dependency upon
“ Obstructions, as all long and tedious Agues,
“ Quartans, and the like ; for a Dropsy,
“ the black and yellow Jaundice, the *Schir-*
“ *rhus Lienis*, or hard Swelling of the Spleen,
“ which the common People call an Ague-
“ cake ; the Scurvy, the Green-Sickness, the
“ Whites in Women, and the Defect and
“ Excess of their Courses. And albeit this
“ last Assertion seemeth to have some Re-
“ pugnancy, in that we ascribe two contrary
“ Effects to one and the same Agent ; yet,
“ there is no such Matter ; for the one is
“ done by opening of Obstructions, and the
“ other either by cooling the Blood, when
“ it is too hot and sharp, and so provoketh
“ Nature to Expulsion ; or by corroborating
“ and strengthening the retentive Faculty.
“ And it is the Property of all equivocal A-
“ gents to vary their Operations according to
“ the Variety of their Objects, and of the
“ Matter they work upon : So the Sun melt-
“ eth Wax, and hardeneth Clay. This Wa-
“ ter doth also cut and extenuate tough,
“ clammy, and (if I may so speak) *Tarta-*
“ *rean* Phlegm ; and in that Regard it may be
“ much

“ much available for those, who are used to
 “ be troubled with the Cholic, when such an
 “ Humour is contained in their Guts.”

Observation the Third.

Our Author has very judiciously pointed out the chief Diseases, in which these Waters may be serviceable. And we have a long Series of Experiences on our Side, to support and prove his Assertions, beyond Dispute. Provided always, that they are properly taken, and at the same Time aided and assisted, as the peculiar Case of the Patient may admit, or require.

He accounts also for the Operation of this Water, or its active Parts, upon the human Body; but I think he forgets their most essential Faculty, the Power of the *Volatile Vitriol Spirits* to penetrate through the minutest Vessels and Parts of the human Body, where the Medicines of the Shops are not able to pervade; but, in another Place, I have explained this more largely.

“ It scowereth and cleanseth all the Passages
 “ of Urine; and therefore is good against the
 “ Gravel and the Stone in the *Kidnies, Ure-*
 “ *ters* or *Bladder*, where also it dissolveth
 “ and washeth away a Kind of clammy,
 “ phlegmatic Excrement bred in the Bladder,
 “ which, sometimes stopping the Passage of
 “ one’s Water, maketh him believe that he
 “ is troubled with the Stone, as happened to
 “ one, that was himself a very skilful and
 “ famous

“ famous Stone-cutter, who, being fully per-
 “ suaded that he had a Stone in his Bladder,
 “ gave himself to another of the same Pro-
 “ fession, to be cut at *Namurs*: But, when
 “ he was cut, nothing was found in his
 “ Bladder, but such a tough Humour, which
 “ might have been dissolved and avoided
 “ with Facility, by the Help of the *Spa*
 “ Water, which was but a Day’s Journey
 “ from him. It is good also (in Regard of
 “ the astringent and healing Faculty it hath)
 “ for all inward Ulcers, and especially for
 “ those of the Kidnies and Bladder, and of
 “ the *Musculus Spinater*, which openeth and
 “ shutteth the same. And in Confirmation
 “ of a bloody Urine, which had long trou-
 “ bled them; and, amongst the rest, a wor-
 “ thy *Kentish* Gentleman, with whom I went
 “ thither the last Year.”

Observation the Fourth.

In a compleat *Stone* and *Gravel*, I con-
 ceive these *Medicinal Mineral Waters* to have
 very little, or no Effect; except in such Cases,
 where the *Urine* is obstructed with slimy
 Matter; when, without Dispute, they are of
 Service and Efficacy. But, as these slimy Hu-
 mours are the first Foundation of the Gravel
 and Stone, from the earthy Parts of the Urine
 gathering round and settling thereon; where-
 by they gradually form themselves into a
 stony or calculous Concrete: Therefore it may
 be safely granted, that the Beginning of these
 Distempers and the just mentioned slimy
 Humours

Humours may be removed by these Waters :
And for *Ulcers* in the Kidnies, in Consequence of the *Venereal Distemper*, or otherwise contracted, these *Waters* are of sovereign Use.

“ It is good also against all inveterate *Dysenteries*, or Bloody Fluxes ; as also all other Fluxes of the Belly, whether it be *Leienteria*, *Diarrhæa*, or *Fluxus hepaticus*.
“ It doth likewise extinguish all inward Inflammations and hot Distempers ; and yet, for all that, the Stomach is no whit hurt by the actual Coldness thereof, but rather corroborated and strengthened, and Appetite provoked, yea in some but too much, as in myself for one : For, whensoever I drank, either at the *Spa*, or at *Tunbridge*, I was never able to fast with Patience until Noon, but must needs *Offam latrant. stomacho offerre*, cast a Bit to my barking Stomach, before the rest of my Company went to Dinner. For this Cause, when I was at the *Spa*, a *Spanish* Physician, who was come thither with the young Prince *Doria* (who was then but a Youth) would not let him take the Water above two or three Days, when he saw such an Effect in him, fearing that he would receive more Hurt by the Excess of his Appetite, than Benefit by the Water ; and, so after a long and troublesome Journey from *Italy* thither, he returned Home without any Profit.
“ The *Nerves* or Sinews, and the Original
“ of

“ of them, the Brain, are strengthened by
 “ the Use of this Water, and consequently it
 “ is good against the Palsy, Inclination to an
 “ Apoplexy, Lethargy, and such like Diseases of the Head.”

Observation the Fifth.

In Bloody Fluxes, these Waters may be of good Service, but, where there is a complete *Dysentery*, I cannot approve of their Use and Administration ; as they cause too great a Velocity in the Blood, at a Time, when a calm and natural Circulation is most requisite and necessary.

And we must naturally expect, that the astringent Quality of these Waters will have an unseasonable Effect on the *Excoriations*, or *Exulcerations* of the Intestines ; so as to threaten the worst of Consequences : Therefore I hold it not good Practice to administer *Chalybeat* Waters in such dangerous Distempers, as *Dysenteries* ; and indeed, for the same Reason, in all inward Inflammations, and inflammatory Cases, they must be utterly avoided. But in the Flux of the Liver, I think they may be as safely used, as in the Case of an obstructed one.

“ And some *Paralytiks* have been seen,
 “ who sometimes avoided all their Water by
 “ Urine, and at other Times were as effectually
 “ purged, as if they had taken a strong
 “ Potion, and withal sweated abundantly all
 “ their Body over. All these Evacuations,
 “ and

“ and Vomiting also, are sometimes seen in
 “ other Diseases, as well as in that ; nay, be-
 “ sides that, in some Women you shall have
 “ an Evacuation by Urine, & *per menses simul*
 “ & *hæmorrhoidas*. The Cause of all Rheums
 “ and Distillations is likewise removed by
 “ the Help of this Water, and all Diseases
 “ cured, which have their Dependency upon
 “ the same, for all that Verse of *Schola Sa-*
 “ *lernitana* :”

Jejunes, vigiles, sitias, sic rheumata cures.

Observation the Sixth.

As to the various Operations and Actions on the Body, proper to these Waters, such as Sweating, Purging, Vomiting, &c. they are governed by the Juices they meet with in the *primæ viæ* ; and as these Juices entirely depend on the Diet, a suitable Regimen is therefore requisite, and should be prescribed to these Water-drinkers ; and preparatively a Vomit or Purge ought to be, and generally are given to obviate these Inconveniencies : And as the most sensible Actions or Operations of the *Tunbridge-Wells* Water are by Sweat and Urine, and rather cause Costiveness ; therefore bitter opening Salts, taken at proper Intervals, are requisite to promote the wanted Evacuation ; and we shall rarely find an Instance of a Patient, observing the prescribed Rules, being either troubled with a Vomiting or Purging.

“ Convulsions also, Head-ach, Megrims,
“ and Vertigo, are driven away by the Use
“ of the same, if the Patient be constant, and
“ not too soon weary. Against Vomiting
“ and the Hickot, it is used with good Suc-
“ cess. Those that are troubled with *hypo-*
“ *chondriacal* Melancholy, find a great deal
“ of Ease by this Water. It helpeth also the
“ Running of the Reins, whether it be *Go-*
“ *norrhæa Simplex*, or *Venerea*, and the Dis-
“ temper of the *Parastatæ* arising from thence,
“ as likewise a certain Carnosity, which grow-
“ eth sometimes in the Conduit of the Urine ;
“ nay, and the Pox also, the Water having
“ a notable potential drying Faculty. It
“ driveth away besides all Manner of Worms,
“ whether they be ordinary ones, or *Ascaris*-
“ *des* or *Taniceæ*. It may be used also for the
“ Gout ; but it must be with some Caution,
“ and the Body must be extraordinarily well
“ prepared and purged before : Because it
“ hath sometimes brought the Fit upon some,
“ who were well when they came thither.
“ Outwardly applied, it doth help sore Eyes,
“ red Pimples, and other external Infirmi-
“ ties. More Diseases, which have Affinity
“ with these, it may be used for ; but I will
“ content myself with this Enumeration of
“ the aforesaid ones, and pass to the Time,
“ Manner, and Order of taking the Water.
“ Yet must I not forget, in the Behalf of
“ Women, to tell them that there is nothing
“ better against Barrenness, and to make them
“ fruitful,

“ fruitful, if other good and fitting Means,
“ such as the several Causes shall require, be
“ joined with the Water.”

Observation the Seventh.

In slight Convulsions, these Waters may be serviceable; especially if warm Baths of them are used at the same Time; but of yet greater Service and Efficacy are they in *hypo-chondriacal* Disorders, and the Remains of the Venereal Disease; in which latter Case, I have known them of such great Service, that I hold it almost necessary for all, who have gone through a Course of Physic, or Salivation, to close with one of *Chalybeat* Waters, which are sovereignly good to recover and strengthen the Tone of the weakened and injured Vessels, and even to extirpate the Remains of *Mercury* lurking in the Body after the Cure.

But to extol these Waters as sufficient, of themselves, to effectuate a Cure of these malignant Disorders, he is nearly as much mistaken, as when he prescribes them for the Gout; whereas Mineral Waters, all (except the *Selter* Waters alone) should be avoided by those afflicted with that Distemper, as they will only render their Condition more miserable.

*Of the Time, Manner, and Order of taking
Tunbridge-Water.*

“ Some that shall read the next foregoing
“ Chapter, will perhaps say, that I make

“ this Water a direct *Panpharmacon*, a Re-
“ medy for all Diseases ; and therefore will
“ give small Credit unto it. But, for all that,
“ daily Experience doth, and, if it continue
“ to be used, will more and more confirm
“ what I have said to be true. For very few
“ of those, who live at the *Spa* (whose Wa-
“ ter hath great Affinity with that of *Tun-*
“ *bridge*) and in the Country about it, and
“ make that Water their ordinary Drink, as
“ many do ; and myself have seen there very
“ aged People, that did never drink any
“ Thing else ; few of them are troubled with
“ Head-ach, Heart-burning, Stone, Obstruc-
“ tions of the Kidnies, Liver or Spleen, Fall-
“ ing Sickness, and the like ; and as for the
“ Jaundice, Dropsy, and Scabs, they do
“ not know what they are. Myself, during
“ my Stay there, being once rid out to take
“ the Air with a Couple of Gentlemen, and
“ a Shower of Rain coming, we made to a
“ Country-house near Hand, to shelter our-
“ selves ; and, after the Taking a Pipe of
“ Tobacco, I requested the good Man of the
“ House (who was a very old Man, and yet
“ fresh and lusty, and with very few grey
“ Hairs) to give us a Cup of his Beer ; but
“ he answered me, that he never had had
“ any Beer in his House ; if we would drink
“ good *Pouhon*, it was at our Service, and he
“ had a fresh Vessel of it abroach. *Pouhon*
“ is the Name of that Spring of the *Spa*,
“ which standeth in the Middle of the Town,
“ and

“ and by the same Name they call also the
“ Water thereof.”

Observation the Eighth.

I agree with our Author, that the constant Water-drinkers do not know, by Experience at least, the Distempers he mentions: But I am afraid, the persuading the Bulk of Mankind to give them strong Liquors with their Food, and to drink good common Water with it (no Occasion for *Pouhon*, or any other Mineral Water) is an Attack upon a Luxury, too powerfully established to be shaken by the Physician's Remonstrances; even though they are so strongly backed by the Authorities of common Sense and Experience: Even the certain Punishments, that threaten the Immoderate in their Diet, cannot, we see, bring over any considerable Number to the Side of Temperance, which is a Virtue big at once with Health and Pleasure.

“ But to return to our Matter,

*Temporibus Medicina valet, data tempore
profunt,
Et data non apto tempore, vina nocent.*

“ And so Water. The Time then of taking
“ those Waters is either the Season of the
“ Year, when to come to them, or the Time
“ of the Day, when to drink of the same.
“ Concerning the Season of the Year, Summer is the fittest, when there is settled

“ warm and dry Weather, as in the *Dog*
 “ Days especially :

Cum Canis arentes findit hiulcus agros.

“ And the chiefeſt Months be *June, July,*
 “ *Auguſt, and September* ; although the *Dutch,*
 “ who naturally love good Beer and Wine
 “ better than Water, uſed to have this rhim-
 “ ing Verſe in their Mouths :

Menſibus in quibus R, non debeo bibere Water.

“ And, according as the Year proveth, a Man
 “ may ſometimes come ſooner, and continue
 “ later. In general, whenſoever the Weather
 “ is clear and dry, the Water is then beſt,
 “ as well in Winter, as in Summer ; yea, in
 “ hard froſty Weather, the Weather is com-
 “ monly ſtrongeſt, the *Antiperiſtaſis* of the
 “ Air hindering, that there is not ſo great
 “ an Evaporation of the Mineral Spirits of the
 “ Water. For when the Weather is rainy
 “ or miſty, and that *Jupiter* doth *per cri-*
 “ *brum mingere*, piſs through a Sieve, as *A-*
 “ *riſtophanes* merrily ſpeaks, the Water loſeth
 “ much of its Virtue. Myſelf have known
 “ at the *Spa* a Friar of the reformed Order
 “ of Saint *Francis*, a good honeſt temperate
 “ Man, who aſſured me, that having been
 “ there three whole Years together continu-
 “ ally for the Stone (of which he ſhewed me
 “ a Box almoſt full, of ſeveral Forms and
 “ Bigneſs) and taking the Water all the while
 “ both Summer and Winter, when the Wea-
 “ ther

“ ther was feasonable, he found divers Times
 “ the Water better, ftronger, and of a more
 “ speedy Paſſage in froſty Weather, than in
 “ the Middle of Summer, without ever per-
 “ ceiving any Inconvenience by the Water,
 “ no more at that Time, than in Summer,
 “ for all he did always drink it cold.”

Obſervation the Ninth.

Our Author gives a full Account of the Time, proper for taking theſe Waters, and withal deduces very ſufficient Reaſons, why they ſometimes vary in their Degrees of Goodneſs or Strength.

And very remarkably, as well as juſtly, is the Story of the *Franciſcan* Friar, who drank the *Spaw*, Summer and Winter, applicable to the Waters of *Tunbridge* Wells; no Reaſon appearing, why they ſhould not be as good and efficacious in the froſty Weather in the Winter, as in the Droughts of Summer, when there is Occaſion for their Uſe.

And here I cannot help inserting an Idea of mine, which has frequently occurred to me; that, if the Nobility and Gentry, who attend the public Buſineſs in Town, during the Winter-ſeaſon, would, in their Vacancies, viſit the *Tunbridge* Wells, ſituate as they are, at an eaſy Diſtance, and on clear Days drink the *Chalybeat* Waters, it would, in my humble Opinion, be a great Means of prolonging or maintaining many a valuable Life, in a good uninterrupted State of Health; as it would be a ſure Means of removing or de-

oppilating the Obstructions in the minutest and most extreme Vessels of the Body, which Gentlemen are so liable to contract, in those public Places, from that gross terrestrial Air, which is occasioned by the Smoak of that common combustible Fossil, the Pit-Coal, which is universal to this great City.

“ For some that use to take it in cold
“ Weather, do warm it ; but sure the Water
“ cannot chuse, by that Means, but lose a
“ great deal of its Virtue, which, in the
“ Warming evaporateth away, seeing that in
“ the very Transporting of it the same doth
“ happen. When the *Spa* Water is bottled
“ to be sent away, albeit those who have
“ the Charge of it, be never so careful in
“ stopping the Bottles close with boiled Cork,
“ and pitching them over, yet will the Mi-
“ neral Spirits find Way, insomuch as when
“ you come to open them, you shall still
“ find some want ; and sometimes a pretty
“ deal, especially of the Water of the *Saven-*
“ *ter*, which is more subtile and spiritual
“ than that of *Pouhon*. But to return to the
“ Matter, there is no more to be said, but
“ that, in a Word, the Water is always best,
“ when the Weather is clearest and driest.

“ Now concerning the Time of the Day,
“ the Morning, when the Sun is an Hour,
“ more or less, high, is the fittest Time to
“ drink the Water. For when the Sun be-
“ ginneth to be of Force, it doth attract some
“ of the Mineral Spirits, and the Water loseth
“ some

“ some of its Strength ; and betimes in the
 “ Morning, it is also best walking. And you
 “ are so to drink the Water, as you may
 “ have taken the Quantity, which you intend
 “ to take that Day, within as small a Space
 “ of Time, as conveniently as you can, with-
 “ out oppressing your Stomach too much, as
 “ within an Hour, or less, if you be able.
 “ Those that lie not too very far from the
 “ Springs, and are able to use their Legs,
 “ shall do better to come thither a Foot, than
 “ to ride, because so they shall heat their
 “ Bodies more. Yet, do I not intend they
 “ should be so hot, as to sweat, or to be ready
 “ to sweat, for that would do Hurt ; but I
 “ mean only that their natural Heat should
 “ be something awaked and excited, because
 “ then the Water will be the better attracted,
 “ and have the more speedy Passage. After
 “ every Glass, every two or three Glasses,
 “ according as you shall be able to take it,
 “ it will be good to take a few *Carraway*
 “ *Comfits*, or *Coriander-seed*, some *Galingall*,
 “ *Zedoar*, *Elecampane*, *Angelica-root*, or such
 “ like, to help the Digestion and Passage of
 “ the Water. In some it is necessary, that
 “ they should have some *Electuary*, *Lozenges*,
 “ or the like, appropriated to the Grief, for
 “ which they take the Water. Divers do
 “ take Tobacco after their Water, which I
 “ do not dislike, especially if they hold it a
 “ good While in their Mouths, before they
 “ puff it out. Moderate Exercise after it is
 “ very available ; but I utterly dislike it, if
 “ it

“ it be too violent, as Running, Leaping,
 “ Jumping, as some in Wantonness used to
 “ do. For that Kind of Exercise is rather a
 “ Hindrance, than a Help, to the Digesting
 “ of their Water; and many Times all the
 “ Good it doth, is to bring it up again,
 “ weakening by that Means their Stomach,
 “ which, in Vomiting, doth always suffer.
 “ True it is, that, if the Stomach be foul, it
 “ is not amiss sometimes so to do, and I am
 “ not against it. After you have taken your
 “ full Quantity, it will do well to walk and
 “ stir there up and down, and to compose
 “ yourself to Mirth with the rest of the Com-
 “ pany: For those that look to reap Benefit
 “ by *Tunbridge*, must turn away all Cares and
 “ Melancholy.”

Observation the Tenth.

Our Author lays down very good *Rules* for
 the Time and Method of taking this Water,
 and the Exercise to be performed with it;
 but omits the most essential Caution, which
 must be daily noted and remembered; that
 those Corroboratives of the Stomach, designed
 in Aid and Assistance of the Digestion of
 these Waters, must be adapted to the parti-
 cular Constitution and Distemper of the Pa-
 tient.

“ In your Return to your Lodging, I hold
 “ it better to ride, than to go a Foot, be-
 “ cause, sitting upon your Horse, the inward
 “ Parts, as the *Muscles* of the Belly, the Guts,
 “ and

“ and the Stomach itself, are thereby borne
 “ up and contracted, and by Jogging of the
 “ Horse moderately stirred, and so consequent-
 “ ly your Water will be the better digested.
 “ The Sign of the thorough Concoction of
 “ the same is commonly known, when your
 “ Urine beginneth to have a *Tincture*, and
 “ be coloured, and then may you go to Din-
 “ ner; but of this we will speak of Pur-
 “ pose, when we come upon Diet. I said
 “ before, that the best Time of the Day to
 “ take the Water was betimes in the Morn-
 “ ing; and I mean also it should be the only
 “ Time for that Day. For I have known
 “ some, who took it twice a Day, namely,
 “ in the Afternoon also, but I could never
 “ approve of it; and my Reason is, that, if
 “ they take it soon after Dinner, their Meat
 “ will not be digested, and the Water, forcing
 “ to make Way for itself, will draw with it
 “ the *Chylus* raw and unconcocted, and so
 “ cause Crudities and Obstructions, which will
 “ do a great deal more Hurt, than the Water
 “ can do them Good; and if they take it later
 “ after Dinner, their Water will not be di-
 “ gested before Supper. Once a Day then is
 “ enough, lest you have worse Speed by
 “ making too much Haste. Now, for the
 “ whole Quantity of the Water to be taken
 “ in one Morning, it is a Thing which can-
 “ not justly be defined, in Regard of the
 “ Difference of Bodies in Age, Sex, Strength,
 “ and other Circumstances; but generally
 “ those that are able to drink most, receive
 “ the

“ the most Benefit, so that they do digest and
 “ void their Water well. And here it is, if
 “ any where, that the *Greek* Proverb should
 “ take Place, ἢ πίθι, ἢ ἀπίθι, *aut bibe, aut abi*,
 “ either drink, or be gone; if you cannot
 “ tipple, this is no Place for you. Yet must
 “ every Man ever have this general Rule in
 “ Memory, *Ajuvantibus & lædentibus optima*
 “ *judicatio*, the best Judication or Direction
 “ is from those Things, which do Good, and
 “ from such as do Hurt. You shall see some
 “ that arise to a great Quantity, and

Inuenies illic, qui Nestoris ebibat annos.

“ Three-hundred Ounces, according to *Nes-*
 “ *tor's* Years: Yea, and some a greater Quan-
 “ tity. And it is a Thing, that will make
 “ the very Women there filling the Glasses,
 “ to laugh, to see some Patients sent thither
 “ by ignorant Physicians, and appointed to
 “ take ten or twelve Ounces of Water, and
 “ arise perhaps to twenty or thirty Ounces.
 “ But this may be a Rule for a Body of com-
 “ petent Years and Strength, to begin at
 “ thirty, forty, or fifty Ounces, and to arise
 “ by Degrees, increasing their Quantity every
 “ Day, to an hundred, an hundred and fifty,
 “ or two-hundred Ounces, more or less, as
 “ they shall be able; and so again to decline
 “ and decrease by Degrees, ending where
 “ they began, when they are to leave the
 “ Water.”

Observation

Observation the Eleventh.

No certain Rules can be laid down for the Quantity of these Waters, that should be taken in all Cases ; but, in general, a copious Potion is requisite : Our Author, therefore, justly animadvert on the Ignorance of certain Physicians, that, sending Patients to these Waters, prescribe them in too small Doses ; a Failure generally met with in those Practitioners, who trust too much to set Regimens : But as different Constitutions require different Quantities, and more or less Continuance ; it is therefore much the best to advise with a Physician well versed in the Nature of these *Chalybeat* Waters, and fully informed of the Constitution and Distemper of the Patient ; and by him only ought the *Continuance* to be determined, as well as the *Quantity*, the Dose to be heightened, or fallen with Judgment, according to the Stages and Variations of the Complaint.

“ As for the Time of every Man’s Stay
“ there, it is a Thing which cannot be defined ;
“ for in some Diseases some Weeks suffice,
“ in others divers Months are not enough ;
“ nay, in some they have Need to come thi-
“ ther the next Year, and the next to that
“ too. This, I hope, will suffice for the
“ Time, Manner, and Order of taking *Tun-*
“ *bridge* Water ; I will now pass to the Pre-
“ paration of the Body of such as are to take
“ it.

Of the Preparation of the Body of such as are to take the Water.

“ I have set down before the chiefest Diseases, which may be cured by the Help of this Water ; but I am not so to be understood, as though I mean that the Water alone were sufficient for the same in all of them, without any other Helps. For, albeit this be an *empirical* Remedy, yet must it not be used altogether *empirically*, but with Reason, Discretion, and Circumspection, otherwise Hurt, rather than Good, will follow the Use of it. Many have fallen into Diseases, as Fevers and Agues, by coming unadvisedly and unprepared to those Waters ; although, as we said before, there is nothing better for Agues, than they are, if they be rightly and advisedly used, the Body being first prepared and purged. For, although Blood, by a sole Distemper of Heat, may cause a Fever, yet cannot the other Humours do it, as *Galen* well observeth, unless they putrify, which they will not do, if the Body be free from Obstructions, and *perspirable* ; and therefore that Body which is to be taken with an Ague, must first be obstructed. Now these Waters being very *diuretical*, when they meet with a foul Body, having a Repletion of gross Humours, they easily and speedily carry the same with them into the Veins, which not being able to give Passage to such a Quantity of Humours, they
“ are

“ are thereby obstructed and stopped; and
 “ those Humours being there retained and
 “ wedged in, and not *perflated or ventilated*,
 “ they inflame and putrify, and so produce a
 “ putrid Fever or Ague. Wherefore those,
 “ that love their Health and Life, must, be-
 “ fore they use the Water, if they have not
 “ a very pure Body, prepare and purge the
 “ same to prevent all Inconveniences.

“ Now, according as Bodies do differ in
 “ Sex, Age, Temperature, Quality of the
 “ *peccant* Humour, and other Circumstances,
 “ so must they accordingly diversly be pre-
 “ pared and purged. And, in that Regard,
 “ we have not thought it good to set down
 “ here any Forms thereof, but refer those
 “ that shall come to the Water to the Ad-
 “ vice and Counsel of learned and skilful
 “ Physicians, and such as are withal well ac-
 “ quainted with those Kind of Waters, which
 “ is the main Point. And as for those, that
 “ come far off, they may take Physic at
 “ *Tunbridge*, and it will be best for them so
 “ to do, because if they take Physic before,
 “ and presently travel upon the same, it may
 “ produce some Danger.”

Observation the Twelfth.

It is not only the best Practice, but, in my
 Opinion, indispensably necessary, to prepare
 the Body either with a *Cathartic* or *Emetic*,
 adapted to the Nature and Condition of the
 Patient's Constitution, or Disorder, at *Tun-*
bridge Wells, that is to say, on the Spot where
 the

the Use of the Waters is immediately to succeed; and this, notwithstanding any Shortness of the Journey to them; because where there is a Dyscrasy, the gross peccant Juices soon return after a Purging or Vomiting; therefore the *Chalybeat* Waters ought instantly to follow after these preparatory Evacuations, which must necessarily too be repeated, in due Intervals, and as the Case of the Patient shall be found to require: The Expedience of which Method our Author very sensibly accounts for, in his Observation that these Waters easily carry the gross, unnatural, peccant Humours into the Sanguification.

“ If the Resort to the Water continue,
 “ and that there be competent Company at
 “ the same, I do purpose, by the Grace of
 “ God, to be there every Summer (for it is
 “ a Place I like) and if any be pleased to
 “ confer with me, I will be ready to afford
 “ them my best Counsel; and they shall find
 “ there Variety of Physic, appropriated to
 “ the several Diseases, which the Water is
 “ to be used for. Neither is it enough to
 “ prepare the Body, and take Physic before
 “ Coming to the Water; but it is requisite
 “ also, in some Diseases, to take something
 “ now and then, during the Time they use
 “ the Water, to help the Working of it, and
 “ to cause a happy and prosperous Effect by
 “ the same; and so much the more, because
 “ some are not able, either by Reason of
 “ Business, or otherwise, to stay there a com-
 “ petent

“petent Time, and therefore have Need of
“some other Help. For some Diseases are
“so stubborn and difficult to be eradicated,
“that we must fight at all Weapons against
“the same, and yet all little enough too.
“Some unlooked for Accidents also happen
“there sometimes, which have Need to be
“redressed and helped by other Means. But
“of these Things, neither myself, nor any
“Man else can speak, but in general Terms,
“and therefore I will conclude, and pass to
“the Diet requisite to be observed there.

*Of the Diet to be observed by those that use
Tunbridge-Water.*

“Diet, among Physicians, is taken in a
“larger Signification than it is with the Vul-
“gar; for, besides Meat and Drink, it com-
“prehendeth Air, Motion, and Quiet, Things
“retained and voided, Sleeping and Watch-
“ing, and the Passions of the Mind. All
“these must be rightly ordered, both to pre-
“serve, and to restore Health. As for Air,
“it must be taken, such as it is found there,
“and I think there is no great Exception to
“be taken against it, being thereabout pure
“and wholesome enough; of Motion and
“Quiet we have said something before, when
“we spoke of Exercise, as also of the Passions
“of the Mind, when we wished all such as
“come to the Water, to compose and frame
“themselves to Mirth, and to leave all Cares
“and Melancholy at Home. Concerning
“Sleeping and Watching, a Moderation must
H “ be

“ be observed therein, though it be better to
“ sleep something too much, than to watch
“ too long; and therefore you shall do well
“ to sup betimes, and to go to Bed betimes,
“ *Animo securo, quieto, & libero*, that the first,
“ second, and third Concoction may be ended,
“ before you take the Water. And, as for
“ Things voided and retained, you must en-
“ deavour to have the Benefit of Nature by
“ all Manner of ordinary Evacuations, as by
“ Stool and Urine, and the private Excre-
“ ments of the Brain, at the Mouth and
“ Nose. And thus much in brief concern-
“ ing those Things; we will now come to
“ Meat and Drink. Bread is commonly,
“ and with most Men, the chiefeſt Part of
“ Food, and therefore, though always, yet
“ here more eſpecially, you muſt have a Care
“ to have Bread of good pure Wheat, well
“ handled and ſeaſoned in the Making, and
“ well baked: For the Excrements and ill
“ Humours, which are heaped by the Uſe of
“ ill Bread, are worſe than thoſe, which pro-
“ ceed from Meat. Ravel Bread generally
“ is wholeſomer than Manchet, and not ſo
“ apt to breed Obſtructions, having ſome of
“ the Bran left in it, which is *detergent*, and
“ maketh it paſs the better.

“ As for Meat, let every one feed upon
“ that, which he hath been moſt uſed to, ſo it
“ be good Meat, yielding good Nouriſhment,
“ and of eaſy Diſteſtion; and let him ſhun
“ the Uſe of Sauces, which have much But-
“ ter and Spices in them. For it was a good

“ Admonition

“ Admonition of *Disarius*, a learned Physi-
 “ cian in *Macrobius*, *Vitandos esse cibos, qui ul-*
 “ *tra sitim & famem appetentiam producerent*,
 “ That those Meats were to be avoided,
 “ which did lengthen Appetite beyond Hun-
 “ ger and Thirst. If you can, be you con-
 “ tented with one Dish at a Meal, for *Multa*
 “ *fercula multos morbos ferunt*, Many Dishes
 “ bring many Diseases, and *Perniciosa senti-*
 “ *na est abdomen insaturabile*, An unsatiable
 “ Belly is a pernicious Sink. In foul Bodies
 “ especially, Over-feeding doth a great deal
 “ of Hurt, according to that Aphorism of
 “ *Hippocrates*, *Τὰ μὴ καθαράων τωμάτων,*
 “ *ὁκόσον ἂν θρέψῃς μᾶλλον βλαψείς*, The more
 “ you nourish foul Bodies, the more you
 “ hurt them. In a Word, a moderate sober
 “ Diet is always best, but especially here.
 “ As for the Kinds of Meat, albeit, amongst
 “ the Flesh of four-footed Beasts, Pork and
 “ Veal be chiefly commended in our Books,
 “ yet here, in Regard of their Moisture, I
 “ prefer Mutton before them. And if Pork
 “ be to be avoided, much more Pig, Lamb,
 “ and such like flashy Meat. As for Beef,
 “ though it be discommended by some Au-
 “ thors, yet good Beef well fed, and of an
 “ indifferent Age, may be used without Scru-
 “ ple, especially by such as have been ac-
 “ customed to it; for these Authors were
 “ never acquainted with our *English* Beef.
 “ If Oxen indeed be killed when they are so
 “ old, that they be past Labour, their Flesh
 “ cannot be wholesome, nor is it to be com-
 H 2 “ mended.

“ mended. But, for our good succulent Beef
 “ here, I verily think, that if those Authors
 “ were alive again, and should taste of it,
 “ they would be so far from forbidding it,
 “ that, to the contrary, they would commend
 “ it. For, if they do so much commend Veal,
 “ I see no Reason they can have to discom-
 “ mend good succulent Beef.”

Observation the Thirteenth.

The Air at *Tunbridge-Wells* is as good as can be wished for, or expected in this Island. Provisions of all Kinds are easy to be had there. The Houses are commodious and pleasant; so that there can be no where greater Conveniencies, or better Accommodation for the Reception of Company of the first Distinction. The Inhabitants are very civil, and, as far as I could extend my Acquaintance with them, I found them in general very just and reasonable in their Dealings, which is the more commendable, in that they chiefly consist of such as depend on their public Business; whereas most of these Places of occasional Resort are accounted to abound in Exacters, which indeed too often proves true: But I am heartily glad of this Occasion, to do no more than Justice, in ranking *Tunbridge-Wells* amongst the honourable Exceptions; and indeed it is the only Place of that Nature I have yet seen, where the Landlords use their Guests with any tolerable Conscience or Moderation, though I have been at a great many of the like noted Places for Mineral Waters,

Waters, though not in *England*, except those near *London*, of which I shall treat in the succeeding Chapter. I hope and wish therefore, that all the Places of Resort to these Medicinal Waters may afford as good Usage and Reception as *Tunbridge-Wells*, of which I speak experimentally.

Yet even there, I owe to Impartiality some Exceptions from this general Character of the Place: There are a few, on whom it would be good to set a Note for their being avoided, that ransom their Guests. The Landlord, where I first lighted, taking I suppose the Advantage of my being a Stranger, imposed excessively on me: No Body could however use fairer Words, or more Civility; but then no Body accommodated worse, or brought in more exorbitant Bills: He had a Servant, worthy to be remembered for his Simplicity and Honesty, who was nicknamed *Sir Edward*; when expostulating with him on his Master's unreasonable Demands, he answered me, That there being but a short Season in the Year for making his Harvest of his Guests, it behoved his Master to think of living in Winter, as well as in Summer, and that the Company ought to make Allowance accordingly: By the Way, this arch Fellow would have subscribed a Number of entertaining Stories for a Writer of *Tunbridge Amusements*. I did not stay however long at this Cut-throat's House, but having tried others, may pronounce very candidly that I

found no more of the Stamp of my first Landlord.

Our Author very rationally recommends the Choice of good Bread to our Water-drinkers, requiring it to be well kneaded, seasoned in the Making, and well baked. These are indeed Circumstances, which ought to be carefully attended to; but this is not the Capital Point that renders common Bread not only unwholesome to Mineral Water-drinkers, but indeed generally so in this great Town especially, and is owing to a most pernicious Custom in Practice amongst the Bakers, in this Writer's Days perhaps unheard of, and now if not so generally known, it is at least felt severely by many Thousands in or near this great City of *London*, and the adjoining Counties, to the great Damage of their Healths. And this deadly Mischief arises from the Bakers using Quantities of *Allum* in the Composition of their Bread, dissolving this Drug in the Water, they use to the Mixing, which makes the Bread turn out *heavier* and *whiter*; and this heterogeneous Mixture occasions Obstructions, which become the Foundation of several other almost incurable Distempers; *incurable*, I say, because their Cause not being *known* and *removed*, the Distemper is constantly nursed from the Bread continuing so considerable a Part of the Patient's Food; insomuch that, not improbably the Consumption, that Disease so ordinary in this Nation, may, in a great Measure, be owing to this unjustifiable Mixture
in

in the Bread, an Abuse not intirely unworthy the Intervention of the Legislature to abolish. But especially let me recommend to the Water-drinkers at *Tunbridge-Wells*, to take particular Care that the Bread they use, in the Time they drink these Waters, be not whitened with Allum.

“ Besides Mutton and Beef, you may
 “ sometimes have Capons, Hens, Pullets,
 “ Chickens, Pigeons, Partridges, Pheasants,
 “ Black-birds, and other small Birds, Rabbits,
 “ and the like. And, because some Hares
 “ are sometimes caught about *Tunbridge*, it
 “ is a Question, which some ask, Whether
 “ those who are there at the Waters, may
 “ feed upon them? They are grown infamous, and banished from most Tables undeservedly, out of a Conceit that they are melancholy Meat. But I will now take their Cause in Hand, and *vindicate* them from that Imputation, if I can, saying with *Martial*:

*Inter aves turdus, si quis, me iudice, certet ;
 Inter quadrupedes gloria prima lepus.*

“ And lest I seem to give too easy an Assent
 “ to the Poet (though he was not a meer
 “ Poet, but well grounded in natural Philosophy) I will strive to prove, that it is not melancholy Meat, but Meat for melancholy Men.

“ First, I will bring in *Galen* to patrocinate

“ nate unto him, who prefers the Blood of
 “ a Hare before that of Hens, Pigeons, and
 “ all other Birds, and saith that it is most
 “ sweet and dainty. Now, if Hare’s Blood
 “ be so good, how can the Flesh thereof be
 “ naught, which is made and produced by
 “ it, Flesh being nothing else but Blood *co-*
 “ *agulated* and converted into the same.

“ The same Authors say also, that Hare’s
 “ Flesh breedeth better Blood, than Mutton
 “ or Beef. And if these two come every
 “ Day to the Tables even of the noblest and
 “ richest Persons, why should the poor Hare,
 “ which is better, and yieldeth better Nou-
 “ rishment than they, be banished from the
 “ same?”

“ After *Galen*, learned *Heurnius* reckoneth
 “ Hare’s Flesh in the first Place amongst
 “ those Meats, which alter Melancholy in
 “ the Kidnies; but to alter and free from
 “ Melancholy, cannot both be done by one
 “ Kind of Meat. For if any Man would
 “ fly here to Similitude of Substance, or to
 “ an hidden Property, he should deserve to
 “ be hissed at. But they say, it is a melan-
 “ choly fearful Creature. What Reason they
 “ have to call him so, unless it be because
 “ he shunneth and runneth away from the
 “ Dogs, which pursue him, I do not know;
 “ But if that be all, Do not Wolves, Bulls,
 “ Bears, yea and Lions also, the like? If we
 “ may believe those, who have been in *A-*
 “ *frica*, an old Woman there, or a Child,
 “ with a Stick in their Hands, do drive away
 “ Lions,

“ Lions, as we do Dogs here. And a Hare is
 “ not so fearful, but that you shall see some
 “ of them turn about, and look upon the
 “ Dogs after a daring Manner. They do not
 “ lie in Holes and Burrows, as Conies do,
 “ which in that Regard should be more me-
 “ lancholy, and yet they are in most Use a-
 “ mongst us, and accounted the best Meat.
 “ And as for their Food, it is the same with
 “ that of Partridges, the Excellency whereof
 “ is no where controverted; and with the Use
 “ of them only, the Pox may be cured, as
 “ *Cardan* holdeth, who could speak of it by
 “ Experience; as having had that Disease
 “ seven Times, as himself witnesseth in that
 “ Book of his, which he entitleth *De uti-*
 “ *litate ex adversis capienda*; and sure his
 “ Witness is not to be rejected. Let the
 “ Hare then return in Use, and be re-admit-
 “ ted to his former Preheminence; so he be
 “ not too old, but of a competent Age, as
 “ of a Year, or less. But, as for Water-
 “ Fowl, you shall do well to abstain from
 “ the same.

“ Concerning Fish, though it be for the
 “ most Part unwholesome, and apt to breed
 “ *excrementitious* and slimy Humours; yet,
 “ for a Change you may sometimes eat some
 “ River Fish, that is firm and not slimy, as
 “ Trouts, Gudgeons, Pikes, Perches, and
 “ the like, either broiled or boiled in Wine
 “ (if you will go to the Charges) rather than
 “ in Water, and corrected with Fennel,
 “ Spearmints, Thyme, Rosemary, Parsley,
 “ or

“ or the like. But for Mints in particular,
 “ let those Women, that come to the Waters
 “ for Fruitfulness, refrain the same, because
 “ it is thought it hindereth Conception. At
 “ your Fruit, you may use some Raisins of
 “ the Sun, a Bit of Marmelade, a roasted
 “ Wardon or Pepin with Carroways, or the
 “ like: But in all this you must be sparing.
 “ Now, for an End of all, I must repeat
 “ what I have touched before, namely, that
 “ you avoid Variety of Dishes. For the Na-
 “ ture of several Meats being diverse, and
 “ sometimes clean opposite and contrary one
 “ to another, and some sooner concocted,
 “ and others later, from hence those Evils
 “ will arise, against which you come to seek
 “ Help from the Water, as Crudities, Wind-
 “ gripings, Pain of the Reins, Obstructions
 “ of the *Mesaraical* Veins, Rawness of the
 “ *Chylus*, and consequently of the Blood,
 “ which shall be made of the same, and
 “ such like Inconveniencies, which, by a
 “ sober and moderate Diet yet may be a-
 “ voided.

“ Thus much concerning Meat. As for
 “ Drink, good ordinary clear Beer, and of
 “ an indifferent Strength and Age, is best;
 “ and it is the ordinary Drink of this Island,
 “ and which agreeth best with the Nature
 “ of those, which are bred in it. Yet if any
 “ having been used to drink Wine at Meals,
 “ desire to continue the same, I am not a-
 “ gainst it, if so be they be not of too hot a
 “ Constitution, and have no principal Part
 “ offended

“offended through Excess of Heat; for a
“Cup of Wine or two at Meals doth but
“help to make the better Digestion. And
“for that Purpose Sack or Claret are better
“than White Wine; because White Wine,
“by the *diuretical* Faculty it hath, passeth
“too soon away, and before the *Chylus* be
“thoroughly perfected, and so it may carry
“some of the *Chylus* raw and unconcocted
“with it, and consequently breed Crudities
“and Obstructions. And thus much concerning Diet.”

C H A P. IV.

Of the Chalybeat Waters at ISLINGTON, called the New Tunbridge-Wells. Of the Waters in Saint WINIFRED'S Well at HOLYWELL in Flintshire, NORTH-WALES: Also of some Chalybeat Springs in that Neighbourhood. And of the Mineral Water, called the NEVILLE HOLT Spaw in Leicestershire.

AS soon as it came to the Knowledge of some of my Friends, that I intended to publish a Treatise on the *Chalybeat Waters* at CLEVES, their extensive Concern, as much for the Welfare of their Country, as for that of Mankind in general, made them wish
that

that I would add some Animadversions on the *ENGLISH Medicinal Waters*, that I might have seen since my Residence in this Island; in Deference to which Desire, having already touched on those of *Tunbridge-Wells*, I proposed to take Notice of these, that had also fallen under my personal Observation, at St. *Winifred's Well* in *Holywell*, and some other *Chalybeat Springs*, I discovered in that Neighbourhood, hitherto unknown to the Public, without Mention of any other, from a Maxim fixed with me, to write nothing of Mineral Waters, on the Faith of others, but only of such, on which I have made authentic and satisfactory Experiments.

But my Friends, apprehending from thence a material Omission, insisted with me, on making some Experiments on the *Mineral Waters*, in the Neighbourhood of this METROPOLIS, with the more Reason, they being suspected of Artifice and Contrivance, as produced by Infusion of old Iron, or other Drugs and Materials disposed in the common Water Springs under Ground, by the Proprietors or Tenants of them.

For me then, who had seldom heard of these Waters, nor ever saw them, during a six Years Residence in the City of LONDON; I was very ready at once to gratify my Friend's Request, and my own Curiosity.

Accordingly, I went on the 27th of *June*, 1748, in Company with four worthy Friends, to the *Chalybeat Spring* at *Islington*, called the new *Tunbridge-Wells*, and arrived there at 5 o' Clock

Clock in the Morning, which was misty and hazy ; to no greater a Degree however, than to oppose the quick Exhalation of the Mineral Spirits of the *Chalybeat* Waters, which I immediately strongly smelt, as did also my Companions, to whom I remarked it.

This Phenomenon is owing to a constant Exhalation on the Fountain-head of those Mineral Vapours or Damps, wherewith these Waters are impregnated, and remain nevertheless equally strong in the Well, from their constant Supply under Ground. But, on a clear, serene, Sun-shiny Morning, these Mineral Spirits, rising quick, cannot be so perceptible to the Sense of Smelling, as they are not checked or opposed in their Passage, by the Interfering of the dense, misty Air.

Perceiving these excellent salutary Mineral Spirits in such a Quantity, I was agreeably surprized, and undeceived of the Prejudices created by the false and disingenuous Report circulated of their being a mere Artificial Compound : A Calumny clearly disproved by the Smell of the Mineral Damps ; a Smell, which Artificial Mixtures can never attain to the Imitation of, and which, wherever we meet with them, carry a Certainty that the Waters are Natural and Medicinal. Such then are these, and I own I am sorry to see such invaluable Gifts of Providence, placed so near a *Metropolis*, where there are such numerous and urgent Occasions for them, in less Note and Esteem than they deserve, from
an

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an Error of public Opinion, which it was so easy to come at the Truth of.

The Proprietor of this Spaw, with great Frankness and Chearfulness, granted me the Leave to make a few *Experiments* on the *Fountain-head*. He told me, that he had long wished for, and often desired and invited Gentlemen of the Faculty to make *Experiments*, that the Public, by their Means, might be satisfied, that this Water was a Natural, and not an Artificial Compound: On which I observed to him, that, though I had not yet made any Experiments, I had already discovered infallible Symptoms of their Genuineness, such as the *Smell*, and also that fat unctuous Matter, that lines the Glasses, out of which the Waters are constantly drank; which are evermore the certain Indications and Proofs of a Natural *Chalybeat*: Besides which, I acquainted him how to clear up any the least remaining Doubt by Mixtures, which I shall hereafter occasionally deduce.

There is, however, a reasonable Foundation for this Prejudice or Suspicion of the Medicinal Mineral Waters near LONDON being the Compositions of *Art*: From such a Practice having been heretofore used, especially by Sir *William Jennings*, and Dr. *Haworth*, a Gentlemen of excellent Judgment and Skill in the Profession; the first having obtained a *Patent* from King CHARLES the *Second*, for Inventions of this Sort, and by Virtue of this Patent, the second did contrive and make *Chalybeat* Waters, in so peculiar,

culiar, exquisite, and ingenious a Manner, as to puzzle even good Judges, to distinguish them from Natural. And not improbably these artful Compounds were the first Causes of the Unbelief of Natural *Chalybeat* Waters, in the Neighbourhood of *London*.

The only Author I can meet with, that has taken any Notice of the Waters at *Islington*, is Mr. *Allen*, in his *Natural History of the Chalybeat and Purging Waters of England*; and that is only in a transient short Account of them. According to him, “ It
 “ made no Alteration in a Solution of Subli-
 “ mate, and, with *Sal Saturni* dissolved in
 “ common Water, became a little milky
 “ and curdled; and not clear as with a Salt-
 “ Petre. With *Lignum Nephriticum*, it re-
 “ mained pale, but clouded with a thickish,
 “ dusky White, &c.” But he enters not enough into the Detail of the particular Use and Efficacy of this Water, which is to be regretted, as not improbably, for Want of proper Directions for Medicinal Administrations, it has so long remained in too little Use and Notice.

N. B. According to the Experiments I have made on this Mineral Water, I may class it under the third Division of *Chalybeat* Waters, stated in the first Chapter: I shall compendize several Experiments into one, where their Nature allows it, for the greater Facility of the Observations I shall annex to them.

Exper.

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Exper. I. This Water taken in a Glafs, and expofed to the Air, turns of a *Pearl Colour*, and the *Mucilagium ferri* appeared firft on the Surface of the Water in a pale *Copper Colour*, which, after long Standing, received a little Quantity of the *Iron-Earth*. There appeared very few of the globular Bubbles; but the *Vitriol Spirit* appeared on the Sides of the Glafs, and it was a confiderable Time before the *Iron-Earth* precipitated itfelf, but in a fmall Quantity.

Observation the Firft.

This Water appears to me well charged with that flimy unctuous Matter, which I call *Mucilagium ferri*, from its being ever a Concomitant of the *Iron-Ore*, and is very homogeneous and falutary to the Animal Oeconomy. Then, as it is of a moft aftonifhing, penetrating Quality, it pervades, and is carried through the whole Human *Machine*, ftrengthens and lubricates all the weakened and infeebled Veffels.

Now, this flimy Matter muft not be taken for that *Sublimate*, to which *Bafil Valentine* gives the Name of the *Seed of Metals*, and which I call the *Nutrimment of Metals*. But this is an unctuous, or rather flimy Matter peculiar to the *Iron-Ore*; therefore, to guard againft this Miftake, I diftinguifh it constantly by the Name of *Mucilagium ferri*.

And this flimy Matter is a Proof incontrovertible of the ISLINGTON Water not being the Production of Art, but intirely a natural Generation.

Generation. For neither old Iron, nor other Materials whatever, however mixed by Art, are capable of producing that Tinge, or slimy Substance; which these Natural Mineral Waters are charged with. It is observed, that the richer they appear in this *Iron-Mucilage*, the more salutary Effects they produce, and the *Islington* Waters being imbibed with a competent Share of it, may consequently, with Justice, claim a Rank amongst the Medicinal Mineral Waters.

But, as the *Vitriol Spirits* and Mineral Damps line the Glass like a Sweat, yet do not rise to the Surface in globular Bubbles, I apprehend that this Water does not contain any elastic or universal Spirits, such as those of *Tunbridge* and other *Chalybeat* Waters are endowed with. The *Tunbridge* Waters contain also more Iron-Earth and Mucilage than these do.

Exper. II. This Water, mixed with *Syrup of Violets*, turns it *green*, or strikes a green Colour.

Observation the Second.

This furnishes me Occasion of throwing a just Light on the Nature of this *Capital Experiment*, which has hitherto imposed on and deceived the Public; being the greatest Proof the Partizans of the *Alkali* adduce to support their Assertion; this in short is the *Experiment*, wherewith they brow-beat and over-bear those, who deny an *Alkali* in the

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Chalybeat Waters: And, to say the Truth, it has hitherto perplexed and confounded many learned and ingenious Men, who, led by the general Observation, that this *Syrup* is changed by *Alkali's* into a green, and by *Acids*, into a red Colour, did not know how to reconcile this Exception, or account for it satisfactorily, not having considered the Matter deeply enough; and therefore, yielding up the Point to those that maintain an *Alkali* in these Medicinal Waters, became Proselytes to this Doctrine, and classed, amongst the vulgar Errors, the Attributing to these Waters the Name of *Acidulæ*; for which the Ancients have been too lightly accused of Ignorance.

But, as the Mistake of those who impute this Phænomenon to an *Alkali* in the Mineral Waters, arises from their not rightly distinguishing the Differences in Matter, I will therefore endeavour to elucidate, with all possible Clearness, this Experiment, by shewing the Causes, why this Exception, in Point of Colour, cannot proceed from an *Alkali*, and by briefly stating the true ones of that *green Colour* which is produced by a Mixture of the *Syrup of Violets* with the *Chalybeat Waters*.

First, It is well known, that *Iron-Vitriol* has such a green Colour as the *Syrup of Violets* assumes, when mixed with *Chalybeat Waters*; yet, I presume, there is no one so ignorant as to imagine that this Colour proceeds from any *Alkali*, or even to suspect one in
Action,

Action, when the *Acid* is so exquisitely predominant in this Compound.

Secondly, Verdigreese is evidently and positively of a perfect *green* Colour, manufactured of Vinegar and *Copper*; but I do not know of any *Alkali* that is necessary to this Product, though *Copper* appears in *blue* Crystals, when dissolved and crystalized.

Thirdly, When *Aqua-fortis*, or any other strong *Acid*, is poured upon *Iron-Ore*, it becomes instantly green: Yet here is not any Syrup of *Violets* in the Case, and supposing an *Alkali* in the *Iron-Ore*, yet the green Colour, which the *Aqua-fortis* expresses, cannot be owing to that, because the *Acid* is here far superior and predominant; and were there indeed so much *Alkali* in this Ore, as to occasion this green Colour, it would undoubtedly, on the *Aqua-fortis* being poured on it, promote or discover itself by an *Effervescence*, which all Experience is formally against.

Fourthly, But this Question is cleared up, beyond all Doubt, by the Solution of perfect Iron, which yields a *green Colour*, as soon as dissolved by *Acids*; and that there is not any Thing of the Nature of Syrup of Violets, or *Alkali*, in this Solution, for the Production of this Colour, I presume no Body will dispute. Thus we see, that, by various Ways, green Colours may be produced; therefore I think, we may safely conclude, the green Colour in these aquatic Mixtures is essentially and peculiarly inherent to the

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Iron-Ore, without any Assistance of *Alkali's*, Syrup of Violets, or any Thing of the like Nature.

But, as the *green Colour* in the *Chalybeat Waters* is produced by the Syrup of Violets, it is naturally incumbent on me to prove whence this Phænomenon proceeds, and for which I presume the following Discussion will satisfactorily account.

Syrup of Violets contains an *Iron-Earth*, and from it may be produced or drawn an Iron Earth by Art.

The *Acid* in the *Chalybeat Waters* is checked or obstructed in its Power and Action, by the Mucilage of the *Iron-Ore*, which is very probably the only and true Reason of this Mineral Water's preserving its crystalline Clearness, whilst unmixed.

The Syrup of Violets disengages, or sets at Liberty, the *Acids* and *Alkali's*, wherever it meets with them, so that they act upon it, agreeable to their Nature; and therefore this Syrup is the Umpire or Criterion, wherewith to prove or decide the Existence of *Acids* and *Alkali's* in the Subjects of *Experiment*. This Syrup then acts but its natural Part on the *Chalybeat Waters*, where it disengages and sets the *Acid* free from that oft-mention'd Slime, the *Mucilagium ferri*, as may visibly be remarked; for, as soon as the *Chalybeat Waters* are in Mixture with this Syrup of Violets, this slimy Matter separates and subsides, and the more it subsides, the stronger the green Colour appears; for then the *Acid* working

working its natural Effect upon the *Iron-Earth*, whereby this green Colour is in Course produced, as it always does where it has Liberty to work either upon *Iron-Earth*, or perfect *Iron*. And the *Acid* can so much the quicker and easier perform its Office, as the *Iron-Earth* in these Waters is already dissolved into Atoms the most minute imaginable; and this I humbly apprehend to be the sole and true Cause, into which this Production of a *green Colour* is resolvable, from a Mixture of the *Chalybeat* Waters with Syrup of *Violets*, which can by no means be owing to any *Alkaline* Quality in them.

Besides, there remains against this last Supposition another Consideration of no less Importance, which is, that if this green Colour in the Syrup was owing to any *Alkaline* Quality in the Waters, that Share of *Alkali*, requisite to produce it, would constitute such a predominant, disproportioned Ingredient in them, as would render it impossible for any Person living to quaff such large Doses of them, as are daily used by Persons of the tenderest Constitutions: Since they must be, in such Case, scarce inferior in Strength to Soap-lees, which is apparently otherwise.

Exper. III. With *Galls* this Water strikes an exceeding fine Purple, which, with Standing, turns no deeper, than a dark deep-coloured Claret. With *Terra Japonica*, it turns first Purple, and afterwards Blue. With *Log-*

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wood gradually a fine Purple. With the dried Herb *Veronica*, it strikes gradually a *Bluish Purple* Cast.

Observation the Third.

These are all certain Signs and Proofs of a *Chalybeat* Water, its natural and genuine Origin: For, was this Water the Produce of an artificial Compound, it would, in Mixture with these Ingredients, strike *black* and not a *purple* Colour, a Criterion with which I furnished the Proprietor the Means of satisfying all, who might entertain any Doubt of these really Mineral Waters.

Exper. IV. The *Oil of Vitriol* occasions in this Water a slight Ebullition; becomes warm, and remains clear. With *Spirit of common Salt*, it makes no Motion or Ebullition, but occasions a yellow Colour; nor with *Spirit of Nitre*, *Aqua-fortis*, *Spirit of Vitriol*, or distilled *Vinegar*, but they all keep it clear, and preserve the original Texture.

Observation the Fourth.

From these *Experiments* we are fully convinced, that there is not any *Alkali* in the *Chalybeat* Waters; otherwise they would inevitably with these strong *Acids* create an *Effervescence* or Precipitation, which we see they do not, plainly proving that it is the *Acid* which maintains and preserves them in their Texture; and is yet plainer proved in
VII.

VII. and VIII. *Experiments*, where the Trials are made with *Alkali's*.

Exper. V. With *sweet Spirit* of Nitre, and this Water, no Motion or Ebullition whatsoever is produced. The Water remains Crystal-clear, and a great many small *globular Bubbles* rise and settle on the Sides of the Glass, which renders this Water extremely sweet and palatable.

Observation the Fifth.

This Experiment suggested to me the following Opinion, which seems not unreasonable, that, as this Mineral Water is destitute of *elastic* or *universal Spirits*, the Addition of a very small Dose of the *sweet Spirit of Nitre* might, in several Disorders, be a beneficial and advantageous Supplement.

Exper. VI. *Allum* being dissolved in this Water, it remains clear, no Motion, nor Ebullition, ensuing. *White Vitriol* curdles it very much of a yellow Colour; and with *Copperas* or *Iron-Vitriol*, it occasioned a great deal of slimy *Iron-Earth* on the Surface of the Water.

Observation the Sixth.

The *Allum* not being impregnated with such a *gross Earth* as the *Iron-Vitriol*, and rather more dissolved by the *Acid*, unites therefore with this Water, without any Altera-

tion ; which could not happen, was there an *Alkali* contained in it.

White Vitriol, being a Compound of several Metals and Minerals totally opposite to the *Iron*, occasions therefore Curdling and Clouds, to which the *Saccharum Saturni*, or the Salt of Lead, is for the same Reason inclined ; and the *Mucilagium ferri* forces the *Iron-Earth* from the *Iron-Vitriol*, and drives it to the Surface in a slimy Substance.

Exper. VII. With a Solution of *Pot-ashes* this Water curdles like Milk, and occasions a *Precipitation*. With *Cremor Tartar* it changes to a Milk Colour, and produces a slight *Precipitation*, but not near so much as with *Pot-ashes*. *Spirit of Sal-Armoniac* and *Spirit of Hartshorn* curdle the Water, and occasion plentiful Sediments.

Observation the Seventh.

There needs not a more certain Proof of the Non-Existence of *Alkali's* in these Waters, than these last Experiments, which palpably indicate their *Acid* Quality ; and though they do not occasion a visible *Effervescence* with the *Alkali's*, the *Precipitation* is sufficient to convince that the *Alkali's* meet with nothing that is homogeneous, or hath an Affinity with them. But that these Waters are supported by a *Vitriol Acid* will be corroborated by the succeeding Experiments, even in so much that when this Water is destroyed by *Alkali's*, the *Acid* restores it to a clear State, and its original Texture :

Texture: Than which, what can be Proof more evident?

Exper. VIII. The Water, in which the *Spirit* of *Vitriol* was mixed, being poured into that with the *Spirit* of *Sal-Armoniac*, occasioned a very brisk Effervescence. It did the same with the *Spirit* of *Hartshorn*, but afterwards became clear, and the Sediment re-incorporated with the Water again.

Exper. IX. The Water tried by a Solution of *Pot-Ashes*, being added to that which contained the *Spirit* of *Salt*, occasioned a strong Effervescence; but the Water returned clear, and the Precipitate made by the *Pot-Ashes*, re-incorporated with the Water. That with the *Spirit* of *Nitre*, *Spirit* of *Vitriol*, and *Aqua Fortis*, all act in the same Manner.

Exper. X. When *Spirit* of *Sal-Armoniac* was poured into the Water that contains the dissolved *Alum*, it became very much curdled, and coloured like Milk. And when that with *White Vitriol* is added to it, it becomes thicker, and the Water of a yellowish brown or muddy Colour.

Thus far the Experiments I have made on these Waters; which I would have pushed farther, by procuring an Extract of their Salts, had I not been prevented by the Difficulties of my Situation, which, though little significant to the Public, I take Leave to hint at,
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in Hopes of their being a serviceable Caution to other Artists, who, I wish, may not buy, so dear as I have done, their Experience, of the dangerous Consequences of alarming the Jealousy of Competitors, by any Novelty, or Discovery of Natural Secrets; since the Benefit they are of to Mankind, will not protect the Editors, or Publishers, from the Envy and Malevolence of those, who take every Service of that Sort (not done by them) to the Public, as an Injury offered to themselves, and often resent it, with too much Success and Efficacy, of which (I am sorry to say it) I have not been exempted from subscribing a Proof.

The Proprietor of this Well acquainting me too, that this Water had declined considerably in its Reputation, from the ill Effects some had found by using it immoderately: It is very easy to account for it, since all *Chalybeat* and Medicinal Mineral Waters are as liable, as any other Medicine, to do good or harm, according as they are judiciously or indiscreetly ordered, or administered; the Direction of which is so properly, as I have often before observed, the Province of the Physician: And it is really Matter of Concern, that this Place is not regularly attended by a *Gentleman* of the Faculty, whose Skill and Experience might regulate, and universalize more, so convenient a Medicine.

I must farther observe that, as this Water is drank with bitter purging Salts, the common *Sal Morabile* of *Glauber*, so often used
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for this Purpose, is improper only, from its being so rarely met with, made up to the Standard of the original Receipt; whereas it is generally adulterated with a cheaper and pernicious *Succedaneum*. But, *Scarborough* Salt, prepared after the Method of the most learned and excellent Dr. *Shaw*, is as good, and a Medicine less liable to be counterfeited, to be used with these Waters. And in the Room of both these Salts, to wit, the *Glauber* and *Scarborough*, may be substituted another Salt prepared in the following Manner, and which may be taken to Advantage with the *Chalybeat* Waters, viz.

“ Take common Salt, *Quantum sufficit*, a-
 “ bout six or eight Pounds; dissolve it, then
 “ *evaporate* it to the Consistence of *Chryf-*
 “ *tallization*, after which, put it into a con-
 “ venient cool Place for shooting; then
 “ pour the Liquor remaining after the Pro-
 “ duction of the *Crystals*, into a Boiler, and
 “ evaporate to the former Consistence again,
 “ and continue this so long, till this Li-
 “ quor will not yield any more *Crystals*;
 “ then take two Quarts of this *Liquor*,
 “ to which add of *Cremor Tartar* eight
 “ Ounces, of *Salt-Petre* six Ounces, of clean
 “ *Pearl-Askes* four Ounces, all these sepa-
 “ rately dissolved, and then added to the a-
 “ bove *Liquor* prepared of the common Salt;
 “ when they are all mixed, add Half a Pint
 “ of *Spirit of Vitriol*, then evaporate the
 “ whole Mixture to the Consistence of *Chryf-*
 “ *tallization*; and the Salt thus produced is
 “ fit

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“ fit for the abovementioned Purpose, and
 “ from two to three Drachms is a sufficient
 “ Dose.” *N. B.* This Salt must be prepared in *Glass*, or well *glazed earthen Vessels*; for if they are done in *Metallic* ones, the *Acid* dissolves them, and not only gives a Second, but also a pernicious Property to the Salt.

That this Water of ISLINGTON is a natural *Chalybeat*, stands manifest and evidently proved, by the above related Experiments; and in those Cases where the *Chalybeat* Waters are salutary, those of this Place may, under proper and due Direction, answer the Purpose sufficiently, and is indeed an extraordinary Blessing, to such whose Business or Circumstances will not permit a Journey to *Tunbridge* in *Kent*, or any other *Spaw* distant from this City.

But those that are able to go to *Tunbridge*, must, upon various Accounts, inevitably find more Benefit than from the *Waters* of *Islington*, of which the considerable Change of the Air is not one of the least.

Those that make Use of the *Islington* Water should take particular Care not to overheat themselves by walking too fast as they go in the Morning to drink them; and when they arrive at the *Wells*, to cool themselves gradually before they take their *Glasses*, which ought not to be too large, nor swallowed too quick, but rather kept a little in the Mouth, by which Means, the Stomach is the abler to digest it; and the Exercise,

cise, taken between Drinking, must also not be violent.

I might have afforded many other salutary Hints and Directions for the Use of the Drinkers, had it not been for the Impediments before suggested; yet, notwithstanding, should it ever be requested of me, to write a short *Medicinal History* of this Water in particular, for the Benefit of those that resort to this Mineral Spring for Relief, I will omit no Means or Endeavours to render it compleatly serviceable.

Upon Enquiry I find, that in former Ages there have been many *religious Wells* in *England*, which still retain their antient Names of the *Saints* to whom they were held peculiarly consecrated: And the Virtues or specific Properties of these Waters were attributed to the *miraculous* Gifts, or Endowment of their respective *Saints*: And in this Persuasion, they were used for many Distempers, and whereas daily Numbers of Resorters received signal Benefit therefrom, they readily gain'd Reputation and Vogue.

One of the most famous of those *Wells* is, without Doubt, that of *St. Winifred*, at HOLYWELL, in *Flintshire*, of the Origin of which we have the following Legend.

St. Winifred had vowed Chastity, but being strongly importuned, and once pursued by a Nobleman of that Neighbourhood, whose Suit she declined, and whose Embraces she flying from, endeavoured to shelter herself in the Church where *St. Bueno* was celebrating

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brating Mafs; but, before this Virgin could arrive at the Sanctuary ſhe propoſed, was overtaken on the Hill near the Church by her enraged Lover, who is nam'd *Carradoc*, and who, deſperate at her Reſiſtance, ſtruck off her Head, which rolling down the Mountain, and at the Place where it ſtopped, immediately iſſued forth the Spring, on which the preſent remarkable Well is founded, from thence called *St. Winifred's Well*; and that beautiful Market-Town receives from this Story the Name of *Holy-well*. Some place this miraculous Event in 644, others in 660; but, to heighten it yet more, is added, that *St. Bueno* replaced the Head upon *St. Winifred's* Shoulders, who was thereon reſtored to Life, and lived fifteen Years after this Accident. In Summer Time, there appear frequently Stones, which ſeem to the Eye, as if they were beſprinkled, or ſtained with Blood (and ſuch I have indeed ſeen myſelf) which paſs popularly, amongſt the *Roman Catholics*, for the Effects of the Saint's ſpilt Blood.

As to the natural Medicinal Virtues the Waters of this Well poſſeſs, they certainly deſerve to be more publicly celebrated than they are, being really endowed with excellent ſalutary Qualities. The Well itſelf is a very great natural Curioſity, if for nothing more, than that ſuch vaſt Quantities of Water ſpring conſtantly without Intermiſſion or Variation; inſomuch that it raiſes above a hundred Tuns of Water every Minute, of
which

which Trial has been made, and confirmed to me, by the concurrent Attestations of several Gentlemen of Worth and Distinction in the Neighbourhood, who had seen the Bason and Well *filled* in less than *two* Minutes, which contain at least two-hundred and forty Tuns, the Water being first let out, in Order to try the Experiment: And such as have seen this *Well*, will, I am persuaded, readily agree with this Account.

The Water of this Well is extremely clear; the Bason is above four Feet deep, yet a Pin is easily perceiv'd lying at the Bottom: On the Sides of the Wood, and Stones of the Bason, there grows green Moss, which has a grateful fragrant Smell, and is vulgarly called *St. Winifred's Hair*, which makes likewise Part of the above traditional Miracle. This Moss is frequently applied to ulcerated Wounds, with signal Success, in the Way of contracting, cohering, and healing them. Which inherent sanative Faculty cannot be better accounted for than this Moss drawing or collecting from the Water a more than ordinary Portion of the *Spiritus Rector*, by some called, *Spiritus Mundi*, or *Spiritus universalis*, by which is to be understood that vegetating Power imbibed by the Air, which maintains and furnishes the Principles of Growth and Life to the whole Vegetable and Animal Kingdoms; which there are various Processes in Chemistry, besides this natural Way, to come at, collect, and fix, as may be more at large seen in the *Chemia*

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mia Experimentalis of Dr. *Johannes Helfricus Jungken*, Page 356.

Hence there is great Reason to conclude, the Water of this St. *Winifred's Well* is copiously impregnated with this universal Spirit of a powerful Medicinal Efficacy; then consequently it cannot but be complicated with this salutary Principle.

It is void and clear of all gross *Earth*, or *Mineral* Contents; which is so much the more remarkable, as this Spring arises in the midst of Hills and Mountains, plentifully abounding in Minerals and Fossils. It is then such a Water as may properly be called, *a simple light Water, destitute indeed of Mineral Contents, especially such as are commonly met with in the Medicinal Mineral Waters, but abundantly enriched with the SPIRITUS RECTOR MUNDI, or UNIVERSAL SPIRIT.*

For many Reasons I therefore esteem it preferable to the *Bristol Water*, that is sold here in Town.

This *Holy-well* Water was never, to my Knowledge at least, made any Use of as an inward Medicine by Drinking, but for a cold Bath only; yet, from its pre-deduced *spiritual* Contents, there is no Room but to conclude, that this Water might, with a proper Regimen and Method, be drank medicinally, and in many chronical Disorders produce the most salutary Effects, especially to the fair Sex, in the Cases of *Obstructions* occasioned by *Hysterics*, or where the Mass of Blood from that or any other Cause is become

come *thick* and *fiſy*; which breeds in young Women a *Sluggiſhneſs*, *Heavineſs*, *pale Colour*, *Pains* in the *Loins* and *Groin*, and in general, a Depravation of all the natural, vital, and animal Functions: In ſuch Caſes, I dare aver, that this Water, on the Account of its exceeding fine *Spirits*, would reſolve and carry off the ſpontaneous Matter incident to ſtagnating Blood, by promoting the natural Evacuations, and reſtore the vital Juices to a healthy, natural Circulation, ſo as to ſpeed a perfect Recovery. And though *Chalybeat* Waters are recommended in theſe Caſes, eſpecially for ſtrengthening the Tone of the weakened Veſſels, yet, I cannot help preferring this Water, as more bland, more ſafe, and leſs liable to occaſion a conſtitutional Revolution, which is ſometimes attended with dreadful Conſequences, and makes it ſo indiſpenſably neceſſary for the *Chalybeat* Waters being adminiſtered with the utmoſt Care, Caution, and under the beſt Medical Regulation: But ſuch violent Conſequences are not to be dreaded from the Water of St. *Winifred's Well*, in Caſe they ſhould be uſed *Empirically*.

Such as are come to that *critical* Stage of Life, in which their *Menſes* leave them, ought to be extremely careful to prepare and put their Blood into ſuch a State, as may guard their Health againſt the notorious ill Conſequences that ſo often enſue from this natural Revolution, ſuch as *ſchirrous Tumours*, and *cancerous Ulcers* in the *Uterus* or *Womb*, and

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by Consent of Parts, in the Breasts, to which the Seat of Harm is frequently and fatally translated. Bathing then in this Well, and Drinking properly this Water with moderate *Bleeding* or *Cupping*, would, in my Opinion, be one of the safest, best, actual, or preventive Remedies they could make Use of; and therefore I tenderly recommend it to such as have Reason to apply to it, or can conveniently do it.

Nor are persuasive Precedents wanting to support this Recommendation; since such light, pure Waters as this at *Holy-well*, are used or drank, with great Success, in several Maladies, to which they prove salutary Medicines. And both in *Germany* and *France*, there are Wells containing Waters of this Sort, that are held in the highest Esteem, which they deserve for their singular Virtue and Efficacy.

To my particular Knowledge, in *Germany* the Medicinal Fountain at *Schleusingen*, in the County of *Henneberg*, those at *Bebra* in *Thuringen*, that at *Osterode* on the *Hartz*, contain no other than a simple, light Water, and like this of *Holy-well* plentifully supplied with the *Spiritus Rector*, without any other Contents of the Fossil or Mineral Kinds; and with which alone they have signalized their Efficacy against the *Stone* and *Gravel*, *Rheumatism*, *Scurvy*, *Phlogistic Sizeness of the Blood*, *Obstructions of the Menses*, *Hæmorrhoids*, &c. and are, to this Day, the Resort of Nations, on that Account.

The Benefit of *cold Water Baths*, in several Distempers, being too well known or established to need a Repetition here, I shall only observe, that, as on the Goodness of the Water the Success of the Remedy so specifically depends, that there cannot be too exact a Choice made of it: And this *Holy-well* cold Bath, having the Experience of Ages, and a Series of innumerable authentic Cures on its Side, worked upon the most *stubborn* and *malignant Diseases*, such as *Leprosy*, *Weakness of Nerves*, and other *chronical inveterate Disorders*; of which there subsist undeniable Records, Traditions, and living Witnesses; these Considerations on the whole form a just Recommendation of it, as a *cold Bath* of the first Rank, independent of the farther Advantage, which may be obtained by a regulated Regimen of *Drinking*, or Taking the Water inwardly. Such then, as have the *cold Bath* prescribed to them, can hardly do better, if their Circumstances will permit them, than to seek their Remedy at a Place, that could not have established such a Reputation, without actual and well-attested Merit.

For though this *Holy-well* is situate in the most remote Part of the Kingdom, in NORTH-WALES, the tried and approved excellent Qualities of this *cold Bath*, and the eminent Cures it has performed for a Succession of Ages, and still daily continues to perform, have drawn such a Resort to this Place, that from a few Cottages it originally

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consisted of, it has increased to a Market-Town, composed of good commodious Buildings, sufficient to accommodate Personages of the first Distinction.

There are also many other collateral Advantages towards restoring Health, pertaining to this Place.

The *Sea* is not above one measured Mile distant; so that such whose Cases require *Sea-water* or *Salt-Water* Baths, may be easily supplied.

It is likewise a Mineral Country all round, and in the Time I resided there, I discovered *two* or *three* Springs of excellent *Chalybeat Waters*, which if compassed, and collected into proper *Recevoirs*, would, doubtless, more universalize this greatest Gift of Nature towards the public Health, which so well deserves a grateful Cultivation, and Attention of the Country they are found in, to render the Blessing as diffusive, as easy, and commodious as possible: To which, the remarkable Healthiness of the Air of that Place is another inviting Encouragement.

It would too much exceed the Limits I have set myself, to enter into a more circumstantial Detail of all the signal Advantages, with which Nature, under the Favour of God, has endowed this justly celebrated Place, and its Neighbourhood, towards the Recovery especially of chronical Complaints: But my tender Regard for the public Health makes me wish, that the *Chalybeat Springs* I have above taken Notice of, may be looked into, verified,

verified, and with due Care disposed into proper *Recevoirs*; towards which, it would be necessary, that an able Hand of the Profession, should accurately examine the Mineral *Contents* of these Waters, and connecting his Report of them, with a full Account of all the other Advantages and Benefits to be hoped for, from a Resort to this Place, with proper Directions for the Patients to govern themselves by. Such a natural History might thereby be formed of the whole, as to be of the greatest Service, by pointing out to the Public a Place so compleatly fitted with every Sort of Water, *pure, mineral, or saline*, that can be prescribed for the Prevention or Cure of Diseases, and situate in an Air, which of itself, would be a powerful Restorer in many Cases.

There is also another *Mineral Water* of a peculiar and salutary Nature here in *England*, which is called the NEVILLE HOLT SPAW between *Harborough* and *Uppingham* in *Leicestershire*, which stands Exportation, and is sold here in *London*, in *Salop*, *Nottingham*, *Sheffield*, and many other noted Places in this Kingdom. It is a *purging Water*, and has done great Good in many stubborn chronical Diseases. I never indeed made Experiments with this Water, but its Contents are sufficiently ascertained, and made known by the most learned and ingenious Dr. *Short*, in his *Mineral Water History*. And I may also refer the curious Reader to a *particular Discourse on the Nature and Uses of NEVILLE*

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HOLT Water, collected by several Hands, and published in the Year 1742.

My worthy Friend Dr. *Short* has informed me, that, since these Publications, he has not made any fresh Experiments on this Water, except the last Summer, after the moist and rainy Winter, 1746, when, on Trial whether this Water had not suffered by the Rains, he evaporated two Quarts, by which he found, that it was as rich in Mineral Contents as ever, and not in any Degree altered, or lessened in the Quantity of its salutary Ingredients.

To do it then Justice by all that I can learn, that this *Neville-Holt* Water is very much esteemed in the Practice of Physic; and I am credibly informed, that it is even preferable to those of *Pyrmont* and the *Pouhon Spaw*, in those chronical Cases, wherein these latter are prescribed and used; which seems very reasonable, as they are removed out of their respective *Climates*, and pass the *Ocean* itself: And both Reason and Experience concur, to establish that natural Medicines are more salutary to the Natives of the Country they are found in.

But, for more particular Directions and Observations on the Medicinal Use of this excellent Water, and the Specification of the Diseases, they are most serviceable in, I must again refer to the afore-mentioned Pamphlet of 1742, wherewith I conclude this Chapter.

C H A P. V.

Of that most extraordinary and remarkable Mineral Water at Shadwell, commonly called the SHADWELL SPAW near London.

I Shall now proceed to the most remarkable Mineral Water Concrete that ever I have seen or heard of, which is that of SHADWELL SPAW, in *Sun Tavern Fields*, in the *Parish of St. Paul's Shadwell*, the Property of *Walter Berry, Esq*; the Discoverer thereof. And as the Discovery was intirely accidental, I shall, *First*, touch upon some of the various Ways whereby this great City has been anciently supplied from Springs, and the Causes of their Disuse ; as what may perchance give some Light to distinguish, whether this particular Water was now first found out, or only recovered. *Secondly*, I shall relate what unforeseen Means Providence has blessed us with, by the first Discovery or Recovering of this Water, just at the Mouth of this great City, where it is so much wanted. *Thirdly*, I shall relate the Experiments I have made on it, and from thence draw some indisputable *Corollaries*, to prove that it is a natural Product, and no artificial Composition, so as to obviate the Principles of its Medicinal Efficacy. And, *Lastly*, illustrate the whole with a Relation of undoubted Facts or In-

stances of many extraordinary and uncommon Cures, which this Water has performed.

First, LONDON has always been happily supplied, not only with the noble River of *Thames*, but with many other clear and wholesome Springs of Water ; from whence several Parts of the City and Suburbs derive their Names : Many Streets, and other Places, being distinguished by the Terminations of *Bourns, Brooks, Pools, Wells, Conduits, &c.* which not only supplied the Inhabitants in their common Occasions, but were some of them beneficial in restoring their Health, or relieving their Infirmities ; though such as were Medicinal, might anciently, in the Days of intellectual Bondage, be not a little robbed of their real Merit, in having the Cures they performed miraculously attributed to the Worship of these Saints, whereunto many of them were dedicated, by such Catholic Friars, whose Interest it was, to drive on the sanctified Traffic, and impose a religious Excise upon those, whom they had trained up in so much Ignorance and Superstition, as to contribute thereto.

But in the Days of Queen *Elisabeth*, when the Citizens began more unanimously to supply their Houses by subterraneous Conduits ; and that great Work of bringing the *New River*, twenty Miles, from *Hertfordshire*, for this Purpose, to accommodate the North-side of the said City, as the *Thames* does the South, was compleated in the next Reign,
by

by the indefatigable and public-spirited Sir *Hugh Middleton*; then many of those little Brooks and Wells, Conduits and Cisterns, were neglected, stopped up, and quite broken down. *John Stow*, the Antiquary, who died a very aged Man, in 1605, has, in his *Survey of London*, a distinct Chapter, wherein is described twenty or thirty of these Wells, Brooks, &c. But this, we are speaking of, the most singular and remarkable Water of them all, is not mentioned, unless it lies veil'd under a different Name. Many of the Springs and Wells were so anciently observable, that *William Fitz-stephens*, a *Londoner* born, and a Monk of *Canterbury*, who died in the Reign of King *Richard I.* Anno 1191, as may be seen in *John Leland's* Book of *British Writers*, *John Stow's* *Survey* aforesaid, and Dr. *Thomas Fuller's* *Worthies of England*, mentions the chief of them; where, in his short *Description of London*, under the Chapter *De Fontibus*, he says: — “Near this City, in the Suburbs on
“ the North-side, some special Wells, of
“ sweet, wholesome, and clear Water, stream-
“ ing forth among the glittering Pebbles, of
“ which, *Holywell*, *Clerkenwell*, and *St. Cle-*
“ *ment's-well*, are most famous, and frequent-
“ ed by Scholars and Youths of this City, in
“ Summer Evenings, when they walk forth to
“ take the Air.” — From hence it is plain, by the Colour, the Taste, and the Resort, that they were mild, palatable Waters, repaired to for Pleasure, not for Medicine; and yet had there then been such a Medicinal Water known so
near

near *Holywell*, as this at *Shadwell* is, being but a few Fields distant, I cannot believe but that Author would have mentioned it, as well for the Variety, as the Excellency of it, notwithstanding the much regretted Brevity, to which he has confined himself. As for *Holywell* and *St. Clement's-well*, they might, by their pious Appellations and Patronage, inspire a useful and profitable Reverence in those who partook of them, under the Direction aforesaid; but I cannot learn that there was any Thing Medicinal or Mineral in their Composition: Perhaps they were not then curious to enquire into natural Causes, at least not publickly, as all Efficacy was religiously accounted for. I have been credibly informed, that the former of them was a good, light, wholesome Water, plentifully impregnated with the *Spiritus Rector*; and, upon that Account, with perhaps a little spiritual Legerdemain, it might be poured out to the Populace, as a supernatural Nectar.

But it is not improbable that some of these Wells, even in those Days, were mere Tippling-houses and Assemblies of Entertainment, as well as in ours: For *Clerkenwell* was, three or four-hundred Years since, frequently repaired to by Clerks and Priests; where to draw Company to them, and some Expence or other from them, no Doubt they used to act pious Plays, and religious Interludes; as at *Sadlers-Wells*, and many others, they act, at this Day, those that are not so.

As

As for *Shadwell*, it is as probable, that this was so called from some Water too, as by its own Name is also implied; but if it had been one so extraordinary as *This*, the constant Good it was capable of doing, would have kept it continually open, and in Use: Some Knowledge of its being resorted to would have descended to us, and the Reputation of its Cures would have been treasured in Record: But, as I yet met with no such Intelligence, I shall, till my Knowledge is corrected with better Information, be rather inclined to believe this *Shadwell-Spaw* was now first discovered than a lost Water, now only retrieved: Whichsoever it is, I doubt not but my grateful Endeavours to preserve the History of its present Discovery and Virtues, in the following Narration, will kindle a Desire in others, who shall hereafter, upon further Trial and Experience thereof, more equal to its Merits, to enlarge upon, and celebrate the same.

Secondly, This *Shadwell Fountain* is about two Miles Eastward from the *Tower of London*, and about half a Mile from the River of *Thames*, or *Shadwell-Dock Stairs*, ascending from thence all the Way to the Top of a Hill, where is a Field of a triangular Form, called the *Sun-Tavern Fields*, on the Eastern Side of which, we find our Medicinal Fountain, called the *Shadwell-Spaw*.

This Field (which at this Time is a Rope-Walk) was higher than it is at present; because

cause it has been dug away at least ten Feet deep to supply Ballast for Ships, and probably never would have had any Well dug there, if the Dispute with the *Parish* of *Shadwell* and the *Proprietors* of the *Thames Water-works* had not happened, the Particulars of which are thus :

In the Year 1734, Mr. *Berry* was Churchwarden of that Parish, and there was a Water-work erected, to raise the *Thames* Water for the Use of the Inhabitants in those Parts. The Proprietors thereof were called by the Name of *the Governor and Company of Shadwell Water-works*. This Body of Men had not paid, for near twenty Years, to the King's Tax in that Parish; and if they were rated to the Poor, as the rest of the Parishioners, they would pay but as they pleased : Being an incorporated Body, all the Parish Officers, before Mr. *Berry*, were afraid to meddle with them; but when he was Churchwarden, the Parishioners applied to him, that they might be obliged to pay their Proportions : Accordingly he cited them into the Bishop of *London's* Court, and after a Year's Contest, a Sentence was obtained against them. Then they removed the Cause into the Archbishop of *Canterbury's* Court, and there no better Success attended them, for they were cast in that Court. The Consequence of this Decision at Law was Revenge upon the Prosecutor : So that in two or three Days afterwards, the Company caused the *Thames* Water to be cut off, not only from Mr. *Berry's* House,

House, but the Houses of fourteen or fifteen of his Tenants. To repair this Distress, he was put upon Digging this Well, which is now called THE SHADWELL SPAW in *Sun Tavern Fields*. He employed the most experienced Man in these Operations, that was in *London*; and in Digging they observed that the Surface of the Ground was a common Earth; after they had got about five or six Feet down, they came to a Gravel of a good deep Yellow, and after that, to a rough hard Ballast, which was difficult to dig up, and was as coarse or lumpish as Wash-balls: Under this they came to a Rock, which as soon as they broke through, up sprung the Water, as strong, as if *a Main had been broke in the Tree*; that is, as I understand my worthy and communicative Correspondent, the Proprietor of the Well, to whom we are beholden for this authentic Account of it, as if the main Trunk of the subterraneous Tree, or great Pipe, had burst, which branches forth into the other Pipes that supply the Houses with Water. The said Proprietor had, before this Contest, lived above twenty Years in his House, but never heard a Word of any Water near him, that had any extraordinary Properties; and if his Opponents had not deprived him and his Tenants of the common Water, the Public might never have had the Benefit of this Medicinal one.

The first Experiment that accidentally happened with this Water, was upon a Boy belonging

longing to one of Mr. *Berry's* Tenants named *Robinson*; who, being very hot at Play one Day, and having drank plentifully of the Water (soon after the Pump was first put down) went Home sick, and fell a Vomiting to an excessive Degree; whereupon the Boy's Mother being frightened, came to Mr. *Berry*, and asked him, What was the Matter with his Water? And told him what Effect it had upon her Son; upon which, Mr. *Berry* called for a Glass of it, and, having tasted it several Times, was somewhat surprized at the extraordinary Flavour of it (for he had never tasted it before) but he persuaded the Mother not to be uneasy, for as he had so plentifully discharged it, she might be satisfied it would do him no Harm. Some Time after, Mr. *Berry* having a Horse of his own, which by some Accident or other, was almost blind, and daily growing worse and worse; and having heard what Effects his Water had had upon others, as well as the Boy, resolved to try whether it might not be of some Service to the Horse, which he accordingly did, and with the utmost Success; for having washed the Horse's Eyes with the Water for some Time, he at length, perfectly recovered his Sight.

This is all that I can learn of the first Discovery and Physical Use of this wonderful Water; but its Medicinal Efficacy was much sooner known by the Poor, and lower Sort of People, than by the Proprietor himself; and it was upon the Account of the extraordinary

dinary Resort of such sick and afflicted Persons, that the Proprietor inclosed this Well, and also erected a Pump and Bathing-house. But what induced People at first to make a Medicinal Use of this Water, I am not yet able to learn, except its Fame arose upon the successful Evacuations, which happened to the before-mentioned Boy.

I shall now proceed to the Experiments I made on this Water, which I began on the 29th of *June*, 1748, the Day warm and serene, and I was at the Well by Six o' Clock in the Morning.

I. This *Water* is of a light *Yellow*, nearest the Colour of *French Brandy*; sparkles when poured into a Glass, like a fermented vegetable Juice, such as *Cyder*, &c. and tastes very adstringent: Thence the vulgar or improper Expression, that this Water of *Shadwell* tastes of *Allum*.

II. A Glass full of this *Water* exposed in the open Air, where the Sun-Beams have full Power, occasions no Sediment, or any other Alteration whatever; loses not its Taste, or the *evacuative* Power it has, when taken inwardly.

III. A *Pint* of this *Water*, taken in the Space of half an Hour in two Doses of about *half a Pint* each, will, on a moderate Exercise of Walking, work a gentle easy *Vomiting*, and two or three mild, unstrained *Stools*.

IV. With

IV. With Powder of *Galls* this *Water* strikes instantaneously a fine deep *blue* Colour, without first striking it into a purple.

V. The *Water* thus by Virtue of the Powder of *Galls* changed into a fine deep blue Colour, affused to *Water* of this Fountain containing or mixed with one Fifth of *Oil of Vitriol*, the *Galls* will subside in their primary original Colour; the *Water* will also come to its first natural Colour again, and no Symptom or Sign remain of the deep blue, occasioned by *Galls*.

VI. If any greater Quantity of *Galls* is added, or mixed with the *Water* that contains the *Oil of Vitriol*, there ensues not any Alteration in Colour or otherwise, both the Powder of *Galls*, and the *Water* preserving their natural respective Colours.

VII. About a Tea-spoonful of *Shadwell Water* will, in three Ounces Infusion of the Herb *Veronica*, strike a deep brownish opaque green Colour.

VIII. Equal Parts of *Shadwell Water*, and Infusion of the Herb *Veronica*, will strike, or occasion a very fine transparent Olive-green Colour.

IX. The Herb *Veronica* dry, mixed with this *Water* cold, without warming it, will in 24 Hours Time, strike or promote the respective Colours, as related Experiments VII. and VIII.

X. This *Water*, with the Powder of red *Sandal* or *Dye-wood*, admits very little Alteration, only rubifies a little.

XI. The

XI. The Infusion of *Green-Tea* with the *Shadwell Water*, strikes first a *green*, and in Conclusion, a *brownish Colour*, retaining somewhat of the first *green*.

XII. With *Syrup of Violets* this Water strikes a deep muddy green Colour.

XIII. With *Terra Japonica*, it instantaneously strikes, or gives a very deep brown Colour.

XIV. With *French Brandy*, it strikes a *blue*, and ultimately a *deep brown agate* Colour.

XV. This Water mixed with *Rum*, is thereby, however faintly, inclined to a pleasing light Green.

XVI. With common *Gin*, this Water strikes a fine *white pearl* Colour.

XVII. *Acet. distill.* or distilled Vinegar, mixed with the *Shadwell Water*, keeps it of its original Colour, causes no Effervescence, Precipitation, or other Alteration whatever, except that it promotes pearly Air-globules, to settle on the Edges and Sides of the Glass.

XVIII. A Solution of *Copperas*, or *Iron-Vitriol*, causes no Alteration, or any Disturbance to this Water.

XIX. A Solution of *Allum* occasions not any Motion or Disturbance in this Water, but rather makes it more clear.

XX. With this Water and *Aqua-fortis*, no Effervescence, Motion, Precipitation, or any other Change occurs; besides an Alteration of its natural Colour to that of a most clear Crystal.

XXI. With *Oil of Vitriol*, this Water also remains in a seeming tranquil State, occasioning at least no discernible Motion, but that of the pearly Globules sticking to the Bottom and Sides of the Glass.

XXII. To *four Ounces of Shadwell Water*, add one Ounce of *Oil of Vitriol*, and it will render it as *hot* as the *Toeplixer* natural hot Springs in *Bohemia*.

XXIII. One Scruple of *Soft Brimstone*, in which the *Phlogiston* is a very little destroyed, by which Means, it is made soft, makes a Pint of *Shadwell Water* full as *hot*, as the Waters at *Aix-la-Chapelle*.

XXIV. A Solution of *white Vitriol* causes not any visible Alteration in the *Shadwell Water*.

XXV. With *Spirit of Vitriol*, this Water suffers no Changes, except its growing rather almost Crystal clear, and settling those pearly Bubbles on the Sides of the Glass; as observed in Experiment XXI.

XXVI. This Water with *Spirit of Nitre*, agrees exactly with the foregoing Experiment (XXV.) but does not render the Water quite so clear.

XXVII. *Spiritus nitri dulcis*, or the *sweet Spirit of Nitre*, occasions not any Effervescence, or any other Motion or Action whatsoever with this Water, besides that of destroying its natural Tincture.

XXVIII. The *Spirit of common Salt* preserves the Mixture of this Water entire; so that its
Texture:

Texture suffers no Alteration, but changes its Colour into a lively Parrot Green.

XXIX. With *Cremor Tartar* this Water strikes a beautiful yellow Colour, like that of the finest *Couflip* Wine, and even in the Smell is not unlike it.

XXX. The *Lixivium* of *Cremor Tartar* acts in the same Manner on this Water, as the *Cremor Tartar* itself, as deduced, Experiment XXIX.

XXXI. *Ol. Tart. per deliquium* causes a strong Precipitation in this Water, which is first of a strong yellow Colour; but when this Precipitate settles, it becomes of a fine clear Amber Colour.

XXXII. *Pearl Ashes* occasion a Precipitation in this Water, but not of such a beautiful yellow Colour, as related in Experiment XXXI, by inclining it somewhat to Red, almost like *Roach-Allum*.

XXXIII. The *Lixivium* of *Pearl Ashes* precipitates this Water, so as to make it of two Colours, the lowest of a brownish, the uppermost of a yellow Colour.

XXXIV. With *Spirit of Sal-Armoniac* it occasions a considerable Cloud, and instantly succeeds a Cuticle on the Top of the Water, coloured like the *Peacock's* Feather: The Cloud is coloured like the *Balsam of Tolu*, and almost as transparent; this Precipitate gradually subsides, then the Water becoming clear, but the Cuticle remains on the Top.

XXXV. *Spirit of Hartshorn* occasions a yellowish brown Precipitate, which mani-

festly proves and demonstrates, that there is nothing of *Copper* in this Water.

XXXVI. *Sal. Volat. Alkali*, or *volatile Salt of Alkali*, precipitates this Water yellow, as also other fixed *Alkali's*.

XXXVII. When this Water is evaporated, the Sediment that remains is always of a beautiful light Cloth yellow Colour, nearly resembling the pale Colour of Gall-stone, in which the Salt of this Water partly remains; and in this Process, the Steam of the Water causes no Smell, more than that of common Water.

XXXVIII. In the Bath-house belonging to this Well, the *Steams* of this Water generate a *Hali Nitrum* on the Wall, which is not however a perfect Nitre; tried by the Fire, it acts almost like *Sal medium magis terrestre*, or like unrefined Borax.

XXXIX. *Oil of Vitriol* turns this yellow *Earth*, or Sediment, into the Colour of *Iron-Ore*.

XL. This Earth reverberated in a Crucible changes its Colour to that of an *Iron-brown* Colour: It loses also in Quantity. The *Phlogiston* is perceptible in this Operation; and the *Flores* which arise, are white, and in every Respect like *Flores of Antimony*.

XLI. The *Magnet* attracts the *brown Earth* remaining in the Crucible.

XLII. The *Salt* I made out of this Water, was a perfect *Borax*; but as the Method whereby I obtained the said Salt from this Water, may not occur to, or may be mistaken by

by others, who shall attempt the Extraction after me, I close this List of Experiments, by communicating a Process, whereby any one, the least versed in Chemistry, may manufacture an identical *Borax* out of this *Shadwell Spaw Water*.

“ Take a Gallon of *Shadwell Water*, in
 “ which mix one Pound and a half of Ful-
 “ ler’s Earth; pour this Mixture into a Re-
 “ tort, and set it in a Sand-heat for eight or
 “ ten Days, but be careful to keep under it
 “ a constant Fire both Night and Day, and
 “ yet not so great to raise the Water, or cause
 “ it to distil; and, for that Reason, you
 “ must have a Receiver luted to the Retort,
 “ that if any Water should come over the
 “ Helmet into the Receiver, you must pour
 “ it back into the Retort again; and, on this
 “ Account too, the Receiver must be very
 “ well luted to the Retort to keep out the
 “ external Air, so that the Water may ex-
 “ hale imperceptibly through the Pores of
 “ the Glass, till the half is exhaled away.
 “ Then add half a Gallon of *Shadwell Water*,
 “ and give it a strong Fire, that it may soon
 “ be boiling hot, and put into it three Ounces
 “ of *Sheeps Suet*, three Ounces of *Hogs-lard*,
 “ and one Ounce of *Oil of Olives*; when these
 “ are in the Retort, stir them well with a
 “ Stick, till the Fat is dissolved, and all well
 “ mixed together; but whilst you are doing
 “ this, keep out the external Air as much
 “ as possible, and then lute on the Receiver
 “ to the Retort again, and slacken the Fire,

“ maintaining no other Degree of Heat, than
“ what you exhaled by the first Water half
“ away : And in like Manner you must con-
“ tinue the Fire, till you exhale impercep-
“ tibly all the Water out of the Retort, and
“ the remaining Matter in the Retort con-
“ tains the *Salt* or *Borax*. This must be
“ lixiviated out, and crytallized in the same
“ Manner as *East-India Borax* is refined
“ here ; an excellent Process of which is set
“ forth by the ingenious Dr. *Shaw*, in a Note
“ on the Article of *Borax*, in his Translation
“ of Dr. *Boerhaave's Chemistry*.”

Thus far the Experiments made on this Water, from whence I shall attempt to draw a few *Conseſtaria*, or Corollaries, by Way of farther Illustration.

Corollary the First.

It is plain, that this Water contains an *adstringent*, *austere*, and *acid* Taste, implying what, according to all Medicinal Rules, is a very singular Property, answering many valuable Purposes ; specifically in Cases where there is a Cohesion wanted, or to draw the elementary Particles of the Fibres nearer to each other, thereby bracing them more firmly : Or to suppress and stop the Hæmorrhages, or Effusion of Blood issuing out of broken Vessels, by contracting or cementing the Mouths of them, or by coagulating the effluent Blood, so as to close their Orifices ;
for

for the Particulars of which Operation *, it is not here the Place to discuss, but only to point out the Virtues of this Medicinal Water from its *adstringent, austere Acidity*, which manifests itself on Trial, as mentioned in Experiment I.

The Distempers however, where a Cohesion or Drawing of the elementary Particles to each other is wanted, are many, such as all weak and lax *Fibres, Nerves, Sinews, Tendons, Membranes*, and in short every Part of our Body that is inclinable to a *cuticular* Nature, and of Course liable to incur a State of Laxness or Debility: Even a common Cold is a Laxation, and Weakening of the nervous and cuticular System in the human Fabric; and this Distemper is absolutely the Fore-runner of many mortal Diseases. Now as the most effectual Remedies against dangerous Colds are *acid, austere Fossils*; most rational it is to suppose that this *Shadwell Water*, containing such a Portion of their inconcrete and seminal Principles, must more powerfully counter-work such Diseases, than any Preparations of them, by the most exquisite Prescriptions of Art: Therefore, I cannot but think it highly recommendable in all Cases of Colds, ordinary or severe (nothing else in the Constitution forbidding their being taken) as a highly valuable Medicine in a Disorder almost universal, at one Season

* See Dr. *Van Swieten's* Commentaries on Dr. *Boerhaave's* Aphorisms, Sect. 28 and 218, and Dr. *Simpson's Hydrologia Chémica*, Page 69.

or another, to the Inhabitants of this immensely populous City, and inconstant Climate.

Corollary the Second.

In those Cases, where *adstringent Medicines* are required, they should be administered with due Measure and Regard; otherwise, if used immoderately or injudiciously, they may create opposite Diseases from too strong a Cohesion, or rather Attraction: therefore proper opening Remedies are not only permitted, but at proper Intervals, necessarily required. And this collateral Virtue obtains peculiarly in this Water, since it is at the same Time both an easy and safe *Emetic* or *Cathartic*, as may be seen in Experiment II. and III. Yet we have Experience and unquestionable Authority on our Side, that this Water has performed its Function, in Quality of a most efficacious Adstringent, when, at the same Time, it caused the above-mentioned Evacuations, as will be more fully explained hereafter.

It may be thought some Disparagement or Disadvantage to these excellent Waters, that they treat the Patient at first a little too roughly, in their various Operations, not only as equally *Cathartics* and *Emetics*, but even somewhat *diuretic*. But this Objection of Delicacy to their Use, which may be chiefly expected from the fair Sex, will weigh very little against their salubrious and admirable Efficacy in many Cases, and those the worst
that

that can endanger or invade the human System.

This *Water*, then, ought absolutely to be considered, as a safe and powerful Evacuant; and certainly for Virtue and Expedition greatly challenging the Preference of any artificial Medicines, or Compositions of the Shops. In this Country especially, such a Water may pass for a rich Dispensation of Providence to its Inhabitants, amongst whom a Fulness of Living, and all Sorts of Luxuriance in Diet, are so apt to create the Disorders of a *Plethoretic* Habit, for which these Waters cannot but be of excellent and sovereign Use; agreeable to the Aphorism of an Author, who, having studied the Simplicity of Nature, is an infallible Guide. My learned Reader already knows, that I mean the ever-respectable HIPPOCRATES: *Quicumque morbi ex repletionem fiunt, eos evacuatio sanat, & quoscunque ex evacuatione repletio, Sect. II. Aph. 22.* In *English* thus: “The Diseases which
“ are bred by Repletion, Evacuation cures,
“ as Repletion does those bred by Evacua-
“ tion.”

What I have already said of the Adstringency of these Waters, may, *prima facie*, perhaps appear inconsistent with their laxative Qualities; but, the Fact being establish'd on indisputable Tests, I shall, without entering unnecessarily into the Analysis of the Causes, only remark that so singular a Re-union of two seeming Contrarieties, in which the one is a Corrective of the other, without weaken-
ing

ing each other's Power and Effects, forms one of the strongest Recommendations of the Virtues of this Water to public Use and Experiment.

Corollary the Third.

That this Water is a naturally medicinal One, without any Interposition of Art, is verified by Experiments, from the III^d to the XVIth. Since such a Variety of *Phenomena* cannot be produced by any Remains of an old *Copperas* or *Vitriol* Work, or by *Sea-Coals*, that could be in this Place corroded, or wasted, whereby the Water might be impregnated, that we drew at the Well.

I own that these are the Suggestions of some Gentlemen now living; but they may easily convince themselves of an erroneous Diffidence and Decision, if they will please to consider,

First, That all *Copperas* or *Vitriol* Works are ever founded as near navigable Rivers, as they conveniently can be contrived; that *Coal-Pyrites*, or *Copperas-Stone*, or other Stores requisite for such a Manufacture, may be the readier supplied: It cannot therefore be reasonably suggested, that, seeing this *Well* is on the Top of an Hill, almost a Mile distant from the *River Thames*, any one would have erected a Manufacture under such an obvious Disadvantage, when actually there are, and always did exist more convenient Places for
such

such a Purpose, on the Banks of the said River.

Secondly, That in such Works, when they have Need of Rain-Water, they have certain Machines, wherewith they work the *River-Water*, by disperfing it through the Air, in fuch a Manner upon the *Pyrites*, that it becomes mild, and almoft of the Nature of Rain-Water; and as only River-Water is fit for this Purpose, confequently, they could not be fupplied fo conveniently with it, upon fo rifing a Ground, or Hill, as that in *Sun-Tavern Fields*, where we now meet with this medicinal Water-Fountain, called the *Shadwell-Spaw*.

Thirdly, Had there ever exifted any *Coppe-ras* or *Vitriol Works* or Manufacture, where now ftands the *Shadwell-Spaw*, we fhould undoubtedly have met with old *Wells*, efpecially as this is a Bufinefs, wherein much Water is required; but we find not the leaft Vef-tiges of fuch old Wells, Refervoirs, or the like Apparatus; nor would there perhaps have any *Well* been funk there now, but for the mere Accident of a Conteft *between Mr. Berry* and the Water-Works Company.

Fourthly, If this *Water* was the Product of the Remains of an old *Vitriol Work*, or of corroded, or wafte *Coals*; the Labourers, in digging this Well, muft have hit upon fome Remains, Signs, or Indications thereof, which it is certain they did not; but met *firft* with a common Earth, then Gravel, Ballaft, and

at

at last with a solid Rock, out of which the Spring issues, or streams forth.

Fifthly, Had there been any sufficient Remains of old *Vitriol* or *Copperas* Works, to tinge the Water-Spring to its present Pitch, or Condition of Appearance; the whole Earth thereabouts would be imbibed with corrosive Ingredients, very unfit for the Use of it to ballast Ships, to which such a Material would prove very destructive: but of this we hear not the least Complaint, and are in Course well assured of the Negative of such pretended Remains, since the whole Field, or Hill, has been dug away above *ten Feet*, for this very Use.

Sixthly, Had there really ever existed such a *Vitriol* or *Copperas* Work, or decayed Coals buried, or covered in a *Rubbish-Mass*; it is not to be supposed, or reasonably imagined, that such Remains would have penetrated through the Rock, out of which this Water streams; it is therefore contrary to all the Laws of Matter, and common Sense, to trace this Water's Origin, or Birth, to such an unwarranted Foundation.

Seventhly, But suppose, for Argument Sake, that this Water was impregnated with the *Sea-Coal*, thus pretended to be buried in Rubbish, and owed its peculiar Taste and Qualities thereto; would not, by an equal Parity of Reason, the Water found in other *Coal-Mines* resemble, or approach in some Measure to those of this Water of the *Shadwell-Spaw*? Whereas none are found in any of the numerous

rous Coal-Mines which this Kingdom, or indeed, any other Country possesses, to resemble it in Taste or Properties; but none such are at least hitherto pretended to be discovered.

The Waters of a *Coal-Mine* are generally *brackish*, *fætid*, and nauseating to the Smell; containing a strong Vitrioline Acid, insomuch that they will occasion a vehement Effervescence with Alkalies: Qualities, that it is evident to Sense and Experience, are inconsistent with those of the *Shadwell Spaw-Water*; which cannot either owe its Properties to any Connexion with *Fossil-Coal*, or the Corruption of it, since *Coal* in any State promotes or occasions a Water of no other Nature, than what we find in the *Coal-Mines*.

Eighthly, The Suggestions too of such, whether innocently, or with Design to decry these Waters of *Shadwell*, aver them to be an artificial Contrivance, are readily refuted from the Experiments above recited, and the Conclusions naturally deducible therefrom; which to a Judge of the least Candour, Knowledge, or Impartiality, establish the Negative of this Water's being a fictitious Composition beyond Doubt or Controversy. But, were not Proofs and Experiments superior to all Respect of Persons, it might be added in Confirmation of the Genuineness of this Water, that the Proprietor of the *Spaw* is a Gentleman of a fair and honest Character, in the Commission of the Peace, for the County of MIDDLESEX, and by all Accounts far superior to the Suspicion of brewing an artificial medicinal Water,
and

and imposing such a spurious Composition on the Public, in a Case so sacred as that of Health: But between the Diffidence, natural to un-examining Ignorance, and the interested Envy, or Competition of others, the most useful Discoveries have mighty and opulent Adversaries to struggle with, before their Merit engage the Public Faith and Attention to them.

Ninthly, Thus, even the bare Word and Asseveration of the Proprietor, when (I say) his Character is considered, would, and ought justly to have its Weight: But when he thus, *bona Fide*, abandons his Water to all the Rigour of Chemical, or indeed any Research or Analysis; they must be in Love with Error, who refuse to be undeceived, in a Point so susceptible of Demonstration.

The Proprietor was at first so dissatisfied with the Taste of the Water, that imagining it to be of no Use in its natural Condition, from its uncommon yellow Colour, and harsh, rough, adstringent Taste; he thought of Means to make it crystalline, soft, and palatable: So far was he from contriving to sophisticate it with *Allum*, as is the vulgar Opinion, from its carrying to the Drinkers, a Taste somewhat like *Allum*; but which is indeed no other than a Taste compounded of *Borax* and *Acid*, and not *Aluminous*, as they commonly, and without knowing its true Nature, alledge. Likewise consider, that *Borax*, sold as it is at the Medium Price of eighteen Shillings a Pound,

is rather too expensive an Ingredient to quit the Cost of adulterating the natural Water with.

Nay, the Proprietor had so little Notion of its real Worth, that in Order to soften the Water for common Drinking, and Use, he was so unadvised, as to throw into the Well a Load or two of *Lime*, which caused so great an Effervescence, and made such a Reeking and Smothering ; that he was glad to clear it all out again, and on better Advice and Consideration, came to think it more valuable, with the Qualities it already had, than those he wished in it : and this is all he ever put into the Well ; which tended more to his own Damage, than the Advancement of his Interest in it.

Tenthly, If this Water was the Produce of any artificial Preparation, it would infallibly be discovered by the Smell, when evaporated ; or the Steam in the Operation would emit a Smell in the same Manner, as all Salts, Fossils, or Minerals whatsoever, after they have undergone the least Motion, or Handling of the Artist, and are incorporated with an aqueous Compound : But as here are no such Symptoms, it is undoubtedly Natural, in all its Qualities. See Experiment XXXVII. This may be sufficient in Answer to all Suggestions or Imaginations of this *Shadwell*-Water being an artificial Composition.

Corollary the Fourth.

That this Water contains an *Acid* ; that the Mineral Contents are dissolved by the Acid,
which

which however is not a sufficient Quantity to dissolve the Mineral Contents of this Water entirely ; whence it retains its earthy yellow, or *French Brandy Colour* : Because stronger Acids affused, clarify it, as is proved from Experiment XVII, to XXVIII.

Corollary the Fifth.

That this Water is provided with all such Mineral Contents, as are requisite for a natural Hot-bath, but not having received a sufficient *Acid* to heat it, it springs or streams forth cold ; that it is also enriched with *Chalybeat* Contents : Therefore, in the first Chapter, not improperly called a Hermaphrodite between *Acidulæ* and *Thermæ* ; and that it also possesses such Spirits, as the natural hot Waters are destitute of ; see Experiments XVII, XXI, XXII, XXIII, XXV, XXXIX, XL, and XLI.

Corollary the Sixth.

That this Water partakes of several Minerals or Fossils that are Medicinal, which are so united and cohered with it, that other Minerals, whose Basis is *Acid*, cannot destroy the original Texture. See Experiments XVIII, XIX, and XXIV.

Corollary the Seventh.

That this Water contains an Antimony, to which we may very justly attribute its *emetic* and *purging* Quality ; that its Salt is a *Borax*, and that it also partakes of the
Phlogiston.

Phlogiston. See Experiment XXXVIII, XL, and XLII.

But since I more especially here aver, that *Borax* is the specific Salt of this Water; and that probably this is the only Medicinal Water-well in *Europe*, that contains this Salt, it may not be improper to touch transiently on the great Medicinal Virtue attributed to *Sal-Borax*: The Nature of which not being yet sufficiently known, is a Matter by most Writers still complained of, notwithstanding it is in great Repute in the Practice of Physic.

Dr. *Van Swieten*, in his excellent Commentary on Dr. *Boerhaave's* Aphorisms, Sect. 135, “ says that, *Borax* is commended much as a
“ De-obstruent, and is used in the most ob-
“ stinate Diseases, as it acts partly by its won-
“ derful *Stimulus*, and partly by its attenuant
“ saline Power.”

Dr. *Newman*, in his *Prelectiones Chemicæ*, Page 427, says, that “ *Borax* expels, opens,
“ and discusses thick Humours; that it pro-
“ motes and facilitates the Delivery of Wo-
“ men in Labour, the *Secundine* or After-
“ birth, and the *Menses*, stimulates and pro-
“ vokes to Venery, in a Manner unhurtful
“ and natural to the Constitution, and is a
“ specific Remedy for the *Fluor albus*.” To which I may, of my own Knowledge and Experience add, that *Borax* is a sovereign Remedy in crazy Constitutions, and almost worn out; so as to revive and restore Nature, as much as possible in such Cases.

To these Qualities too, should be joined, that of its being the best *Stiptic* and *Consolidant* in Wounds, old or green; but more specifically an excellent, and perhaps the safest Remedy known at present for inward Wounds, particularly in those Cases, where the *Lungs* and *Liver* are affected.

The very ingenious and learned Mr. *John Hill*, in his last published *General History of Fossils, Minerals, &c.* has given (Page 395) the most accurate Account that I have seen, of the Origin, Product, and Nature of *Borax*, to which I refer the Judicious: And I doubt not but they will receive great Satisfaction, when they have examined and compared the Experiments on the *Shadwell Waters*, with Mr. *Hill's* Description of *Borax*.

But it is greatly surprizing that all modern Writers confine *Borax* only to *Asia*, and many of them deny even the Probability of this Salt being found in *Europe*, or in any other Part of the World; whereby the Search after this valuable Fossil is hindered, or greatly discouraged; notwithstanding which, it is highly probable, that on proper Investigations our *European Mountains* would not be found destitute of it. Dr. *Jorden* (Page 44) in his *Discourse of Natural Baths and Mineral Waters*, positively affirms, that the Isle of *Lambay*, near *Dublin* in *Ireland*, produced a fixed *Borax*; and as this Author seems to have been a Gentleman of sound Judgment, and one of the best skilled in the Mineral Kingdom, of the Age he lived in, one would not imagine,

Imagine, that he could venture an Assertion of this Sort, of a Fact, which if false, could be so easily disproved; and if true, is it not a Pity that so beneficial a Discovery should have been lost for Want of Cultivation or Improvement?

Corollary the Eighth.

That this Water contains an *Acid* of Vitriol, which is by the Mineral Contents so much absorb'd, as not to occasion or promote any Effervescence with *Alkali*, and discovers itself only by Precipitation. See Experiments XXXI, XXXII, and XXXIII.

The most eminent Gentlemen of the Faculty prescribe Spirit of Vitriol, as a Remedy in malignant Diseases; and indeed, Experience has approved it for a proper and serviceable one, in certain peculiar Cases, where it has signalized its Efficacy. But I cannot help observing here, that it happens frequently that these strong *Acids*, from various Reasons, come to be irritated in the Stomach; so as to produce thereby most exquisite Pains, such as Flatulency, Spasms, iliac Passions, &c. &c. * which are commonly but improperly called Convulsions of the Bowels: The cautious and judicious Physician therefore chuses to prescribe in Distempers that require *Acids*, such as are absorbed, and past an Effervescence, a Quality for which the most excellent and learned Dr. Stahl held the *Tartarus Vi-*

* See more at large Van Swieten's Commentary on Boerhaave, Sect 63.

triolatus in high Esteem : Therefore, as the *Acid* of this Water is also past an Effervescence, it is the more safely to be recommended, and forms the higher Presumption of its sanative Virtues.

Corollary the Ninth.

That this *Water* contains not any Minerals that are heterogeneous to the human Constitution, is verified by the Experiments XXXIV, XXXV, and XXXVI. For was there any *Copper* dissolved or detained therein, these volatile *Alkalis* would precipitate it *blue* : Or were there any other Fossils in this Water, besides *Antimony* and *Iron-Earth*, that were precipitable ; then these volatile *Alkalis* would not have agreed so exactly with the fixed ones, but would necessarily produce a Precipitation different in Colour from yellow, and a brownish yellow.

Corollary the Tenth.

That this Water readily and homogeneously unites with vegetable Salts, insomuch as to partake of their Nature, is evident from the Experiments XXIX and XXX ; so that we may safely conclude, it mixes kindly with the *Chyle*, and in Course carries very powerfully its Efficacy into the Blood, so as thereby to be distributed through the whole Machine ; to which very salutary Property, may be attributed the many Cures this Water has to boast of, on outward Ulcers and old Wounds ; over which it has a singular Power.

Corollary

Corollary the Eleventh.

That this Water may be used, as a safe and efficacious Cleanser for the human Constitution ; especially in those periodical Revolutions of Spring and Fall, when it is ever highly expedient, if for nothing more than Prevention, to discharge all undue peccant Juices, contracted in the Intervals, which our Bodies are so obnoxious to, when we are even in the best State of Health. See Experiment II. and III.

Corollary the Twelfth, and Last.

Upon the whole, we may with Certainty, and authoritatively pronounce, that this Water cannot be a Contrivance of Art, or occasioned by any Accident, of Situation of old *Vitriol* or *Copperas* Works, and as little by any Corruption of Sea-coals ; but that it undoubtedly is a Natural Medicinal Water, produced of a *Medium-Nature* between the *Acidulæ* and *Thermæ* ; but rather richer in the Mineral Ingredients, or Contents, than either the *Acidulæ* or *Thermæ*, according to the Experiments pre-deduced ; whereby it is proved, to contain (1.) *Iron-Earth*. (2.) *Antimony*. (3.) A *Phlogiston*, or *Principium inflammabile*. (4.) *Acid* of *Vitriol*, that is absorbed. (5.) *Sal-Borax*. (6.) *Mineral Spirits* well digested and fixed. (7.) And *common Water*, with which all these Ingredients are con-corporated. And indeed, the Spirits of this Mineral Water are so well fixed, and keep

the whole Mixture so unalterably together, that they enable it to stand Exportation to any Part of the World, without any material Diminution of its primitive Quality, Goodness, or Efficacy : So that it must be of signal Service, especially to our Colonies abroad, in the *West-Indies* or elsewhere, in such chronical or endemial Distempers, as those hot Climates are apt to create in *European* Constitutions, the Relicks of which Distempers, these Waters would be salutarily employed to rid the Body of.

Closing then here, on the Head of Experiments, and Corollaries thereon ; in Order to verify and establish the Genuineness and Virtues of this admirable Water. But, as the same is a modern Discovery, and Examples persuade more than the strongest Reasons, and form a Bridge for others to venture over : I subjoin here a few Cases, selected from a Number of Cures already performed by these Waters, in the very little Time that their Medicinal Use has been known or attended to.

In the Front then, of the Examples, I think I may justly place the Cure these Waters operated on a black Boy, belonging to his Grace the Duke of *Cleveland* ; and by Permission of their Graces the Duke and Duchess, the Mention of it was inserted in Mr. *Berry's* printed Advertisements, in Order to spread the Fame of it to the Public.

This Boy was, it seems, afflicted with the *Taws*, a Distemper happily unknown to these
our

our Climates, being peculiar to that of the *Negroes*, or *African* Nations: But, as this Distemper is of a putrid Nature, so as to rot the human Flesh insensibly, and without the affected Part feeling any Pain, also without any Inflammation or Fever, preceding or accompanying it. From the History and Description of this Boy's Symptoms, I am apt to believe, that he was either actually afflicted with this dreadful Malady, or with one not inferior in Malignancy to the *Yaws*; for I am credibly informed, that all his Head was crusted over with large Scabs, his Shoulders and Neck interspersed with ugly hard Swellings, and other Parts of his Body broke out in putrid Ulcers. Such was his Condition, when their Graces of *Cleveland*, from their innate Tendernefs and Humanity, suffered no Means to be spared, for the Recovery of this their Servant; for the Space of eight Months, he had the Advice and Assistance of many eminent Gentlemen of the Profession, in which Space, he was thrice salivated to no Purpose, or perceivable Melioration whatever: But, at length, he being sent by their Graces Order, to the *Shadwell Spaw*; the Under-steward of that noble Family, and a Surgeon, under whose Care he had been for some Time, brought him thither, where he both drank and bathed every Day; first drinking a Pint of this Water in the Morning, upon an empty Stomach, and then, some Hours after, he went into a prepared warm Bath of this Water, in which

he remained an Hour and upwards. And with this Method alone, this black Servant became cured in eighteen Days Time.

But, whether this black Boy brought this Distemper from his native Country, or revived it here, by coming into another Diet, which seems not so probable; or whether he might contract a Venereal Taint here, that would naturally revive his native Distemper the *Yaws*, the Seeds of which might yet be lurking in his Blood; are all Circumstances which I am not able to determine: For we have Instances, that the *European* Air and Diet alone have cured this horrid Distemper; but whatever might be the Causes, this Boy was certainly most radically and inveterately afflicted; since three successive Salivations were not able to correct, or overpower the stubborn Infection, which yet submitted to the Efficacy of these Waters, in no considerable Space of Time.

In Cases of *Leprosy* this Water has also signalized its Efficacy, but the most authentic and remarkable One, I take to be that of *William Wheatly*, an Apprentice to *Thomas Price*, a Joiner in *Seacoal-Lane*, near *Fleet-Ditch*, who, for six Years was most malignantly, and miserably afflicted with this dismal Distemper, for which he was by Sir *Hans Sloane* advised to drink this Water three Times a Day, and bathe in a warm Bath, prepared of the same; and I am informed, that in the Time he made Use of it in this Manner, he shewed himself once a Week before

fore the College of Physicians, and is now perfectly cured by this Course of Drinking and Bathing.

There are other Instances of Cures performed by this Water in *leprous* Cases, for which I refer the Curious to an authentic Account of them, preserved by the Proprietor, as far as needful, to support and attest the Truth, and the Truth only.

In such Ulcers, or Wounds, as have infected the *Tendons* or *Nerves*, either by immediate *Excoriations*, or by drawing the Nutriment from them, and thereby *enfeebling* and *weakening* the same, so that they are no longer able to execute their common Offices, or to discharge their natural Function, in imparting Strength to the Members of the Body, this Water is a sovereign Remedy; and indeed, it has distinguished itself surprizingly in many Instances of this Nature; but more particularly in the Case of one *John Gosden*, at the *Angel and Crown*, in *Hungerford-market*, who was for six or seven Years most miserably afflicted with *sores* or ulcerated Legs, in which were broke out Seven very grievous Ulcers; insomuch, that he was obliged to make Use of Crutches: Whereas he is now perfectly restored to the Use of his Legs, and the Ulcers are cicatrized and healed up by only the Application of this *Shadwell Spaw*.

In the Case of weak and lax Fibres, the Foundation of so many fatal Disorders, and itself a very bad one, this Water works admirable Effects. In Attestation of which, the
Case

Case of Mr. *Francis Dutton*, in *Rosemary-Lane*, over against Mr. *Cross's* Brewhouse, deserves to be quoted, whose whole fibrous System, was in so lax and enfeebled a State, that having no Use of his Limbs, he was obliged to keep his Bed for a Twelve-month, but by the Use of this Water only, he is restored to the full and perfect Use of his Limbs.

I should too much depart from my Purpose, were I to enumerate here, the many authentic Cases of the different Distempers, such as Dropsies, Fistulas, Consumptions, &c. that have been relieved or cured by the Use of the *Shadwell Spaw Water*. Praises that attempt to prove too much, prove nothing; but it is to the judicious Physician I appeal, Whether it is at all improbable, that this Water should prove so valuable a Discovery, as to me it fully appears; and so extensive a Remedy for many Disorders, that affect the human Constitution; when it answers so many Tests, as manifest it an aquatic Concrete of such salutary Ingredients, that go as near as any I know in the whole Medicinal-Water Genus, to form a Panacea: since Trials of Art and Experience, have already shewn it to be an excellent and safe Evacuant, as an Emetic; a purgative and gentle Diuretic, a certain Cleanser of the Blood, a generous Dissolver of all calculous earthy Matter, that can possibly affect the nervous System; an absolute Strengtheners, Bracer, and Reviver of *weak* and *lax* Fibres, and a most powerful consolidant of all inward, and outward Ulcers, Wounds,

Wounds, Scabs, or Tetters, whether *green* or *old*.

As to the Use of this Water, I am sorry that I cannot here set down or specify the Methods, which each Patient followed in the above related Cases: Because, as the Discovery and Use of it were in their Infancy, it is easy to be imagined, that no regular Form or Order were observed by them, whilst the *Rationale* of this Water's Virtues was unknown, and could only be tried on the Faith of an empiric Prescription in their several Cases. The Patients, it seems, began to drink and continue it, without any Regard to Exactness in the Dose, till it vomited, or purged them; in bathing likewise, they proceeded in the same irregular, desultory Way; some did not even bathe at all, but applied the Water crude, or warm, to the affected Parts, and yet for all this loose, unguarded want of Rule and Regimen, these Waters did not miss of performing these surprizing Cures: They must however certainly work more steadily and efficaciously, when subjected to Rules and Orders, in their Use and Applications, subordinate however to necessary Variations in particular Cases.

But for a general Direction, and Rule, I take a Pint to be a sufficient Dose, taken in the Morning upon an empty Stomach: Which Pint too, I apprehend to be best taken in four Doses, or Glasses, walking, or using any gentle Exercise about Half an Hour between each Glass, and when the vomiting is over, to take
either

either a Dish of Coffee, thin Gruel, thin Chocolate, or very weak Broth, of which the Fat should be clean skimmed off, and without Spice, or Herbs, after which Breakfast as usual.

As to Bathing, I think those that drink the Waters in the Morning, should bathe in the Evening about Six o'Clock, before Supper: But if they have a Mind to bathe in the Morning, I apprehend that, in such a Case, they should not drink the Waters at the same Time, but forbear their inward Use, when the external is thus applied: but this Caution need not extend to those, who only bathe partially, or foment particular Parts, but not their whole Body. These may at the same Time drink the Water also.

With Respect to Diet, or the Regimen of Eating or Drinking, whilst under a Course of these Waters, I do not conceive there is any Necessity of being so scrupulous or exact, as is requisite in a Course of *Chalybeat* Waters: but, however, those will sooner reap Benefit from these Waters, who confine themselves to some Rules, and adhere to such Food, as is proper in their respective Disorders: But there is no Manner of Necessity or Occasion for *Aids* or *Correctives*, to be taken with *Shadwell Spaw*, such as *Coriander-Seeds*, and the like comfortable Aromatics, or bitter Salts, that are absolutely requisite with the *Chalybeat* Waters.

This may be sufficient for a general Hint of Directions, for the Use of this Water, in
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some Method or Order ; nor can a more particular, or special Regulation be expected, unless some Gentleman of the Faculty, should attend this Medicinal Fountain for a Space of Time, that their Use might be entirely under his Inspection ; when I doubt not, but from his minute Observations, more authentic Directions might be framed : And so far is certain, that a Water of such singular Properties, and Virtues, well deserves such a Super-intendance, and the sooner it takes Place the better ; with which Wish I conclude this Chapter, taking my Leave of the *English* Mineral Waters, and proceed to those of *Cleves*, in *Germany*.

C H A P. VI.

Containing a Geographical Description of the Town of CLEVES, and its Neighbourhood : Also a Physical Account of the famous Spring of Chalybeat Water there ; with the pleasant and commodious Situation, for the using of the said Medicinal Water.

BEFORE I proceed any further, I think it will be necessary to give a short historical Account of the City of CLEVES, and its Neighbourhood, wherein Providence hath
blessed

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blest us with that excellent *Chalybeat* Water, which is one of the principal Topics in this Work; and then we shall compare the same with the Town of *Spaa*, whereby the great Superiority which *CLEVES* may claim in this Respect, will easily appear.

The Town or City of *Cleves*, from whence the whole Dukedom takes its Name, was anciently the Residence of the Dukes of *Cleves*; but since this Dukedom, with several other Dominions in *Westphalia*, have been inherited by the most illustrious House of *Brandenburg*; there is a Chancery, with several other Courts of Justice kept there, for this Dukedom, and the Countries in *Westphalia*, thereto belonging. It is a regular, well-built City; populous, and endowed with all Manner of Delicacies, that human Life can desire. The Inhabitants are very courteous to Strangers, and all Religions are here tolerated. The *Roman Catholics* have several Churches and Monasteries; the *Lutherans* one, and the *Presbyterians* have one; the *Jews*, the *Anabaptists*, and other Dissenters have also their Meetings.

It has been advanced by Mr. *de Vries*, and several other Writers, that *Cleves* may be compared with *Jerusalem*: Because the one as well as the other was built upon three Mountains. The *Mount of Olives* near *Jerusalem*, is supplied at *Cleves* by that pleasant Hill near the Royal Park, called the Mountain of *Cleves*, whereof more hereafter; and the River *Kidron*, is at *Cleves* resembled by the

the River *Kermesdahl*: And thus much may suffice here of this Comparison.

The Town of *Cleves* lies under the temperate Zone, in fifty-two Degrees, and some Minutes of Northern Latitude.— It is eight Leagues distant from the strong Fortrefs of *Wesel*; two Leagues from *Emmeric*; four Leagues from *Nimeguen*, a large trading City in that Part of *Gelderland*, which belongs to the *United Provinces*; and six Leagues from *Arnheim*, another very considerable Town in this Province.

The Situation of *Cleves* is extremely agreeable and healthful: Towards the East, about two Leagues distant, flows that most noble River the *Rhine*. The Ground extends in a fair and fruitful Level, disposed into ploughed Lands, for the Productions that are serviceable to Men, and Pasturage for Beasts. The South and West Parts of the Town diversify our Prospect with a rising Ground; here we have aspiring Mountains, Flowery Gardens, shady Groves and Forests, extensive Meadows, Heaths and Lawns, which are perfectly commodious for Hunting; so that, if their Constitutions will permit, those who visit these *Chalybeat* Waters, have here the most inviting Opportunity to exercise and entertain themselves with this noble Diversion. To the North of *Cleves*, is that most magnificent Royal Park, with its Mountains before-mentioned, in which Doctor *Shutte* has discovered this excellent *Chalybeat* Water; and, by this Means, has enriched us with a Variety in
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the Bounties of Nature, by adding a wholesome Medicine to the Pleasures, that abound in this Place.

Cleves is blessed with an exceeding healthy Air; because the upper Part of the Town being built upon a dry mountainous Soil, the Air that is fanned through the Forest is, as it were, refined thereby, and that which comes from the Mountains over the Town, carries all Vapours and Exhalations into the Flats: And there they are received into the *Rhine* and the *Waael*, and swept away by the Current of these Rivers, which, at the same Time, by their Motions, occasion a healthy Change in the Atmosphere. Nor are there any standing Waters, or Morasses near, or about *Cleves*, that, with their frequent Stagnations and Putrefactions, are able to infect the Air; but all is carried off into the main Ocean.

The Royal Palace, which was anciently the Ducal Residence in this City, is very famous for its Antiquity, fine Structure, Spaciousness, and its most charming and delightful Prospects upon the *Rhine*, and the Cities of *Calcar*, *Rees*, *Emmeric*, *Griethuyssen*, *Eltenberg*, *Schenkenbans*, and several other Places. This Palace is at present inhabited by the Lord Chancellor, the President of the Royal Chamber, and other inferior Officers in the Chancery. These Gentlemen are extraordinary civil and obliging to Strangers, but none more eminently so than the Lord *Raesfeld*, who is the Lord High Chancellor himself; and
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the Vice-Chancellor, *Von Koenen*. The Chancery, the Royal Chamber of the Finances, and the High Court of Justice, with all their Offices and Repositories of all their Records, are kept in this Palace. It is said, but with what Authority, I pretend not to determine, that Part of this Palace, an old square Tower, and a large Hall, which goes by the Name of the *Long-Hall*, were caused to be built by *Julius Cæsar*, in the Year 698 from the Building of *Rome*: And Mr. *Teschmacker* endeavours to prove it by an Inscription that formerly was found in this Hall, which is as follows:

ANNO AB URBE DCXCVIII.
C. JULIUS DICTATOR,
HISCE PARTIBUS SUBACTIS,
ARCEM CLIVENSEM
FUNDAVIT.

But the Inscription, that is at present to be seen there, seems to be of a newer Stamp, and is written in this Manner:

ANNO. AB. URBE. ROMANA
CONDITA. SEXCENTESIMO.
NONAGESIMO. OCTAVO.
JULIUS CÆSAR DICTATOR.
HISCE PARTIBUS IN DEDITIONEM.
SUBACTIS. ARCEM CLIVENSEM
ÆDIFICAVIT.

Upon this *Long-Hall* above-mentioned, there is erected the Statue of *Eumenius* the Rhetorician, carved in Stone, after the ancient
N Manner:

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Manner: This *Eumenius* was the first Rector at *Cleves*; and about fifteen Years ago, when the *Middle-gate* of this City was beautified, a Resemblance of that Statue was painted over the Front of this Gate, with a large Inscription concerning him.

The City of *Cleves* is of great Antiquity. It was first founded by a *Roman* Colony, which was encamped about a thousand Yards from the present City, on the very Spot, where, at this Time, the Village *Kellen* is to be seen, and the *Harenacium* was erected; where at present the Village *Qualburg* stands, which is but a very little Way from *Cleves*. This Town, after its Foundation, soon flourished and grew very populous, but was entirely destroyed in the *Dioclesian* Wars: But, as Tranquillity revived, the present *Cleves* was re-built out of its former Ruins, and never after suffered such an entire Destruction, but rather continued advancing in Prosperity, tho' at some Times but slowly, and as Fruits are retarded in their Maturity by a backward or unkindly Season. But, since it has been under the Influence of the most illustrious House of *Brandenburg*, it has, by the Favour of its cherishing Beams, shot forth in great Abundance, with Elegance and Improvement, both in Respect to Art and Nature, as well in the most magnificent Buildings, as beautiful Gardens, Groves, Walks, &c.

When you pass out of the *Nassau* Gate, which is so called after Prince *Maurice* of *Nassau*; you are in a most stately shady Walk
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of Lime-Trees, in the midst of the finest Pleasure-Gardens, upon a Mountain, which, still as you move on, refreshes the Appetite of seeing with new and uncloying Feasts of Variety. These Gardens belong to the Nobility of *Cleves*, but they are devoted to the Reception and Welcome, as well as the Accommodation and Entertainment of all polite Strangers. The eminent Situation of these Gardens yields also a farther amusing Prospect, where with another adjoining Hill, they make a natural Amphitheatre in the Form of an Half-Moon, or look as if Nature was extending her hospitable Arms to embrace each approaching Visitor. The Avenue or *Visto* before the *Nassau* Gate is above two-thousand six-hundred Yards long, planted all along with Lime-Trees, in the greatest Order and Perfection, as is already mentioned. In the middle, between, and under the verdant Canopy of their Shade, is the Road for Coaches, and on both Sides are the Paths or Walks for Foot-Passengers: This is called by the *French* the *Allee Royale*.

Since I have mentioned the *Vistoes*, where-with the Neighbourhood of *Cleves* abounds; I think it will not be unnecessary to give some farther Account of them: But they are so numerous, and beautifully diversified, that I cannot have Room to give a Description of them all in this Place. One of these *Vistoes* extends itself no less than five Leagues, from *Cleves* to *Xanten*, planted all along with Oak, Beech, Fir, and others of the tallest and

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most spreading Timber Trees, growing very regular, shady, and cooling in the Summer. This noble Plantation was performed at the Command of that illustrious Monarch, *FREDERIC THE FIRST*, King of *Prussia*. Those *Vistoes*, that extend from the *Haagshagate* to *Cranenburg*, are two Leagues long, of fair Lime and Beech-Trees: And from this same Gate to *Matterborn*, *Gog*, *Gennep*, and to several other Places some Leagues distant also, of Lime and Beech-Trees; besides the many croses and By-Roads, all adorned with regular Rows of the finest Trees in the most delightful and commodious Manner.

Matterborn is about two *English* Miles distant from *Cleves*; and here are several pleasant and elegant Country-Seats, or *Villa's*, for the Nobility of *Cleves*, where Strangers are often very politely entertained. At *Berg-en-dabl*, about three *English* Miles from *Cleves*, where Prince *Maurice* of *Nassau* resided in Summer, when Governor of that Dukedom, there are very stately *Vistoes* of Fir-Trees; and near this Place, at the Village of *Qualburg*, there are tempting *Vistoes* of Fruit-Trees, continued to a great Extent, and planted in curious Order. From the *Caverinshe* Gate to the Royal Park, forming an excellent *Visto* of Lime-Trees, and on both Sides the various Scenes of fruitful Gardens, and rich Pasture-Lands: With many other such stately Walks and shady Groves, fragrant and fruitful Gardens, these Parts are so richly bedecked, and, as it were, embroidered over, that

that they must be here omitted ; because it would be an Injury to their Beauties and Perfections, to mention them superficially ; and to make a Representation of them proportionable to their due Merits, would require a Volume only on that Subject. We are indebted for most of the before-mentioned Beauties, to that indefatigable and most excellent Prince, *Maurice of Nassau.*

The highest Mountain near *Cleve* is called the Mountain of *Cleve* : It lies about an *English* Mile distant from the Town, and is wonderfully pleasant. It is reported, that this Mountain is of equal Height with the *Swan* upon the Spire of that exceeding high Tower on the Royal Palace, which is called the *Swan's-Tower*, and stands also upon a very high Mountain. King *Frederic the First* was, with extraordinary Expence, the Beautifier of the Mountain of *Cleve* ; for he not only caused the same to be made in such Manner, that Chariots and Coaches may drive almost to the Top of the Hill, but he also raised it higher, in Order to command a more extensive Prospect over the Forest, the adjoining Hills, and the Royal Park ; and the Brows of it are crowned with a noble Garland of lofty Lime-Trees, which are surrounded with Benches, to rest those who have wearied their Limbs in ascending to them : And then they are tempted by Stair-Cases about their Trunks, to ascend still higher into their shady Arms and Heads, where they may weary also their Eyes, with the Variety of distant

Objects around them: For from hence is their Sight directed down eleven Vistoes or Avenues, leading to the Foot of the Mountain into the high Roads; and such spacious Avenues they are, that Foot-Passengers, Horsemen, and Chariots may pass and repass without Interruption. These Avenues also direct to so many different Places, which are to be seen from the Top of this Mountain; so that, from this one Spot of Ground, you are instantly entertained with eleven different and agreeable Prospects.

There is another Hill, called, in the *German* Language, *Frendenberg*; in *English*, *The Rejoicing Mountain*, about two *English* Miles distant from this Town. From this Hill, the City of *Cleves* represents itself in a most beautiful View, intermingled with Gardens and Orchards of the finest Fruit-Trees, Meadows, Woods, Walks and Waters, in Ponds, Rivulets, and other Varieties. There is also an exceeding fine Prospect to be commanded from this Mountain, all along the *Champaign* or *Flat Country*, and the River *Rhine*. Also, contiguous to this Mountain, there is another alike famous for pleasant Prospects, adorned with aspiring Fir-Trees. So that the Curious may have their Choice, not only of what Prospects will best amuse and delight them, but also of what Shades they would behold them from, or contemplate and solace themselves under; whether of Oak, Beech, Lime, Fir, Pine, Fruit-Trees, or many others: And, as under some that are green
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all the Year, so consequently those that yield their cooling and comfortable Shadow or Shelter all Hours of the Day.

If the *English* Gentry, who have so much encouraged their Evening Entertainments by Lamp-Lights, in some of the public Gardens near *London*, had one of these Mountains so planted there, to illuminate in the same Manner, and harmonize with an *Orchestra* in the Trees and Arbours at Top; or would contribute as much to raise such an one, as they have to support these Places; it would exceed, beyond all Comparifon, *Vaux-hall*, *Ranelagh*, *Cuper's* Gardens, or *Marybon*; and might be a vast Improvement of those Assemblies *Al Fresco*; by not only making such a lofty and circular Body of Illumination shine more conspicuously and invitingly over all that great Metropolis, and several of the adjacent Towns and Villages; but save a prodigious Expence in Candle-Lights and Faggoting on Rejoicing Nights, by being made the Bonfire or Luminary-General upon those Occasions: And then *London* would have its Mount *Brilliant*, as well as *Hanover*, and its *Frendenberg* or *Rejoicing Mountain* as well as *Cleves*. I know not how these worthy good Citizens may approve of my Project; but they may plainly see, that I have studied not only for their Diverfion, but their Interest as well as their Health.

Now I will give a little imperfect Landfkip or Sketch of the *Royal Park*, in which my intimate Friend Dr. *Schutte* has discovered

that excellent and most celebrated *Chalybeat* Water. Imperfect I must call my Description, as the Grandeur of this Park exceeds so much any Thing of that Nature I have ever seen, that I hardly can draw the Outlines of this worldly or temporal Paradise. However, I will offer an humble Essay, that, if any of my Readers shall hereafter see the Place itself, they may be so much the more delighted with new Beauties of their own Discovery, whereof they had not been before apprised.

The pleasant Road out of the *Caverinthgate*, on the North-side of *Cleves*, leads into this *Royal Park*, which is about one *English* Mile distant from *Cleves*. This Park is about two Leagues in Circumference, has four large Porches or Entrances, and the high Road extends throughout, without any Obstruction for Coaches, Chariots, and Horsemen; but no Hounds, or Dogs of any Kind, are admitted. This Park is plentifully stocked with the most beautiful Bucks, Does, &c. of the finest Breed, which in the Summer have superfluous Pasture to graze on, insomuch that the Grass, which is to spare, is made into Hay for their Winter's Food. At the Entrance from *Cleves* into the Park, there is a large well-built Mansion-House, the Habitation of his Majesty's Deputy-Ranger of this Park, and the Forests in the Dukedom of *Cleves*, who is a very complaisant and entertaining Gentleman to all civilized Strangers.

From this House we proceed some hundred Yards forward, and then arrive at the Water-works, where we meet with four very good ones, that play up their Streams to a considerable Heighth, with two Cascades and Grottoes. Above these Water-works, towards the Mountain, is the Amphitheatre in a Half-moon Figure, which was erected in the Year 1711, and the Year preceding, by the Order of *Frederic the First*, King of *Prussia*. This Amphitheatre has a Cupulo in the Middle, and, on both Sides, fourteen Arches, in all Twenty-eight, which are so spacious, that two Ladies together may at once, with their largest Hoop-petticoats, walk under them. From this Walk the Spectators Eyes are courted by many rich and variegated Prospects all over the Water-works, Statues, Vistoes, and Avenues; besides several Cities, Villages, Pasture Lands, Forest and Rivers, even to a Sight of the Navigation on the *Rhine*.

Near this Amphitheatre, the *Chalybeat*, or Mineral Water Well is most commodiously situated; so that in Case the Air is moist or wet, the Gentry walk under those pleasant and sociable Arches, when they assemble to drink the Waters, without the least Fear of being incommoded by an Inclemency of the Atmosphere; and this is such an exceeding great Convenience to the Water-drinkers, that I dare say it is hardly to be matched in Point of Accommodation, by any other Mineral Well in *Europe*.

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These Water-works are adorned with many fine Statues and Images, very well executed in polished Marble; and there are two Lions carved in the same Material, of very curious Workmanship; one holding in his Paws the Coat of Arms of the States-General, and the other the City Arms of *Amsterdam*. Both these Lions were presented to ornament these Waters, by the City of *Amsterdam*; the Gentry of *Holland* using, for some Years past, to resort to *Cleves* for the Summer Diversion.

From the Amphitheatre on the Right-Hand at a small Distance, was formerly the Lodge where the Master of the Water-work resided, or such Person as was appointed to supervise and keep the same in good Order; but, since the Discovery of this *Chalybeat*, his Habitation is by his *Prussian* Majesty's Command removed, the old House being pulled down, and a spacious Tavern, with large Rooms built on the Place. Before this Tavern, there is a large *Fish-weigh*, or Conservatory, in a long square Form, and there is in the Middle of it another Water-work, in which it is artificially contrived, that by the Motion of the Water several Figures are agitated to Dancing and other Exercises, agreeable to the Characters of what they represent; which makes this Tavern extremely delightful to many People; not to mention the several pretty Boxes, Lodges, Summer-Houses, &c. pleasantly situated on the Banks of this Water, for the Reception and Entertainment
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of Company, out of all which Rooms there are very beautiful Prospects.

From the Left of the Amphitheatre, passing near the *Ice-Cellar*, we come to the *Star-Mountain*, and may ascend to the Top of this through a commodious Road, over-shadowed all the Way up, with very flourishing Oak and Beech-Trees, and upon the Summit or Pinnacle of this Mountain there grows a Lime-Tree, that looks more graceful and majestic than the tall spreading Plumage, that rears out of the Crest or Burganet of an armed Hero. From hence we are directed, by twelve Vistoes or Alleys, to many fair and variegated Prospects. These Alleys shoot their Rays out into the Form of a double Star, whence the Mountain received its Name from Prince *Maurice*, by whose Directions it was disposed into this Order. There are several other Mountains in this Park, all trimmed and adorned with the like *Sylvan* Furniture of Woods and Walks, Arbours and Arcades, Glades and Avenues, Vistoes, and new Prospects of fresh Entertainment and Variety ; but the Limits proposed to this Treatise, will not permit me to give a Description of them.

The Remainder of this Park below the Water-works, the *Spaw*, and those Mountains to the North-East, is beset with a Diversity of pretty Groups and Groves, shady Walks and Alleys, of Oak, Beech, Lime, &c. sometimes opening and extending by fresh Vistoes, into new Views and Prospects ; and sometimes turning or winding, as it were, into
endless

endless Labyrinths of the verdant Scenery, and other delightful Objects ; your Steps are attended all the Way by the clear Streams or Rivulets that are gliding beside your Paths along the Ground, and over Head, you are so spaciously canopied, as if the Trees stretched up their Arms to contribute such a continued Umbrella as might shelter you, whether walking or riding, from the Inconveniences of the Sun or Rain.

His Majesty's Palace in this Park, where *Frederic the First*, King of *Prussia*, very often resided, and the other Summer Seats or Residences belonging to the Nobility, adjoining to this Park, I must omit for the Reasons already mentioned. In short, if any of my Readers should repair to the Spot, they will find it to be true ; that in this Park *Medicine* has taken up her Dwelling with *Pleasure*, and that Nature in her Beauty and Art in its Perfection, are united in the most consummate Manner ; that no *Spaw* can boast of such a *Terrestrial Paradise*, not even the warm Baths in what Country soever ; and that it is second only to the Paradise, which was in *Eden*.

It is another Convenience, that this *Spaw* is so near the beautiful Town of *Cleves*, where the Gentry and Visitors may be accommodated to their Wishes, and the Way from the Town to the Park is so pleasant, that it is a singular Delight, either to walk or ride thither. Mr. *Kayser*, an ingenious Poet, informs us, that *Cleves* is adorned with, and renowned for ten curious Places and Rarities, that
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are most delightful and memorable to the Beholder. Nor do they possess themselves of his Sight, but to his greatest Entertainment and Admiration; where he gives us the following Description of this City and its Neighbourhood, in his *Parnassus*, Pag. 119.—*Decem Loca jucundissima curioso Memorabilium Spectatori, non sine ingenti Recreatione et Admiratione, oculis usurpanda præbet Clivia Nostra :*

1. *Arcem*, 2. *Arbusta*, 3. *Hortos*, 4. *Tiliam*,
5. *Vivaria*, 6. *Fontem*,
7. *Stellatos Montes*, 8. *Clivos*, et 9. *Gaudia*,
10. *Pontem*.

To which Dr. Schütte has added *Monumenta Principum*, whereby we are to understand:
1. *Arcem*, the *Royal Palace*; 2. *Arbusta*, the *Plantations*, *Walks*, *Vistoes*, *Alleys*, &c.
3. *Hortos*, the many fine *Gardens*; 4. *Tiliam*, an exquisite fine *Lime-Tree*, that formerly grew before the *Haagishgate*, but some Years ago decayed, in the Place of which there is planted another; and Endeavours are used to assist Nature, that it may emulate its Predecessor in Beauty and Magnificence, and it is in a fair Way; 5. *Vivaria*, the beautiful *Royal Park*, of which I have attempted a slight Description, and wherein Providence has blessed us with that most useful *Spaw* or *Mineral Water*; 6. *Fontem*, the *Water-works* in this Park; 7. *Stellatos Montes*, the *Star-Mountain*, in this Park; 8. *Clivos*, that pleasant Place called *Bergenthall*, which signifies,
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in the *English* Tongue, a Mountain and Valley; 9. *Gaudia*, which is the *Freundenberg*, or the Rejoicing Mountain; 10. *Pontem*, the Stone Bridge crosses the River; and lastly, the *Eleventh*, Dr. *Schutte's Monumenta Principum*, are the Tombs of the ancient Dukes of *Cleves* in the Cathedral Church, which are reckoned exquisite Workmanship.

Here I will stop in my Account of the Beauties and good Qualities of *Cleves*, which are absolutely tending to render the Use of its Medicinal Waters more agreeable and efficacious, more convenient and serviceable to those who drink them, than most Places I know of; and, after having thus displayed these Advantages, discover something of the Disadvantages which the little Town of *Spaa*, in this Respect of Medicinal Conveniences, is attended with, and so submit the Comparison to the impartial Judgment of the Public.

First, We must consider the Roads to *Cleves* and *Spaa*, which is a capital Article, as it is supposed Persons of *sick* and *weak* Constitutions are the chief Travellers, whom we are principally to be concerned for: And therefore it would be a barbarous Negligence to omit so material a Point. From the Sea-Shore to the former of these Places, through any Part of the *United Provinces*, there is the most easy Passage, either by Water or Land, that the *weakest* Constitutions can possibly expect or desire, and a plentiful Supply of all Manner of Conveniences, that they can require.

quire. On the contrary, the Roads from *Aix-la-Chapelle*, and through the Principality of *Liege* to *Spaa*, are so rough, hobbling, and incommodious, that it is impossible for feeble Travellers to go through the Fatigue of the Journey : Infomuch that there are many Instances of Patients *dying* often upon the Road to *Spaa*, which is many Times reasonably attributed more to the intolerable Uneasiness they endured by the bad Roads in their Way thither, than to the Distempers they expected to be cured of. And as it is chiefly upon Account of the *Geronster Water*, which cannot be exported, but must be used at the Spring-Head, that the Sick or Diseased go to the *Spaa* ; I will therefore plainly prove, in the Eighth Chapter, of the Experiments on the *Chalybeat Waters of Cleves*, that this is far superior to the *Geronster* at *Spaa*. And as the *Pouhon Water* from the same Place, very well known in this Kingdom, may be with equal Efficacy administered at Home, without any Necessity, for the Use of it, to harass the Patient with such a disagreeable Journey to the Fountain-Head : Because it endures, like the *Pyrmont Chalybeat*, Exportation. I think it therefore but reasonable, to consider this especially, among the Circumstances whereby the Patient may be endangered : And as the Remedies, which have hitherto been so much travelled to *Spaa* for, may be more efficaciously supplied, with greater Convenience, with less Danger, and by a shorter and far better Way, at *Cleves* : What Occasion is there
for

for rifquing our Bones and Lives in thofe horrid and dangerous Expeditions to *Spaa*?

Secondly, It is highly material, to confider the Air of the Place in which we intend to drink the *Chalybeat* Waters, which is at *Cleves* extremely *ferene, calm, regular, and healthy*; as may be eafily apprehended from the Observations I have already made; all Exhalations, Damps, Vapours or Mifts, being, as before obferved, carried off. It is alfo fufficiently warm, and favourable for the Digestion or Working of thofe Waters without being immoderately fo, to incommode in any wife the Drinkers of it at the Place; and this kindly or temperate Warmth it retains fo much the longer, and with fuch an happier and wholesomer Equality in its Degree, as they are all Sand-Hills wherewith it is furrounded; fo that your Conftitution is not put to the Hazard of any Extremes, it is under no Apprehenfion of enduring a fudden Cold upon the Decreafe of hot Weather: But every Change advances without Surprize fo gradually, as to be almoft infenfible, nay, and even defireable to you. But at *Spaa* it is otherwife; this little Town lies in the Cellar of a deep Valley, all cooped and furrounded with fuch very high, fteep, craggy, and barren Rocks, as are not only moft horrid to the Sight, but make fuch ftrong and violent Reflection of the Sun Beams upon the Town; that it is all the Summer intolerably hot in the Day-time, and the Evenings and Nights as difagreeably cold; not only in being firft obftructed

obstructed by those Rocks from the Rays of the declining Sun, but afterwards annoyed by the unwholesome Breath of Damps and Fogs it has exhaled out of their Bowels; so that there are here Extremes upon Extremes, but in nothing more so, than in its Thunders and Lightnings, which are both very frequent and very horrible: For, when the dreadful Roaring and Rattling thereof is heightened and rebounded from Side to Side of those repercussive and echoing Rocks, it is so frightful or terrifying to many of the poor Patients, whose Minds are already dispirited by the Disorders of their Bodies; as not only to have given them greater Diseases, than any they brought thither, but made them quite incurable: Being possessed with a Belief of the Necessity they were under to resign their Lives, since it could be nothing shorter they were arrived at, than the *Day of Judgment*. But as this Situation of *Spaa* cannot assist the Air in carrying off the noxious Vapours and confined Exhalations, as that of *Cleves* does; I am surprized that People, after any Sight and Experience of the Place, can endure to abide there, at least as it is found so inconvenient and detrimental to the afflicted Sick; but that indeed as they came a long and tiresome Way for Relief, it would often be their Death to take such a fearful and fatiguing Journey back again; and so they think it easier to leave their Bones there. Surely *the Amusements of Spaa* ought to be very extraordinary, to make

Atonement for these, not to mention others of its extraordinary Disadvantages.

Thirdly, We are never troubled at *Cleves* with too much Water; for, when it rains as hard or violently as it can, it only washes and cleanses the Streets, and runs constantly away through the small Channels, that are behind the Streets, into the River; so that it is not in the least incommodious or obstructive: But at *Spaa* it is otherwise; the little Stream or Current, that runs through it, swells frequently, after any sudden Rains, so high, as to overflow its Boundaries, in such Manner, that it keeps the Inhabitants Prisoners in their Houses, and unable to stir an Inch abroad. How detrimental this is to those, who repair thither, for the Benefit of the Waters, requires no further Explanation; as it is well known to every Body, who is acquainted with the *Chalybeats*, that, with the Use of them, there is absolutely required Exercise.

Fourthly, The more convenient, pleasant, and enticing the *Walks* for this Exercise are, the greater Benefit the Water-Drinkers receive; for it is not only reasonable to suppose, but absolutely necessary, that the more the Mind in this Respect is entertained, exercised, and attracted from one Variety to another, the more successfully the *Chalybeats* operate upon the Body. That *Cleves* in this Particular may justly claim a great Superiority, is already sufficiently demonstrated; but what great Disadvantages there are, in this Point,

Point, at *Spaa*, is no less known by those who have been there: Because there is but *one Garden*, which can accommodate the Company with such Exercise of Walking, in all *Spaa*; and that is not only very small, but also only at some certain Times of the Day accessible, or fit for Use. This *Garden* belongs to the *Capuchin* Friars, and these Fathers expect at every Season at least a *Couple of Ducats* of each Person, who makes Use of them. And, besides this *single Garden*, there is not one Walk more, in all *Spaa*, any Ways convenient for the Purpose, except two small Meadows; whereof the one is called, *The four Hours Meadow*; and the other, *The seven Hours Meadow*: The Reason of which Denominations is, That, at *Four* of the Clock in the Afternoon, the adjoining high Rock projects its Shadow over the former, and at *Seven* o' Clock, in like Manner, over the last of them. But when it rains, the Water-Drinkers must stay at Home; whereas at *Cleves*, they may take the necessary Exercise in that most delightful *Gallery* of the *Amphitheatre*, without any Interruption of the Weather.

Fifthly, There is a stronger and more violent Exercise than Walking in Gardens, necessary to be used with the *Chalybeat* Waters, by those Gentlemen, who, from thirty to fifty Years of Age, have been used to vigorous and violent Exercises, and complain of *Rheumatic* Pains, or are afflicted with Obstructions in the Joints, or other extended

Parts of the Animal Fabric : In those Cases, I have never seen the *Chalybeat* Waters used without Success ; provided the Exercise was adapted accordingly, to promote and procure the same. There is nothing better both to entertain and exercise the Mind and Body, than *Hunting* ; and those Water-Drinkers, who have Occasion for this Exercise, have the finest Conveniencies and Invitations thereunto at *Cleves*, that are in all *Germany* ; no other Situation being more favourably or delightfully disposed for the same, than the Neighbourhood of that Country. The very identical Spot of Ground is near *Cleves*, where the Emperor *Charlemain* used to divert himself with *Hunting* ; and this was his most favourite Stage for that Recreation, in all his *German* and *French* Empire : But, where can this be enjoyed at *Spaa*, upon the rugged Rocks ? In short, Sportsmen must absolutely leave their favourite Exercise at Home, when they go to *Spaa* for the Waters ; but at *Cleves* they may be gratified both with this Pastime for their Diversion, and an excellent *Chalybeat* for their Health.

Sixthly, It is allowed, that Flies, Gnats, and other Insects of the same Nature, are chiefly generated and occasioned, or nourished and increased by stagnated Air ; but at *Cleves*, the Air, or Atmosphere, as above-mentioned, is rarified to the utmost Perfection ; so that we are not in any Degree molested with those pestilent and eternal Tormenters, as they are at *Spaa*. For there they have two Sorts of Insects,

Insects, that are always extremely troublesome: One rules the Night, and the other the Day-time. Those that have the Day's Work, are very *large*, and so industrious and greedy, in biting and sucking, at your Legs in particular, that both Sexes are obliged to be armed in a Kind of *Gambadoes*, or booted up in leathern Stockings: But for those more hungry Insects, that prey upon you by Night, as bad, or worse than the Muskettoes in the *Indies*, they have discovered no Remedy; in-somuch that, besides being harrassed with the tedious Fatigue of sleepless Nights, you must continually undergo the Discipline of those vexatious Disturbers that occasion them. This is a sufficient Indication of the Unhealthiness at *Spaa*, that this Abundance of those Insects is so considerably owing to the stagnated Air of that Place; and how can it be otherwise expected, from what has been said thereof? Which makes it plain, that it is a Place very unfit for the sick and afflicted *Water-Drinkers* to recover their Health, at least such a one as renders it probable, that you may sooner contract worse Disorders by the Air, than are cured by the Water.

Seventhly, There are other most requisite and material Circumstances, for aiding and assisting the kindly Operation of *Mineral Waters*, in removing most chronical Distempers, to entertain the Mind, and expel the sluggish, gloomy, and melancholy Humour, to which these Patients are so liable; and, for this very Reason, there is such a Variety of

Entertainments invented at such Places, where they are blessed with wholesome *Chalybeats*, and Company resorts for the Use of them. The more various these Diversions are, the more Benefit is reaped by the Water-Drinkers from them; provided they are used with Discretion. The Water-Drinkers at *Cleves* have other Advantages, which most other such Places of Resort cannot boast of; because they can ever shift themselves to one delightful Place or other, among the Neighbouring Towns, such as *Marienbaum*, *Xanten*, and *Wesel*, which are not only very diverting Places, and worth the Sight of Travellers, but will also entertain them with a View of the most elegant and famous Military Exercises of the *Prussian* Soldiery. They have likewise the Attraction of *Eltenberg*, *Emmeric*, *Schenckenschans*, *Gog*, *Neu Closter*, *Mook*, and several others, which may be repaired to according as the Conveniences and Diversions, which each of them severally claim, are agreeable to the Taste and Choice of the Company.

But all the principal and polite Entertainments at other *Spas*, such as Balls, Assemblies, Concerts of Vocal and Instrumental Music, &c. are not wanting at *Cleves*: So that it may be justly said of this Place, that it can entertain all its Visitors suitable to their own Inclinations.

C H A P. VII.

Containing a short and historical Account, in which Manner, and by what Means, the Chalybeat Waters at CLEVES were first discovered.

FROM the preceding Chapter, concerning the Description of the Situation and Boundaries of the Town of CLEVES, it appears, that this Town is surrounded with Hills and Mountains; and though these Hills are not so steep, high, and barren as the Mountains in the Mineral Countries commonly are, but fertile and productive of many excellent Herbs, and all Sorts of Timber, and other Necessaries; yet Mr. *De Vries* assures us, in his Description of *Cleves*, that the Mineral taken or extracted from the Mountain, called the *Butter-Mountain* in the Park (the very Mountain from whence the *Chalybeat* Fountain flows) upon a proper Trial was found to contain *Copper* and *Iron*; and that this Mountain was also enriched with an excellent Clay, proper and sufficient to make the finest and best earthen Ware: This is the whole that Mr. *De Vries* tells us of the Matter; but I cannot learn or hear of any such Trial being made for Minerals or Metals in the Mountains near *Cleves*: Yet it is probable enough, that these Hills do contain a Store of *Copper* and *Iron*, and other Metals; and

that there is great Reason to suspect such, will appear, from what I shall advance on this Head.

That there is a great Plenty of *Iron-Ore* in these Mountains, is indisputable; since it appears, that the low Lands adjacent abound so much with the *Stone* called the *Iron-Stone*, which strong Symptom was one of the chiefest and greatest Inducements to Dr. *Schutte* to search for the *Chalybeat Spring*. That these Mountains at *Cleves* contain a Plenty of other Minerals likewise, is undoubtedly suggested and made appear by many reasonable and undeniable Proofs; and in particular, the several Sorts of *Pyrites* plainly indicate the Truth of this Suggestion, as they are certain Signs of the Variety of the Metals or Minerals they yield.

Near these Mountains have frequently been found great Quantities of *Crystal-Stones*, very beautiful, and far superior to those of *Bristol*. Infomuch, that an eminent Jeweller in *Amsterdam* was deceived by the delicate Lustre of one of them, and looked upon it as a real Oriental *Diamond*; the Particulars of this Story are told thus: Prince *Maurice* of *Nassau* having procured one of these Stones of a very beautiful Colour, and, after having it properly polished, sent it to a Jeweller at *Amsterdam* to be set, who taking it for a real Diamond, of an extraordinary Value, it induced him to think of an Imposition upon the Prince, which he effected, by exchanging a real Diamond of a smaller Size, and setting it

it in its Stead; the Prince, who was a great *Connoisseur* in precious Stones, discovered the Jeweller's Error, and was greatly pleased with the *Finess*.

These Stones, wherever discovered, are certain Signs of Minerals; and the Boundaries of all Medicinal Mineral Water-Fountains are full of them: The Neighbourhood of the Medicinal Water-Springs at *Bristol* and *Bath* are near Instances of this Assertion, where these Stones not only are in plenty, but many other Concretes of the same Kind, and all Mineral Springs are accompanied with them; so that, where Stones of the sparry or *Lapis Specularis* Kind are discovered, we may freely search for Mineral Waters.

To give a very particular Account of the Discovery of the *Chalybeat* Waters at *Cleves*, I will extract the same from Dr. *Schutte's* History, which he published in the Year 1742, wherein he gives us, in his second Chapter, a plain Account of this Affair; and from another Book since published (which treats more largely on this Head) intitled, *The Amusements at the Spaw of Cleves*.

Dr. *Schutte*, who for many Years has been the appointed chief Physician at the *Chalybeat* Water-Fountains at *Schwelm*, (a remote Place in the County of *Mark*, in *Westphalia*, where great Numbers of People resort) has had the best Opportunities of searching and examining into the Nature and Virtue of these Waters, and of becoming a perfect Master of their particular Qualities; and more particularly

larly so, as he has a good natural Share of Knowledge in *Mineralurgia*: The Doctor had always great Inclinations to search after a good *Chalybeat* Water in the Mountains near *Cleves*, and as he had discovered great Quantities of *Iron-Ore*, commonly called Iron-Stone, in the Neighbourhood of *Cleves*, this Discovery was a strong Inducement for the Undertaking of this Work; accordingly he began his Search, and examined all the Water-Springs and little Rivulets, and particularly those in the Park, near the *Butter-Mountain* (knowing them to be rich in *Iron-Ore*.) This Examination, after great Sagacity and Pains, proved successful, for, upon discovering, near one of the Pipes that conveys the Water to the Water-works, by the Means of a Leak in the Pipe, a Sediment peculiar to the Medicinal Mineral Waters, the Doctor discovered it by its Taste to be a very good *Chalybeat* or Mineral Water, and had the Satisfaction by trying it with Galls to see it turn instantly Purple, and afterwards to a Blue Colour.

Thus the Doctor succeeded in his long wished-for Design, in discovering and establishing the salutary *Chalybeat* at *Cleves*: And, as it is reasonable to imagine, that the Doctor pursued his Discovery, he proceeded, and hereupon opened the Water-Cock, that conveys the Water from the Receiver into this Pipe, from whence the Mineral Water came: When, first, a fine Black, then a Red, and, at last, a more Yellow Iron-Earth appeared;
then

then the clear Water came, that had not any Mineral or *Chalybeat* Taste (which was the Water of the third Receiver) and did not in the least partake of the Principles of the Medicinal Waters: He therefore closed the Cock again, and, in the Space of half an Hour, the Water, that came from the Leak of the Pipe, was a very good *Chalybeat*; the Doctor thereupon justly concluded, that there must be another Leak in the Pipe, through which this Mineral Water entered from some *Chalybeat* Spring from the adjacent Mountain: For the farther Discovery of which he pursued his Design by Means, which will appear hereafter.

Thus far the Doctor advanced in his Discovery; but then it was difficult to determine what Quantity of Water there might be, whether, or no, there would be sufficient for Bathing or Drinking, to answer his well-grounded Purposes, and to recompense him for the great Pains he had taken in the Attempt: This was not to be determined but by digging and opening the Ground; it was indeed well known, that there was Plenty of Water in the Mountain, but the Difficulty was to discover if there was Mineral Water enough contained therein, which could not be known but by Trial: Because this Experiment could not be made by the Mineral Water *Magnet*, as the Mountain was so full of *Iron-Ore* and common Water, which, when together, or near each other, the *Magnet* will operate upon them, as upon a Me-
dicinal

dicinal Mineral Water of the same Nature; then as common Water and *Iron-Ore*, though often found together, yet do not always unite, so as to constitute a *Chalybeat* Water, these Circumstances created great Difficulties towards the Discovery; for which Reason, the Doctor concealed his Intentions and Progress for many Years.

But, notwithstanding the many Difficulties the Doctor encountered in the Pursuit of his Discovery, many favourable Indications still daily encouraged him, and fully persuaded him, that he should surmount them all by a diligent and laborious Examination; for which Purpose, he first enquired of those Labourers, who were employed in digging the Foundations of the Amphitheatre, if they had in their Works ever observed or met with in the Bowels of the Earth a yellow Water; the Labourers observed to the Doctor, that there were such Numbers of Water-Springs flowed from the Mountain in one Night's Time, that retarded their Work for laying the Foundation, insomuch that they were obliged to secure their Works, by the driving of large wooden Piles into the Ground, and by supporting it with large Planks or Boards; but as to the Colour or Nature of these Waters they observed nothing; but told the Doctor, that the Earth, whereon the Foundation rested, was of a red Colour, from whence he concluded by these Accounts, that the Mineral Water Spring (as he before conjectured) must inevitably lie behind the Gallery,

lery, in Search after which it was necessary, in the first Place, to procure more Miners; and, as there had not been any Instances of Trials being made before in Search after Minerals at *Cleves*, the Town consequently could not furnish the Doctor with Persons proper for this Undertaking; but very fortunately, about this Time, it happened, that a Ship fell down the *Rhine* in its Passage to *New-England*, which was stopped near *Schenkschans*, about two Leagues distant from *Cleves*; among the Crew of this Ship, who were *Palatines*, the Doctor found out three Miners, and engaged them in his Service; and on the 20th of *June*, N. S. in the Year 1741, they began this Undertaking, by pursuing, with great Pains and Fatigue, the little Spring first discovered near to the Pipe of the Waterworks, which when they had uncovered, they discovered that the Mineral Water entered into this Pipe through a Leak, as suspected. They pursued this Water into the Mountain, and were obliged, with indefatigable Pains, to sink a Pit, which caused a more than ordinary Trouble to the Doctor; for, as the Mountain contained so many Springs, he was obliged to be continually with the Labourers, to examine each Water with great Care, and to prevent them from mixing with each other, which would inevitably spoil the *Chalybeat* Waters, and frustrate his whole Designs. However, in about the Space of four Months, he compleated this Work, so far as to put a Receiver for the Water

Water into the Pit, which when executed, he desisted from any farther Proceedings, and locked up the Pit for this Season. And in the Month of *March* following, after having procured three other Miners from the County of *Mark*, he again pursued his Undertaking, and ordered them to sink a new Pit behind the Amphitheatre, in the digging of which 28 Feet deep in the Earth, they discovered an *Iron-Ore* and a Mineral Water, but they were so interspersed, and mixed with common Water Springs, that it was impossible to separate them from the true *Chalybeat*; upon which, the Doctor ordered them to be shut up, and directed his Workmen to open and unlock the Well, which was dug the Year before, from which he conveyed the Mineral Water through a long Pipe into a proper Receiver erected for that Purpose, over which was built a convenient Place to drink the Waters in; but afterwards, Orders were given for the building of a fine and ornamental Piazza of Stone, which not only serves the Purpose of a Drinking-House, but adds much Beauty and Splendor to the whole Place. Over the Receiver, from whence the Mineral Water is drawn for present Use, the following Inscription is affixed:

CREATORI

C R E A T O R I.

Deo. Ter. Opt. Max.

Omnis Boni.

Unicae. ac. Vivae. Scaturigini.

Sacrum.

*

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*

*

Sub Imperio.

Celsissimi. Et. Augustissimi.

Principis

Friderici. II.

Magni. Borufforum Regis

Anno MDCCXLI

Tempore Belli.

In Silesia. Feliciter gest.

Hic. Fons Mineralis

Est detectus

Et

Anno Sequenti

Post

Binas. Victorias.

Ac

Pacem Wratislaviensem

In Salientis Aquae Formam.

Redactus.

Et

Dei Clementia.

In Languentium

Salutarem Usum Medicum

Optato Effectu

Collocatus.

Ab Inventore

Jo. Henrico Schutte

Med. Doctore.

In *English* thus :

Sacred to the most High and Great God, Creator of all the Earth, the only and living Fountain of all Good.

Under the Reign of the most High, Puissant, and August Prince, FREDERIC the Second, KING of Prussia, in the Year 1741, during the War that was successfully carried on in Silesia, this Mineral-Spring was discovered, and in the Year following, after two Conquests and the Peace of Breslaw, successfully set up in the Form of a Cascade by the Discoverer,

John Henrick Schutte,
Doctor of Physic.

Thus far the Doctor compleated his Discovery, and executed this great Undertaking ; but being in continual Search, after more *Chalybeat* Springs, he discovered another not far distant from the already compleated Mineral Water-Well, which being more strongly imbibed by gross, sulphureous, Mineral Vapours, than those Waters in the Well before-mentioned ; and therefore, consequently, not so salutary for inward Applications, as for Bathing : He ordered a proper Receiver for this Spring, from whence the Artificial *Chalybeat* Baths are prepared, and used with great Success. All necessary Preparations now, after indefatigable Pains of the Doctor, being compleated for the Reception of those who thought

thought proper, or had Occasion to use these Waters, having first published abroad, and advertised them in the publick Papers of *Holland* and *Germany*; he opened the Season for Drinking, on the 17th of *July* 1742, which was attended with great Success; for great Numbers of People resorted thither for the Improvement and Recovery of their Healths, and as they received extraordinary Benefit from the Use of them, the Company considerably increased Yearly: The Doctor continued this first Season till *September* the 15th, N. S.

Dr. *Schutte*, who has very deservedly gained great Reputation and Honour by this Discovery, could not but take Notice and complain with great Justice of the many Discouragements he met with in the Pursuit of his Discovery, from many idle and ill-natured People, who, either from Defect of Knowledge in these Matters, or from natural Inclination to defame superior Merit, took improper Liberties with the Doctor, and vainly endeavoured to decry and subvert his noble and truly esteemed Design. But all these ill-natured Reflections of designing People did not discourage the Doctor from his laudable Pursuit; and indeed, when we consider, under whose Patronage and Protection he was employed in this Undertaking; even under the most gracious Approbation of his *Prussian Majesty*, who is a Prince both too steady and just to give Ear to the idle Conjectures of conceited People: I say when we consider this, the Doctor was proof against any Persons whatever, that were inclined to at-

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tack

tack his Reputation; however an audacious Attempt to frustrate a Design so beneficial to the publick Good, could not but call for Resentment in some Kind: But, more particularly, the Doctor complains very heavily of some Gentlemen of the Faculty and the Apothecaries, who took great Pains to condemn and explode the Reputation of these salutary Waters, looking on them, as great Obstructions, if not a total Destruction, to their Fees and Sale of Drugs. To these may be joined another Set of Gentlemen of the Faculty, who through Want of Knowledge, being unacquainted with the Nature of the *Chalybeats* and other Medicinal Mineral Waters, have taken upon them with Authority to condemn their Power and Virtue. But all these united Attacks both against the Doctor and his salutary Remedies, were insufficient to gain any Profelytes to their bad Cause; except some of their own Herd, whom private Interest united thro' Fear of coming to Destruction; for his *King* was too wise to be baffled out of Reason by such Incendiaries.

I cannot but here remark, what Difficulties and Obstacles most Projectors meet with in Search of new Discoveries, which, tho' intended for the universal Good of Mankind, meet not with that Candour and Encouragement they deservedly merit: And a great Misfortune it is, that this Matter is not taken into some Consideration, as so many public Advantages to Mankind would consequently accrue. And I beg Leave to observe, among all the Nations that I know off, the *English* in my Opinion give the

the least Encouragement to a Projector; nay very often, a happy Invention destroys him, here; as there are commonly a Set of People, to whom if the Projector allows not the whole Profit to themselves, and even the Honour of the Discovery too; they endeavour to find out some Method to frustrate the whole Undertaking: and if, by chance, an useful Discovery should force its Way into the World, it is often attended with greater Difficulty than the Discovery itself, witness the Discovery of the immortal *Harvey*, viz. of the *Circulation of the Blood*, where it cost him more Pains and Trouble to gain Faith and establish a firm Belief of this most useful and grand Truth, than the Discovery itself: Almost innumerable other Instances I could produce, but, their being so common, it would be needless to mention any more.

C H A P. VIII.

The Mineral Contents in the Chalybeat Waters at CLEVES, attested and proved by Experiments.

ALthough the *Mineral Spirits* in this *Chalybeat* Water, are of so volatile a Nature, as not to bear Exportation, from their Evaporating in a few Hours after they are taken out of the Well, and the Disunion of the whole Water-Concrete; yet, by his

PRUSSIAN MAJESTY's Directions, there was some of the Water sent, in Winter, to the College of Physicians at *Berlin*, in Order to have Experiments made on it: And, notwithstanding the Spirits were mostly exhausted, there was still enough left in the Body of the Water, and its Sediment; whereby, on due Experiments, to pronounce with Certainty, that this *Chalybeat Water* was endowed with the same *constituent Parts* or Contents, as the Waters at *Schwalbach* or *Egra*; and, if drank at the Fountain-Head, would indubitably produce the same good Effects.

But as Experiments on *Chalybeat Waters*, made otherwise than at the Fountain-Head, are not invested with sufficient Authority, nor afford Certainty enough to establish safe Conclusions on, such as those made at the Fountain-Head, incontestably furnish; Dr. *Schutte* having made very precise and exact Experiments on this *Mineral Water* upon the Spot, I will here deduce them, and from thence conclude the essential Properties and Quality of this Water.

I. A Glass full of this *Mineral Water*, in a warm clear Day, taken out of the Well, and exposed open to the *Air*, is first Crystal-clear, like common Spring-Water, without any Mineral Particles to be seen in it; but, after standing a little Time, there settle innumerable little *Bubbles*, of a globular Form like *Pearls*, on the Sides and Bottom of the Glass:

Glaſs : Theſe Pearls gradually riſe to the Surface of the Water, then burſt and vaniſh ; but, as long as they continue under Water, they preſerve their Form and Figure undiſſolved.

II. The warmer the Air is, the ſooner theſe *Pearls* or *globular Bubbles* appear ; but in a cold, cloudy, or miſty Air, they are, in Proportion, ſlower in forming as well as diſſolving.

III. When this *Water* hath ſo remained in the open Glaſs a ſhort Time, it will firſt change to a *milky Colour* ; and the Pearls or globular Bubbles will continue to emerge to the Surface, till the milky Colour in the Water gradually changes red, and ultimately becomes dark and cloudy.

IV. When the *Water* is thus changed into a red dark Colour, then the *Iron-Earth* ſeparates from the Water, and ſubſides gradually to the Bottom ; in the Form and Appearance of a fine yellow Powder : In the mean Time, the Top of the Water is covered with a ſhining Surface, or Cuticle, which appears firſt of a pearl Colour, then of a yellow Colour like *Gold*, and at length of a *Copper* Colour ; till at laſt, this Cuticle aſſembles a great many beautiful Hues, very much in the Manner of a *Peacock's Feather* : At which Point of Appearance, the State or Texture of this Water is broke and altered.

V. By theſe Experiments may be inferred and obſerved, that every globular *Bubble*, mentioned in the ſecond and third Experiments,

carries a small *terrestrial Atom*; so minute as to be scarce perceptible to the naked Eye, to the Surface of the Water, altogether forming that shining Cuticle on the Water, which, according as it increases by their Appulse, changes Hue as above-mentioned.

VI. When, by the inward Workings of the Water, the Emergence of the globular *Bubbles* is ceased; the Water changed into a *yellow Colour*, and the Cuticle on the Surface of the Water arrived at its last Period, the component Particles are separated, the Texture altered, and the Water loses its original Mineral Taste.

VII. When this Water, thus changed and discomposed, has stood two or three Days, without Interruption; the yellow *Iron-Earth* continues sedimented at the Bottom; but the Water becomes again Crystal-clear, and will for a long Space of Time remain liable to no Change; but preserve a small Taste of the Salt it contains.

VIII. When the Contents are thus separated from the Water, and that Water is decanted into another Glass, it will not strike any Colour with the Powder of *Galls*.

IX. When this Water, conformable to the Experiments V, VI, and VII, has undergone the Disunion of its Parts, and its original Texture is so far broke; that the *Iron-Earth* is sedimented, and the Cuticle on the Surface formed: Then gradually infuse *Spirit of Vitriol*, so much as is perceivable to the Taste, and let it stand uninterrupted for a few Hours; the

the Sediment and Cuticle will then be dissolved, and re-incorporated with the Water, which will become Crystal-clear again, without any Thing extraordinary to be seen in it; but, with *Galls*, strikes a very *deep Blue*.

X. With *Powder of Galls*, it strikes a deep Purple, which changes blue at last.

XI. With the *Bark*, and *Saw-dust of Oak*, severally, it strikes first a *Violet* and then a deep *blue Colour*.

XII. The Leaves of *Green Tea*, after they have been some Time in this *Chalybeat Water*, (cold) strike first a *purple*, then a *brown*, and at last a *deep blue Colour*.

XIII. Fine powdered *Pomegranate-peels* make this Mineral Water first of a *Violet*, then of a *deep blue Colour*, occasion a blackish Sediment, and on the Surface of the Water gather a dark *brown Cuticle*.

XIV. An Infusion of the Herb *Veronica* strikes first with this *Medicinal Water* a *Violet*, and then a *deep Blue*.

XV. The *Syrup of Violets* occasion a very green Colour.

XVI. The Powder of *Terra Japonica*, a red, pretty much of the Colour of the *oriental Hyacinth*; then a *Violet-blue*, and at last a *brownish black colour*.

XVII. Good *Rhenish Wine* and *fine Sugar* in Powder mixed together occasion a *Fermentation*, or more properly an *Ebullition*, such as the *Pouhon* and *Pyrmont Waters*, and tastes very gratefully. With *French Wine*, it has no Motion whatever, but tastes very agreeably,

bly, as it likewise does with any other *Red Wine* of the Nature especially of *Florence Wine*.

XVIII. Some *fresh Milk* was taken in warm Weather, and exposed in an open Glass, and in another Glass of the same Milk mixed with this *Chalybeat Water*, and set together in one Place, where it was next Day found, that the *pure Milk* was *sour*; but that mixed with the Mineral Water had neither lost its natural Taste, nor was in the least altered.

XIX. The same Experiment was made with boiled *Milk*; when it was found, that the unmixed *Milk* was on the Turn the second Day; but the mixed did not turn *sour* till the fourth.

XX. *Oleum Tartari per deliquium* causes a *Precipitation* with this Water, and the Sediment thereby produced, is of a yellowish-green Colour.

XXI. This Water also precipitates with *Sal-Armoniac*, a Sediment which at first appears of a true green Colour; but, in some Hours, it changes into a greenish yellow, or Parrot-coloured green.

XXII. The *Spirit of common Salt* occasions not any *Precipitation* in this *Chalybeat Water*, but entirely prevents it; insomuch, that it maintains the Water in its Texture, so that it neither produces a Sediment nor Cuticle on the Surface; but the Water becomes of a *yellowish* Colour, like *French Brandy*.

XXIII.

XXIII. This Water, with the *Spirit of Nitre*, proceeds the same, as in the foregoing Experiment with the *Spirit of common Salt*.

XXIV. When this Water is mixed with the common *Spirit of Vitriol*, it preserves it in the original *Crystal-clear* Texture, without suffering any Sediment of the *Iron-Earth*, nor the Cuticle to appear on the Surface: And the Water, thus mixed, will keep clear in its original State, though exposed in the open Air, for many Weeks.

XXV. *Common Vinegar* occasions a little Motion or *Fermentation* with this Water, but preserves it in its original State of Clearness.

XXVI. *Cremor Tartar* preserves likewise this Mineral Water in its Texture, so far as not to occasion any Sediment or Cuticle; but tinges the Water with a light *yellow* Colour.

XXVII. A *Solution of Pot-Ash* occasions no Motion or *Effervescence*, but produces a *yellow Precipitate*, which, when settled, the Water above this Sediment clarifies again, and nothing like the Cuticle appears on the Surface thereof.

XXVIII. *Dissolved Allum*, gradually poured into this Mineral Water, occasions a small *Effervescence*; but not so much as with *Aqua-fortis*.

XXIX. A *Solution of common Salt*, in Mixture with this *Chalybeat Water*, occasions a great *Motion*; but they remain clear, and no Sediment appears.

XXX. When this Medicinal Water is taken in a Glass, to be evaporated in a *Sand-heat*,

beat, then the globular Bubbles or Pearls mentioned in the *Experiments* I. and II. appear quicker and more numerous; the coloured Cuticle forms sooner on the Surface, as does the Sediment at Bottom; and when the Water is evaporated, the Sediment with the *Salt* remains.

XXXI. The Colour of the Sediment is not always the same, but differs according as the Operation is performed; that is to say, if done with a gentle flow Fire, or a quick one, in an *earthen* Boiler, or a *Metal* one, over an open *Fire* or a *Sand-beat*; all which Differences in the Process vary the Colours respectively, which is also observed with Regard to the several Sediments of *Pyrmont*, *Spaw*, *Schwalbach*, and other celebrated *Chalybeats*; and commonly little white Specks are to be discerned on those Sediments, which are the natural Salts of these Medicinal Mineral Waters.

XXXII. When upon this yellow Sediment (or in whatsoever Colour it appears) is poured distilled *Rain-Water*, with sufficient Time to dissolve the Salts, then filter the Mixture through a Paper; the Salts go off with the Water, but the *Iron-Earth* remains in the *Filtrum*; and, in this Manner, the Separation of their Contents are obtained.

XXXIII. When this Water is evaporated to the Consistence of Crystallization, and then disposed in a proper cold Place for Shooting, by this Means will be obtained the true *Mineral Water Salts*.

XXXIV.

XXXIV. This *Iron-Earth*, which the Salts are separated from, in the Manner above-related (Experiment XXXIII.) dry in a Crucible by a clear Fire; then, very well reverberated, will become of the Colour of *Crocus Martis*; when cold, and levigated to a fine Powder, the Magnet will attract it, like Filings of Iron.

XXXV. When a Crucible full of this *Iron-Earth*, thus extracted from the Mineral Water, is reverberated, the Smell of the *Principium inflammabile*, or *Phlogiston*, is very perceivable during the Operation; but in an agreeable Sense, and no wise nauseous or suffocating like the Smell of common Brimstone.

XXXVI. When upon the Sediment, or yellow *Iron-Earth*, of this *Chalybeat* Water, is poured the *Spirit of Nitre*, a Smoak arises, followed by an Effervescence.

XXXVII. *Spirit of Vitriol* causes also an Effervescence and Smoak, when in Mixture with this Sediment or *Iron-Earth*.

XXXVIII. With *Aqua-fortis*, this Sediment, or *Iron-Earth*, makes a very strong Effervescence, accompanied with a Smoak that smells very *sulphureous*.

XXXIX. When upon this *Iron-Earth*, or Sediment, is poured *Aqua-fortis* sharpened with a small Quantity of Spirit of *Sal-Armoniac*, setting it in warm Sand, it will yield, in Extract, a *saturate yellow Tincture*.

XL. The Salt separated from the Sediment or *Iron-Earth*, as related Experiment the
Thirty-

Thirty-second and *Thirty-third*, has a pungent bitter Taste like to *Arcanum Duplicatum*; causes no Effervescence in Mixture with *Acids*, and consequently, may be ranked as a *Sal medium*, or neutral Salt.

XLI. A Piece of *Silver*, laid in this *Chalybeat* Water for twenty-four Hours, was not visibly discoloured or *blackened*.

XLII. When this *Chalybeat* Water has been constantly drank for eight or nine Days, out of one Glass, the Sides thereof are very much furred with the *Mucilage* of Iron, of a yellow Colour, of a *bituminous* Nature; so as not to be cleansed, or yield scarcely to the hardest Scouring.

XLIII. When in the Summer, in the Heat of the Day, about Noon, this Water being carried in a Glass-Bottle well stopped and cemented, from the Spring to the *Town*; it will suffer a very visible Change and Alteration of its natural Colour, even in so short a Way; and the powdered *Galls* neither strike so soon a Purple, nor so strong a one as at the Well.

XLIV. But if this Water is, in the Morning before Four o' Clock, carried to Town, in well cemented Bottles, it will preserve itself two or three Hours in its *primitive Quality* and Property to be used, or medicinally taken.

XLV. In Winter, if carried to *Town*, with the above Precaution, it will remain clear for several Days, retain the Mineral or *Chalybeat* Taste,

Taste, and strike a *purple* Colour with Powder of *Galls*.

XLVI. This Medicinal Water being in a corked and cemented earthen *Jug*, and in Winter, during a Frost, exposed to the most intense *Cold*; the Water will freeze to Ice, on the Sides all round the Inside of the *Jug*; and the *volatile Spirits* of *Vitriol* will concentrate inwards, in the Space that remains unfrozen.

XLVII. When the *Jug* is opened, and a Hole bored through the *ambient Ice*, the Water containing the *Vitrioline Spirits* will run off, and the frozen Water remains in the *Jug*.

XLVIII. The Water, in which the *Vitriolic Spirits* are concentrated, taste very strong and unpleasent; so that they are by no Means so grateful to the Palate, as the fresh Water at the Spring-head.

XLIX. The *Powder of Galls*, in Mixture with the Water, in which the said *Vitriolic Contents* are concentrated, strike instantaneously a *deep blue* Colour, much quicker than with the fresh Water from the Well.

L. When the *Ice* in the *Jug* (Experiment XLVII) is dissolved, it becomes Crystal-clear Water again; yet, with *Galls*, it strikes only a pale: Whereas that Water, containing the *Vitriolic Spirits concentrated*, instantly strikes the deepest Blue, as before observed, Exper. XLIX.

LI. That Water of Concentration is *cloudy*, of a *saturate* yellow Colour, but the Water, returning

returning from the Consistence of Ice, is as clear as Crystal.

LII. The Water, with the concentrated *Chalybeat* Contents, when exposed to the *Air*, precipitates more *Iron-Earth* or Sediment, than the same Quantity of fresh Mineral Water at the Well-head ; but the Water obtained from the Ice, retains no Mineral Taste, nor occasions any Sediment or Cuticle on the Surface of the Water.

LIII. This *Chalybeat* Water is full two Degrees lighter, than the common Water that can be found in the Neighbourhood of *Cleves*, which for light, hearty, common Water is remarkably famous.

These are the Experiments I have thought the most worthy of Notice, and of setting down here, on the Subject of this famous *Mineral Water* at *Cleves* ; in Virtue far superior to that of the *Geronstere Spaw*, which has hitherto been in more Repute for the Cure of chronical Disorders, and with which it differs not much in Taste.

Dr. *Schutte*, who has, on both these Waters, made very nice and accurate Experiments, writes me, that the *Geronstere Spaw* possesses more common Salt ; but then, that at *Cleves* is more richly impregnated with the *Mars*, or *Chalybeat* Contents, and therefore more efficacious and salutary than the *Geronstere Spaw* ; which is evinced and testified by the Waters at *Cleves* striking sooner and easier their respective Colour, than those at *Spaw* ;

as well as by a Number of Cures they have wrought in the most desperate Cases, in many Distempers.

This Gentleman also writes me, that five or six Drops of *Solution of common Salt* will make a *Pint* of the Water at *Cleves* taste exactly like the *Geronstere Spaw*.

That the *Geronstere Spaw* has been, and continues to be frequently imported into this Metropolis of *London*, I know, and at which I am greatly surprized; because these Waters, when they have lost their Spirit, are so hard, unkind, and heavy to the Animal Oeconomy, that they are rather of a petrifying Nature, so as scarcely to be digested with the strongest Animal Motion; at least, no Good can be expected from them, unless precisely drank at the Fountain-head.

The *Pouhon Spaw* and the *Pyrmont Waters* are the best, that bear Exportation from *Germany*; and these, with the *Selter Waters*, are the only Foreign Mineral Medicinal Waters, that can be usefully imported here on this Island.

The Mineral Water at *Cleves* is also superior to many other famous *Chalybeat Waters*, in Regard to their sovereign Lightness; a Property in them not to be wondered at, when we allow for the natural Advantages this at *Cleves* is peculiarly endowed with: Its Passage, for Example, through a compact sandy Bed of Clay, in its Nature not unlike the famous *filtring Stones*, that are brought from the *Canary Isles*; when other the like Waters,

as at *Spaw* or elsewhere, spring out of Rocks, and sensibly shew their Want of this *Filtrum*; which not only cleanses and lightens the Water, but also refines the Mineral Contents: And consequently they get sooner into the Sanguification, as well as discharge themselves more readily by Urine; whereby the Mineral Contents acquire and exert more Power in their Action, towards producing their salutary Effects.

From the above Experiments we may safely draw a few *Conseſtaria*, or *Corollaries*, tending to establish and prove, beyond all Exception, that this *Spaw* at *Cleves* is a *Chalybeat*, impregnated with Mineral Contents, of singular Virtue and Efficacy towards the Cure of several chronical and inveterate Disorders.

Corollary the First.

That this *volatile Quality* of these Waters is of an *Acid* Nature, commonly called a natural *volatile Spirit of Vitriol*, is now out of Dispute: As also, that it is of a very subtile *Ætherial* Quality, imbibed with the *Phlogiston*, and other Mineral Contents, which may not improperly be stiled the Quintessence of Fossils, appearing, perceivably to us, in the Cavities of the Earth like Vapours or Damps; which Contents are the chief Ingredients of this Water, and the great Sources of its salutary Operations; as may plainly be collected from the following Consideration: To wit, that this Water continues its Force and Efficacy, so long as these Mineral Contents remain

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remain in Union with the Water; but, as soon as they are evaporated, it is intirely destroyed, changed, and loses its Temperature and Energy. See Experiments VI, VIII, and IX.

Corollary the Second.

The Striking of *purple, blue, and black-brown* Colours with Powder of Galls, *Green Tea*, Herb *Veronica*, *Pomegranate-peels*, *Terra-Japanica*, is owing or occasioned by this volatile Spirit of Vitriol, and the *Iron-Earth* it contains dissolved in this Water. See Experiments X, XI, XII, XIII, and XIV.

Corollary the Third.

That the *Ætherial Vitriol Spirit* is not of a sharp corrosive Nature, or heterogeneous; but, on the contrary, salutary, kind, and homogeneous to the human Constitution, is manifest from its Mixture with the *Milk*, occasioning no *Coagulation* whatever. See Experiments XVIII, XIX.

Corollary the Fourth.

From these Experiments on *Milk*, it likewise appears, that this Medicinal Water may be safely, and without Inconvenience, used or drank with Milk, in such Distempers where the particular Case or Circumstances of the Patient, such as Weakness, Decay, &c. &c. require it,

Corollary the Fifth.

For a Proof that the *volatile Vitriol Spirit*, or Mineral Contents, will not permit the Transport or Exportation of this Water, either for Experiments or Medicinal Use; but by all Means is to be used or taken at the Spring-head; see Experiments XLIII, XLIV.

Corollary the Sixth.

That a fixed *Vitriol Acid* continues or preserves this Water in the original Texture of a Crystal Clearness, may be ascertained by Experiments XXII, XXIII, XXV, XXVI.

Corollary the Seventh.

That when the natural *volatile Vitriol Acid* is evaporated from this *Chalybeat Water*, the Iron or Chalybeat Contents subsided, and the Cuticle, like Peacocks Feathers, is gathered and formed on the Surface; the *Vitriol Acid* thereto affused, dissolves the Sediment and Cuticle, and restores this Water to its natural primitive clear State again, appears by Experiment IX.

Corollary the Eighth.

That this Medicinal Mineral Water contains an *Iron-Earth*, which after it has been reverberated strongly in a Crucible, the Magnet will attract the same, may be noted in Experiments XXXIV, XXXVI, XXXVII, XXXVIII, XXXIX.

Corollary

Corollary the Ninth.

That the *Iron-Earth* of this Mineral Water contains Part of the *Phlogiston*, or *Principium inflammabile*, which carries not with it such a nauseous, suffocating Smell as the common Sulphur, and which cannot be separated from this *Chalybeat* Content, the XXXVth Experiment shews.

Corollary the Tenth.

That this Mineral Water is endowed with a *Sal medium*, or a *neutral Salt*, occasioning no Effervescence with *Alkalis* or *Acids*, is clear from Experiments XXXII, XXXIII, XLI.

Corollary the Eleventh.

That this *Chalybeat* Water is lighter and cleaner, than the best common Water at *Cleves*, which is even famous on the Account of its being remarkably light and clear; see Experiment XLIII.

Corollary the Twelfth and Last.

That this *Chalybeat* Water, or the *Spaw* of *Cleves*, contains all Ingredients, Mineral Virtues, and every other Quality of a Medicinal Mineral Water, commonly called *Chalybeat Waters* or *Acidulæ*, proper and salutary to be used for Relief in several chronical Diseases; appears plainly on the Sum of these Experiments; as well as from repeated Instances of their Success, in very desperate Cases.

C H A P. IX.

Chalybeat Waters, *their Mineral Contents considered, and their Medicinal Virtue, Power, and Action upon the human Body, explained and accounted for; particularly those of CLEVES in GERMANY.*

HAVING in the first and second Chapters suggested the most rational Account I could yet discover, how, and by what Means the Element-Water is changed in the great subterraneous Laboratory of Nature, and compounded into a salutary Medicine, and of the Materials, with their Process of Operation; I shall treat in this Chapter of the Medicinal Power and Efficacy of the Mineral Contents in these Waters.

But I cannot help first premising my Regret, of what appears to me a great Deficiency, or *Desideratum*, in the Study of Physic; in that the Professors of this Science, so necessary to the Well-being of Mankind, in their *Lectures* to their Pupils or young Students on the *Materia Medica*, hardly ever touch on, or mention the *Mineral Waters*. And to this Omission, as I apprehend, it may be imputed, that either these valuable Medicines are too little known, regarded, or introduced into Practice; or are abused by unjudicious, unmethodical, and empirical Prescriptions

scriptions of them : For, had these *Waters* been duly treated of, in such regular Lectures, and made the Object of Study and Examination ; we might probably be able to give a better Account of their Properties, Nature, and Essence, together with their Causes and Modes of Power and Action on the human Body, collected from a more extensive Investigation, than has been hitherto obtained in this material Branch of the *Materia Medica* ; and for Discoveries, in which we might perhaps have seen more than one Genius spring up, when once put into the proper Track.

But, as we labour under this Deficiency, we can only make the best Use of such Opinions, as we can collect from the most eminent of those *Authors*, who have treated on this Subject ; to whose Knowledge and Lights therein I gladly do Honour, and whose Mistakes I deem highly excusable, from the natural Abstruseness and Obscurity of the Matter : Some of these I shall here quote, in Support of my own Opinion, which I shall likewise freely give, under Appeal to those sacred Guides, *Experience* and the *Love of Truth* ; how, and in what Manner the Mineral Contents perform their Medicinal Office and Operations. And though I derive what I advance thereon, especially from the *Waters of Cleves* ; what I shall say relative to them, will be so abstracted, as to bear a competent Analogy and Application to all Waters of the same Nature.

Dr. *Jorden* says, Page 125, “ That the
 “ Qualities of the Medicinal Mineral Waters
 “ are seldom one or two, but commonly
 “ more : These Qualities are either *first*, as
 “ hot, cold, moist, dry ; or *second*, as pe-
 “ netrating, astringent, opening, resolving,
 “ attracting, cleansing, mollifying, &c. For
 “ the first Qualities, it is certain, and agreed
 “ upon by all Authors, that all Mineral Wa-
 “ ters do dry exceedingly, as proceeding from
 “ Earth ; but some of those do cool withal,
 “ and some do heat.”

Now, in Regard to the *drying* Quality,
 which the above Author attributes to *Earth*,
 he is so far right, as this Quality is owing to
 and proceeds from the *Iron-Earth* ; which,
 however, he does not mention, or specifically
 distinguish, nor indeed, what Sort of Earth
 it is, to which he ascribes this Effect.

Iron-Earth, singly, without a proper Cor-
 rective, will, in the human Body, absorb, and
 like a Magnet, attract all the Humidity out
 of the Animal Fluids, and discharge them,
 so as in Course to produce *Heat* or *Dryness*,
 to a sanguine Constitution ; and, for the same
 Reason, this Earth will operate as a *Cooler* to
 those, whose Constitution of the Blood is
 viscid or fizy : Since, by its magnetic or at-
 tractive Power, it will interrupt and slacken
 the *Circulation*, the Languor of which natu-
 rally cools the whole Body : This, however,
 opens to View a very salutary Consequence,
 which is, that the volatile Mineral Spirits,
 by their penetrative Power, open a Passage
 for

for the Water and Salts, by which Means the thick fizy *spontaneous* Gluten of the Blood may be properly *diluted*, and restored to its healthy State again.

Another just and true Definition of the active Power of the *Iron-Earth* in the human Body, is given by Dr. *Simpson*, in his *Hydrologia Chemica*, Page 27, §. 20. " That the
" Operation of Steel, whether Filings, Cro-
" cus, or Sugar of Steel, is by coagulating
" this excrementitious Salt, which, because
" *Acid*, is therefore partly Mineral; for as
" soon as the Steel aforesaid enters the Sto-
" mach, and so passeth from the first to the
" second Digestion in the Intestines, as it
" passeth along, the spurious Salt runs head-
" long towards it to dissolve it, but instead
" thereof is coagulated thereon, spending its
" Activity upon the Steel, loseth its Acute-
" ness or Sting, and so is carried away with
" the Steel by Stool."

What Dr. *Simpson* here asserts, is a known and indisputable Truth; to which, however, it is proper to add, that by the same Rule, as the *Iron-Earth*, in the Manner thus pointed out, pervades the whole Animal System; it also entangles the *Acid* in the most extreme Parts, and carries it off either by Sweat or Urine.

It is indeed much debated, whether an *Acid* can possibly exist in the extended, or any Parts of the human Body, the *primæ Viæ* excepted; or whether such an *Acid* can naturally be contained in the sound or unsound

Liquids of Man or other Animals, so that it may thence by Art be extracted ; which Controversy seems to me unquestionably decided in the Affirmative, by that most exact Experimentalist, Dr. *Boerhaave* *, as may also be easily verified by daily Experience. For not only external Ulcers from a scorbutic Taint, or the like, that contain no digested Matter, but yield forth, instead of Matter, a clear Water-like Liquor, which clear Liquor will on Trial manifestly prove itself an *Acid* ; but also the very Urine itself both of Men and Brutes will yield, or a common Salt may be produced out of it : Now, it being well known, that a common Salt cannot exist without an *Acid*, and as this Salt, thus produced from Urine, according to the Laws of the Animal Oeconomy, must have passed through the Circulation of the Blood, the indisputable Consequence follows, that this *Acid* must have been Part of the Blood, and other Animal Juices in the Extremes.

Dr. *Simpson* takes also Notice of the Disorders we are liable to, from *Acids* in the extreme Parts of our Bodies ; and indeed he has given a lively Description of them, Page 116 of his pre-cited Treatise ; where, however, it seems as if he relied more on the *Salts*, than the *Iron-Earth*, in his Assertion that the *Salts* of these Mineral Waters are the principal Agents or *Anti-Acids*. I grant him indeed, that these *neutral* Salts are salutary Remedies

* See Dr. *Van Swieten*'s Commentary on Dr. *Boerhaave*'s Aphorisms, Sect. 60.

in the Case of an *Acid*, and undoubtedly they aid and assist the *Iron-Earth*. But, from what has been said already on this Subject, I apprehend him to be mistaken, and even not consistent with himself, when he attributes this Quality to the *Salts* only.

The next Writer occurring to my Notice, is Dr. *Haworth*, who, in his *Description of the Duke's Bagnio*, Page 96, of the *Chalybeat Waters in general*, observes thus: "The chief
" Virtue of these Waters consists in their di-
" uretic Quality, for they work potently by
" Urine. To some Bodies they give a Stool
" or two, especially if they drink them quick;
" they make the Excrements very black, and
" the Urine pale: They dilute the Blood,
" and dissolve those Salts, that are fixed upon
" the Nerves, or other Parts, causing acute
" Pains and other Maladies, and force them
" out of the Blood, through the Reins and
" Bladder." To which he adds a Catalogue of *Distempers*, in which these Waters are serviceable.

But, in Regard of the Cleanness and Lightness of the Waters, Mr. *Allen* distinguishes them most judiciously, and therefore I repeat his own Words, Page 64, in his *Natural History of the Chalybeat and Purging Waters of England*: "The extraordinary Virtue of this
" Sort (the light *Chalybeat* Waters) consists in
" that, as the *Chalybeat* Principles are in these
" most clean, so the Spirit is most thin, and
" the Water both light and thin; and so we
" have their Virtues not only most full here,
" but

“ but somewhat differing : They invigorate
 “ the Blood without Heating, penetrate fur-
 “ ther without Inconvenience, volatilize, at-
 “ tenuate more, and their Acidity goes off
 “ without leaving any preternatural Impres-
 “ sion behind.”

This same Mr. *Allen* gives also an Account, in his Book now quoted, from Page 71 to 82, of Hypochondriacal Disorders, where he fixes the Seat of the malignant Matter of this Distemper in the *Chyle*, which he has observed to increase, on using fermented Liquors ; but always found that *Acids*, either Spirit of Vitriol, or obtained from Sulphur, used with common Water, which is void of Fermentation, have given Relief in this Disease : This, it seems, induced him to send Numbers thus afflicted to *Tunbridge-Wells* in *Kent*, for the Use of the *Chalybeat* Waters, where they answered to his Wish.

The celebrated Dr. *Hoffman*, in his first Book on *Waters*, Page 51, says : “ That the
 “ Mineral Waters likewise operate through
 “ their moist and volatile Contents ; for they
 “ destroy by Alteration all sharp Humours
 “ of the Juices and Fluids wherewith they
 “ readily mix, and by this Means dilute and
 “ dissolve those that are thick and fizy, and
 “ bring them into Motion again ; and these
 “ Waters are so much more serviceable, the
 “ lighter and softer they are in their Nature ;
 “ in particular, the *Spirit*, that these Waters
 “ contain, does very great Service ; for it irri-
 “ tates and invigorates the Blood, as soon as
 “ united

“ united therewith; promotes the Circula-
“ tion, and penetrates through the most mi-
“ nute Blood-Vessels, establishing the most
“ natural Degree of Circulation, as by drink-
“ ing these Waters may easily be discovered;
“ for the Motion of the Pulse or Arteries in-
“ creases, the whole Body perceives a more
“ than usual Warmth, and a gentle Sweat
“ appears: All evacuating or cleansing Fa-
“ culties of the human Fabric perform their
“ Offices in such a mild and generous Man-
“ ner, that the Appetite is not thereby de-
“ stroyed, nor the Constitution in any Man-
“ ner weakened.”

Dr. *Hoffman* also attributes great Virtues to the *Alkaline* Salts, which he fancied these Waters contain, particularly in absorbing Acidities, diluting the viscid Blood, and carrying off the morbid *Mucus* out of the Intestines: But there are other Contents in these Waters, that have a juster Right to vindicate these Properties than these supposed *Alkalis*; nor is he himself far from confessing it, where he says, that the neutral Salts of these Waters have the same Medicinal Power and Virtue, as the *Alkalis* he imagines therein. Then he proceeds to the fine subtile *Iron-Vitriol*, which these Waters, according to his Opinion, also contain, of which he says thus:
“ In Regard to the subtile *Iron-Vitriol*, which
“ these Waters are likewise possessed of, they
“ have a strengthening, mild, attracting Qua-
“ lity, by which Means they strengthen weak
“ Limbs,

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“ Limbs, particularly the *Viscera*, and restore them to their natural State again.”

Then he adduces Instances of the great Services, he has observed done by these Waters in Bloody Fluxes, and that the *Vitriol* is so mild and gentle, as to cause a natural easy Cohesion. But I am afraid, that, if there was really any *Vitriol* in these Waters, he would not, in all Probability, have had Reason to praise them so much: But it is however certain, that the good Effects he attributes to the *Vitriol*, are owing to the *Vitrioline Acid*, which these Waters contain, and not to *Vitriol* itself.

Then he proceeds to the terrestrious or earthy Parts of these Waters, of which he says, “ That they destroy the Acidities and “ sharp acrid Humours in the Blood, and “ that the same operate in this Respect, as “ another *Alkaline* absorbent Earth.”

Thus far the Opinions of others; and now I will proceed to my own.

It must be confessed, that the *Spagirical Writers*, particularly the *Alchemists*, have furnished us with Discoveries of the elementary Parts, and the Contents of the Solids and Fluids of the Animal Bodies, which occurred to them, in their Chace after the *Philosopher's Mercury*, in the Animal Kingdom; their Eagerness after which made them search and examine the Subjects with the utmost Care and Exactness, so as not to leave one Part either solid or fluid in the whole Animal Empire untortured, in the Prosecution of their
darling

darling ideal Prize, the *Hermetic Mercury*: From which, however, we have incidentally received the Advantage of learning the component Parts of which both *Solids* and *Fluids* consist; and, by this Means, we have been taught and enabled to extract and produce a *malleable Iron* out of all Animal Parts, as Blood, Fibres, Flesh, &c. and even the very Excrements are not exempted: But, though the Process is well known, yet for the Sake of those, who are not conversant with Chemical Studies, I shall here, *per saltum*, insert it, *viz.*

“ The Animal Matter, from which we
 “ intend to make by Art an *Iron*, is first
 “ gently dried till all the Phlegm or Moisture
 “ is separated or exhaled; and then it is to
 “ be reverberated to Ashes, which are to be
 “ washed methodically, when it will always
 “ appear that Parts of these Ashes are of a
 “ yellow, reddish Colour, inclining to brown,
 “ and specifically heavier than those that ap-
 “ pear of a whitish Grey, and will generally
 “ yield to the Attraction of the Magnet;
 “ these heavy and yellow reddish-brown
 “ Parts are to be separated from the other
 “ Ashes, and then mixed with the Fat or
 “ Suet of the same Animal, and in a Cru-
 “ cible put into a Smelting-Furnace, when
 “ it will as easily, and in the same Space of
 “ Time, by a quick, strong Fire, produce a
 “ *malleable Iron*, as from the *natural Ore*
 “ itself.”

Hence

Hence it is manifest, that the Animal Elements are cohered and solidated with *Iron-Earth*; at least, this Conclusion seems to rest assured on the Experiment before-mentioned; for, undoubtedly, the Animal Solids consist of what we extract out of them: And this *Iron* can even be extracted out of the Matter that goes to the Composition or Renewal of these Solids: For the all-wise Creator has so bountifully and providentially disposed this Mineral, that even all Vegetables partake thereof, so that not any one Animal can take in any Food, without swallowing a Dose of *Iron-Earth*, at the same Time; which is incontestably designed by eternal and admirable Wisdom, to compose, nurse, and preserve the Solids of the Animal Fabric, by the constant Apposition of fresh Particles, as fast as others are worn out by the Action of Life.

There is another Argument, which confirms me strongly in my Sentiments, that the divine Creator purposely adapted the *Iron-Earth* to bestow that Firmness and Stability to the Animal Elements, necessary to produce and constitute Solids, which I derive from the immediate Effect we perceive upon the Fibres, and indeed the whole Animal Machine from artificial Iron-Medicines, and *Chalybeat Waters*; since Nothing is quicker in pervading the Animal Fabric, than what participates of *Iron*, and there is Nothing in the whole *Materia Medica*, that can well promote a Cohesion, unless it is related to this Mineral. Many more Arguments I could produce

produce in Favour of these Conclusions, but that they must be unnecessary to enforce a Point already so sufficiently demonstrated.

All the Food we eat, without the Seasoning of Salt, tastes not only insipid, but, independent of the *Nausea*, our Stomach can neither well digest, nor the fluid Juices obtain the requisite Nutriment for preserving the natural Faculties of our Body, without this *Salt*, which is therefore with great Propriety called the *Seasoning* of the *Earth*. Therefore Salt is not only an esculent, but an indispensable Medicament and Corrector of our Food; particularly with Respect to those Parts that constitute the Solids. And indeed, most Animals have a Kind of Medicinal Instinct towards Salt: Thus, Who may not have seen in Sheep, Pigeons, and Horned-Cattle, a joyful Appetency of *Salt*, when presented to them? Now, as *Iron-Earth* is found by Experience, when by itself, without a sufficient Corrective, to be prejudicial to the Humidity of the Animal Fabric, if used unmethodically, as it almost calcifies the Solids, and is therefore very justly held too adstringent; for this Reason, the ablest Gentlemen of the Profession always used it with the greatest Caution imaginable; and we should undoubtedly incur a proportionate Inconvenience from our daily Food, were it not for the Salts we correct it with, and thereby guard the Contents that compose the Solids. By the same Rule, *Salt* is required in *Chalybeat Waters*; and, if they do
not

not naturally contain a sufficient Quantity, we must have Recourse to a Supplement of them, by joining with them a due Proportion of those bitter purging *Salts*, which, in good Practice, are commonly taken with them.

It is manifest that all *Acids* come from one original Cause, which is the *Acid of Vitriol*; and that owes its Birth or Generation to *Iron-Earth*, its appropriate Matrix. Now it is evident, that the *Chalybeat Waters*, and particularly their earthy Contents, absorb the *Acids* in all Parts of the Body: Yet it is nevertheless true, that these Waters themselves contain an *Acid*; and it would therefore seem a Contradiction, necessary to be reconciled, how an absorbent Power should exist in these *Chalybeat Contents*, when they themselves contain that which we expect they should remove. But this will appear consistent with Reason, when we consider, that these *Chalybeat Waters* contain only a *volatile Acid*, and that to no greater Degree however, than to rarify and divide the *Chalybeat Principles* into the most minute Atoms: So that, when these Contents have entered the Animal Juices, the *Acid* is exhaled by Perspiration, and the *Iron-Earth* thus deserted of its *Acid* certainly attracts the *Acids*, wherever it meets them; which is thus confirmed by Dr. Hoffman:

“ The earthy Parts of the Mineral Waters destroy the Acidity and sharp acrid Humours of the Blood, and operate in this Respect, as other *Alkaline* absorbent Earths;
“ for

“ for when they have attracted, and are
 “ united with the *Acid* and acrid Juices,
 “ they have then changed their Nature, and
 “ have contracted an astringent Quality, which
 “ cannot however do any Prejudice; for, as
 “ Liquids constantly follow, they cannot oc-
 “ casion Obstructions, but are Strengtheners,
 “ and preserve the necessary Tone, Vigour,
 “ and Elasticity to the Animal Parts and
 “ Functions.”

Fixed *Acids*, indeed, would certainly be noxious, if they existed in our present Subject; but they are not to be found in any *Chalybeat* Waters, that are fit for Medicinal Use. But those that contain a fixed *Acid* may properly be called *Vitriolic*, for they will always adhere so close to the Mineral Contents, as, upon Exhalation, to yield a perfect *Vitriol*; and such Waters are from and at all Times condemned and reprobated in the wholesome Practice of Physic; since it is these very identical *Acids*, that are inclinable to make the Animal Elements to cohere. Undoubtedly, the *Roman* Soldiers invigorated and recruited their Strength by their *Posca*, which they used in their Campaigns, for their common Beverage in hot Countries, which was Nothing but Water and Vinegar. The *German* Soldiers use this Liquor frequently, in the Wars of *Hungary*; and by its cohering adstringent Effect, it is a good Preservative to them against that wonderfully relaxing Distemper, called the *Hungarian Disease*; that, in so dissolving a Manner, attacks the nervous System,

that the Fibres of such as languish under this Distemper, are near reduced to a perfect *Mucus*. And doubtless, it is from the like Experience of its Benefit, that the Stage-fighters of this Metropolis, as soon as they are wounded or tired, drink a Draught of Vinegar to recruit their Strength; for the Moisture which exhales from their Blood would soften the Tendons, as the Steam of warm Water softens Bones: So that they would presently lose their Strength, if they did not check the exhaling Moisture, by the cohering Quality of the Vinegar: Hence may be concluded, that if the *Chalybeat* Waters contained a fixed *Acid*, they would cohere too much, and almost callify the Solids.

Notwithstanding, the fixed *Acids* are pernicious Conjuncts with ferrugineous Medicines, yet, the volatile ones are not only not prejudicial thereto, but even necessary to be combined with them: For, as they pass through the Animal Fabric quicker and freer than the *volatile Alkalis*, they in Course not only open the Passages for the *Iron-Earth* into the most minute Vessels and Circulatories of the Blood; but also, by the stimulating Quality of the *Acid*, cleanse and fitly dispose the Elements for a due Reception of these cohering and solidating Mineral Contents: An essential Distinction, which Practitioners in Physic should never lose Sight of, since Experience of late hath fully authenticated its Truth and Justness; in that, all the Preparations of *Iron*, such as Powders, Salts, Essences, and Tinctures,

tures, &c. &c. made with such volatile *Acids* as are obtained from common Salt, have performed such Wonders in Distempers, where *Iron-Medicines* are salutary, as were never yet matched by the Effects of those prepared to the ancient Standard, with fixed *Acids*.

Dr. *Van Swieten*, that justly celebrated Commentator of Dr. *Boerhaave*, affords so strong a Corroboration of the Excellence of Mineral Waters, in the Diseases of a weak and lax Fibre, which infest chiefly the inactive, the sedentary, and indolent Part of Mankind, and is constitutional to the fair Sex; that I cannot, with Justice to my Subject, omit so authoritative a Citation. In his Commentaries on Sect. 28. of Dr. *Boerhaave's* Aphorisms, he says as follows:

“ Among the *Acid* austere Fossils, Steel
“ dissolved in a fermented vegetable *Acid* is
“ preferable to all others, by Means whereof
“ such Persons, as labour under a cold weak
“ tumid Habit of Body, shall recover even
“ to a Miracle. It causes no Evacuation of
“ the distending Liquid, but adds new Strength
“ to the solid Vessels, where by being more
“ contracted, they drive forward the almost
“ stagnating Fluids; whereas, were we to
“ attempt the Cure of these Diseases by Eva-
“ cuations, we should only increase the Weak-
“ nefs.

“ From the Use of these Preparations, an
“ agreeable Warmth is found to diffuse itself
“ through every Part of the Body; the bloat-
“ ed Parts subside; the Paleness of the Lips

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“ and Cheeks is changed into a florid sanguine Complexion : The Dullness, Indolence, and Difficulty of breathing upon every the least Motion cease ; the former Activity returns, all the Functions are properly discharged, and Life is in a Manner renewed.

“ The SAME Effect is produced by the Steel dissolved in the medicated (Medicinal) *Spaw-Waters*.”

Now here, Dr. *Van Swieten* is only blameable in the Degree of Prevalence, he ascribes to these *Chalybeat Waters*, in saying no more than that they have the *same* Effect, as an artificial Preparation of Steel ; whereas he should have given them immensely the Preference ; and this I shall prove clearly from his *own* Writings, without torturing or straining his Meaning.

Section 28; he observes, “ That the prepared Medicines act first on the *primæ Viæ*, and cannot enter the Mouths of the Lacteals, till they are *greatly diluted*, and so insinuate themselves by Stealth, as it were, into the Blood : For this Reason, they cannot arrive at the last Stage of Circulation, but with their Powers very much diminished.”

He goes on afterwards to assert, that “ Steel dissolved in the milder *Acids* is commonly preferred to all others ; because it acts not only by its austere, astringent Virtue, but because by the wonderful Stimulus of its
“ metallic

“ metallic Sulphur, which is so friendly to
 “ our Nature, it raises the vital Powers.”

To me, then, it is surprizing, that, reason-
 ing from his own Principles, he did not more
 strongly perceive, and of Course, inculcate
 the *Chalybeat Waters*, as the very Vehicle
 which Nature has made so preferable to all
 the Compositions of the *Dispensatory*, to an-
 swer the Purpose of conveying that *Steel*, he
 so highly and justly recommends, through the
 whole Animal Fabric ; diluted to his Hand,
 accompanied by the friendly and even ne-
 cessary *Acid*, and urged by their exquisite
 spirituous Principle, from its elastic, volatile,
 expansive Nature, through Vessels small be-
 yond Imagination, which they at once de-ob-
 struct, strengthen, and restore.

Farther, in his Commentaries on Section
 the 66th, where the Cure of spontaneous
 Diseases from an *Acid* Humour is treated of ;
 Dr. *Boerhaave* having proposed towards their
 Cure, Medicines that absorb, dilute, blunt
 and change *Acids*. Dr. *Van Swieten*, on the
 Head of diluting Medicines, observes, that
 they are those, in which “ Water, and every
 “ other Liquor, in which Water is the pre-
 “ vailing Ingredient. Oil of Vitriol burns
 “ every Part of the Body that it touches ;
 “ and yet, if diluted with a great Quantity
 “ of Water, it shall do no Hurt. But, as an
 “ *Acid* commonly prevails in weak Bodies,
 “ and watery Diluents tend to make them
 “ weaker, and Weakness has been assigned
 “ as one Cause of producing an *Acid* in the
 “ Body,

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“ Body, the absorbent Medicines, for this
 “ Reason, are to be preferred to the Di-
 “ luent.”

Here it appears very plainly, that the great Objection to watery Diluents is, that they *weaken*. But, in the Use of *Chalybeat* Waters, this Objection is clearly removed by the known Efficacy of the Irony Principles ; so that you have here a natural Medicine, which, from the tried Properties of its Contents, not only at once *dilutes* and *strengthens*, but acts as a powerful Absorbent and Alterative of the radical Cause of Complaint ; that *Acid*, which if not the universal Cause of Distempers in human Bodies, as has been by some advanced, is at least one of the most common Origins of them. Whilst, at the same Time, the Operation is highly benign and gentle : “ *Friendly to hu-*
 “ *man Nature, and raises the vital Powers.*”

As to the fair Sex, the Use of the *Chalybeat* Waters, and their Benefits, may be easily collected from their Propriety in a lax, languid Habit of Body, to which they are so often subject.

It is then, in these Waters, methodically and judiciously prescribed, that the pale, weakly, languid Girl, whose Blood and stagnating Fluids have given her a yellow or greenish Colour, and whose flagging lax Texture of the Solids has put her out of Frame and Order ; in these Medicinal Waters, I say, must she expect chiefly to find a true and natural Cosmetic, when the recovered Firmness of Flesh, and the true Colour of the
 Blood,

Blood, shall restore her to a State of Health and Beauty: The Lips and Cheeks will resume their agreeable Incarnate, and the whole Body its healthy Hue and Consistence; exhibiting the pure genuine Charms of Nature, inimitable by all the inconsistent and uncomplete Imitations of Art: As what can be more staringly absurd than the comparatively dull, red and white Fucus unnaturally plaistered over a flaccid, watery System of Muscles; such as some superficial Women vainly imagine they can impose on the Evidence of the Senses by; whilst they neglect the Aids of Medicines, that might perhaps really restore to them their lost natural Privileges of pleasing.

Both the Animal Fluids and Solids partake of the *Phlogiston*, or inflammable Principle, as also the *Chalybeat Waters*; which Assertion is manifested by Electricity, whereby we can elicit Fire from any Water; it is then to our Purpose to consider, Whether the *Phlogiston* in the Mineral Waters has any Influence or Connexion with their Medicinal Power and Actions on the human Body. But as we swallow more *Phlogiston* in two Ounces of Bread, than a Gallon of *Chalybeat* Water can possibly contain; I apprehend, that this inflammable Principle is chiefly the necessary Companion of the Mineral Damps, and that those Vapours cannot exist without it; so that it only assists to preserve the Texture of this our aquatic Mineral Concrete, and that this small Quantity does not deserve

to be considered as of any Account in the Medicinal active Parts of it: Yet, it is probable, it may in a slight Degree connaturally invigorate the Animal Fire or Spirits, and thus contribute to refresh the Vitals.

That there are many different Sorts of Damps and Vapours in the Bowels of the Earth, is of incontestable Certainty: For the Fossil-Coals contain a Damp, that is quite different from those we meet with in Metals, or other Minerals. They are too so gross, dense, and terrestrious, as to be easily gathered and preservable in Bladders and Glasses, which those of Metals and Minerals are not, being of a finer, and more rarified Nature: Those of Coals, therefore, are of a more suffocating Quality; so that they are capable of overpowering the vital Spirits, and proving immediately mortal to those that approach them too near: And thus we so frequently hear of Coal-Miners being suffocated; whereas, on the contrary, the Vapours in Metalline and Mineral Veins are of a more subtile Nature, and occasion lingering Diseases.

It is also indeed remarkable, that the Effluvia of Liquors, such as Wine, Beer, &c. when they are in Ferment, are of a Mineral Quality, and will prove certain Death to any Animal whatsoever, that should be confined in a close Cellar, within their Sphere of Activity, whilst the Liquors are in Fermentation. Nor should it escape Observation, that the pernicious Charcoal Damps have ever a Smell exactly like that of *Arsenic*.

But

But all those Damps, that are contained in the Mineral Waters, are rarified and corrected by the *Phlogiston*, and the *Acid* Contents, which are so powerful in subduing heterogeneous Qualities, that even the poisonous *Arsenic* cannot resist these overbearing Correctors: Since it is very well known, that *Arsenic*, by the Help of Brimstone only (which is nothing else but *Phlogiston* and *Acid*) may be changed into a most salutary Medicine, that retains none of those pernicious, deleterious Qualities, the *Arsenic* is infamous for. But the Damps, wherewith the Mineral Waters are impregnated, are certainly the most mild and homogeneous to the human Constitution; so that even were they not corrected by the *Phlogiston* and *Acid* (which, however, they always are) I should not think them in any considerable Degree heterogeneous to the Animal Fabric, unless they were received in too great a Quantity; for, then, undoubtedly they would over-power the Vitals, and prove certain Death. This, however, is no more a Danger, than what an Excess of Quantity will make all Cordials, Wine, or any Medicine whatever, liable to bring with them.

But, undoubtedly, these Damps, though of a Mineral Nature, have some Affinity with our Animal Spirits; insomuch, that it is almost instantaneously perceptible many Ways, after drinking them; even, insomuch, that they intoxicate such as are of a weak Constitution, or, at least, to all Drinkers induce a
Drowfiness,

Drowfiness, or Inclination to sleep, upon which however a Briskness of the Vitals ensues. Those who complain of restless Nights, and for Want of their natural Repose, are constantly in a fretting, melancholic, unlively Condition; but as soon as they drink these Waters methodically, they not only procure themselves a sound natural Sleep at Night, but wake in the Morning, salutarily refreshed with a surprizing Vivacity and Strength: So that I cannot help thinking, that the Damps in the Mineral Waters restore, at least, the vital Spirits to their natural Functions, when clogged and suppressed in slimy, fizy Juices.

Dr. *Hoffman* tells us, not without great Weight of Reason and Truth, that common Water approaches the Idea we have of an universal Remedy. Dr. *Shaw*, who has translated his Treatise on Mineral Waters, will permit me to quote his Translation (as I should not be able to furnish a better one) of that Part, where he treats of Water, as an universal Remedy, Page 157.

“ We assert, that Water is a Remedy
 “ suited to all Persons, and all Times; that
 “ there is no better Preservative from Dis-
 “ tempers; that it is assuredly serviceable
 “ both in acute and chronic Diseases; and
 “ lastly, that its Use answers to all Indica-
 “ tions, both of Preservation and of Cure.”

From what has been said then, I apprehend we may safely conclude; that, in general, the Medicinal Power of the Mineral Waters consists in the following Contents:

1st, In the *Iron-Earth*.

2^{dly}, In the *Mineral Damps*. (N. B.) In the Division of the latter End of the first Chapter, I have comprehended them under the Head of Phlogiston, or Principium inflammabile.

And, 3^{dly}, In the common Water.

The *neutral Salts*, *Phlogiston*, and *volatile Vitrioline Acids* are the Correctors of the whole Concrete.

To the *Water* and *Iron-Earth* it is owing, that by Experience two opposite Qualities in the *Chalybeat Waters* are observed, viz. the Suppression of the *Menses*, when too violent; and the Promotion of the same, when obstructed or totally suppressed; for which, I apprehend however, we may thus conciliatingly account.

In the first Case, of an Excess of the Flux, the Blood-Vessels are weak and lax, the Fluids are corrupted; so that the Solids are deprived of that Support, which they constantly want, and the *Chyle*, for Want of a due Concoction, turns into a watery Substance, too thin for the Animal Faculties to execute their Functions, which thin Matter discharges itself with the *Menses* like a Flood. Now, the *Iron-Earth* in this Condition not only corrects the Fluids, but also restores the Tone of the injured Vessels, by which Means the Circulation is restored, upon which the Organs depend for performing their Part; whilst, at the same Time, the Water impregnated with

with the Mineral Damps corrects the corrupt Juices, and disperses them either by Perspiration, or other natural Evacuations: And thus the Whole is restored into the natural State again.

In the second Case, of obstructed or suppressed *Menses*, this different Effect may well be accounted for, flowing from the same Cause as in the first, weak Vessels and vitiated Fluids; for, could the Organs but perform their Office, the Blood would not turn thick and fizy (which makes the Difference from the thin Chyle in the first Case) so as to occasion Obstructions: Now I apprehend, that in these Circumstances the *Iron-Earth* performs its Medicinal Office, in correcting the Fluids, and strengthening the lax Vessels, whilst the Water dilutes the fizy slimy Bood, and penetrates in Virtue of its Mineral Damps thro' the most minute Passages of the Circulation: So that these Extremes are likewise reduced and brought back to that salutary *Medium*, in which Health consists.

Very eminent Gentlemen of the Faculty suggest, that Mineral Waters are beneficial in all Constitutions, and in all Ages; but this, I apprehend, admits of a Restriction: For, if they would please to consider, that the longer we live, the fewer Blood-Vessels we retain in our Bodies, those innumerable small Canals diminishing gradually, and are at length almost totally lost; then the Moisture of the Animal Liquids lessens considerably, the larger Vessels in Proportion become cartilaginous, solid, rigid,

rigid, and callous: Now, in the Case of a Vergency towards such a Habit, I leave any one to imagine, whether Concretes of the Nature of Mineral Waters; that dispose by their native, inherent Astringency and drying Quality, the elementary Particles to Cohesion, if taken into a Body thus already too much disposed to it, would not hurry Life to its final Period, or at least accelerate it.

The learned Dr. *Schutte* therefore, who deserves the most to be credited, from his extensive Study and Conversancy for many Years, in these Waters; after having, with that Candour and judicious Accuracy, which do so much Honour to *Hippocrates*, enumerated as well their good as bad Qualities; entirely and very justly forbids to those, who are past 60, the Use of the *Chalybeat Waters*.

Then, in Regard to the Pretension of their being serviceable in *all* Constitutions, this is likewise to be cautioned against: For it is very well known how prejudicial they are to sanguine, or as they are otherwise distinguished, hot, or adust Constitutions; so that it would be superfluous to enter on a Refutation of this Assertion here: But, if these pre-mentioned Advocates for the universal Propriety of Medicinal Waters, mean the simple, pure, light Waters, such as those of *Holywell*, &c. &c. though they contain no Mineral Ingredients, and abound only in Air, and a subtile, æthereal Spirit, such as I have before on that Head treated of, I readily subscribe to their Opinion; for I hold them not only curative of many
chronical

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chronical Disorders, such as the Gout, Rheumatism, Stone, scorbutic Foulnesses of the Blood, schirrous Tumours, and Languors of the Limbs; but good Emmenagogues, and indeed, safe and salutary Medicines, internally or externally applied, in all Constitutions and Ages of human Life.

The softer also the Mineral Waters are, the more salutary Effects they produce. And, upon this Account, the learned Dr. *Schutte* has observed a more sovereign Efficacy in the Mineral Waters of *Cleves*, than in any other known *Chalybeats*, owing to their remarkable superior Lightness and Softness: For as I have already mentioned, the Waters of *Cleves* pass through a natural *Filtrum*, and the best in its Kind; by which Means, they are rendered benign, mild, and friendly to all the natural fluid Juices: Therefore they unite sooner with the Blood, and readier, and easier secrete themselves from it by Urine, whereby the Circulation is in every Respect, and in the most salutary Manner, facilitated.

Dr. *Schutte*, who cannot be too often quoted on a Subject, in which his Opinions have the Weight of Decisions, has also observed, that these Waters of *Cleves* are eminently efficacious in consumptive Cases, in which he frequently prescribes them with Milk, where-with they perfectly agree and operate with surprizing Success.

C H A P. X.

*Rules and Directions for the Use of the
Chalybeat Waters, especially those of
CLEVES.*

AS I have, in the preceding Chapter, in my Description of the Properties and Virtues of the *Chalybeat Waters*, taken those of *Cleves* for a Standard: I shall, in the same Manner, apply the Rules to be observed in their Use more immediately to those Waters; so however, that they may easily be abstracted and generalized.

I apprehend that proper Rules or Directions for those, that intend to enter on a Course of the *Chalybeat Waters*, will be the more necessary, as the Resort to them is generally preceded by the Fatigues of a Journey, more or less, according to the Distance of Residence. All Circumstances, then, should be duly weighed, and every previous Caution be used, before they are attempted.

In Order then to ascertain the Benefits to be expected from, or the Dangers to be guarded against, of their Use and Abuse: I shall here endeavour to put the Patients into a right Road and Method, by the following Observations and Directions, which for the greater Clearness and Explicitness, I shall divide into these Sections.

Sect. I. *What is proper to observe before
a Course of Drinking the CHALY-*

BEAT

BEAT WATERS is entered upon, and what Preparations ought to precede it.

Sect. II. *The Rules necessary to be attended to, during the Course of Drinking these Waters.*

Sect. III. *How to manage after the Course of Drinking is compleated or left off.*

Sect. IV. *Considerations on the Distempers or Revolutions of the Animal System, that incidentally arise in the Course of Drinking these Waters.*

Sect. V. *Of the Effects that sometimes ensue the Course of these Waters, after the same is compleated or left off.*

Sect. VI. *How the Patients are to prepare their Bodies for Bathing; the proper Times of Bathing; the Term for continuing in the Bath; the Manner of Bathing, and Directions therein.*

Sect. VII. *Of Accidents that sometimes intervene in the Bathing; preventive Advice against any bad Consequences attending the Bath; with Cautions against the Abuses of improper Bathing. And,*

Sect. VIII. *Rules necessary to be observed after Bathing.*

Sect.

Sect. I. *What is proper to observe before a Course of drinking the Chalybeat Waters.*

The Patient must previously have the Approbation of a Physician, that is both acquainted with his Constitution, and the Nature and Properties of these Waters; unless he is sensible, that his Disorder is the simple one of a lax System of the Fibres, that original Cause of numerous and dangerous chronical Disorders, and that a Cohesion of Elements is wanted, towards restoring or bringing it to its proper *Crafsis*, or Firmness; in such Circumstances, I apprehend, he may proceed, without Hesitation, upon his own Judgment.

It is next requisite, that the Patient should take with him an historical Account, from his constant Physician, of the Nature of his Distemper, the Cause, Beginning, Changes that have happened; what Remedies have been applied, and what Effects they produced. This Account the Patient should deliver to the Physician, attending on the Spot, at the Mineral Waters; and withal relate to him, as distinctly as possible, what he himself thinks, knows, believes, or has felt of his own Disorder; so that the Physician may be enabled to collect or frame, out of the whole, the truest Idea or Diagnostic of the Case, and thereon advise the best Manner of appropriating the Waters, to answer the most salutary Ends: For all this distinct Informa-

S

tion

tion is the more necessary, as that all chro-
 nical Diseases are commonly complicated with
 other Distempers, which will in their Course
 put on various Aspects, and incur various
 Changes from Time to Time ; all which the
 Prescription of these Waters must have spe-
 cial Regard and Adjustment to.

When these Preliminaries are settled, the
 Patient must prepare himself for opening his
 Course of Drinking, which is to be done va-
 rious Ways, agreeable to the Constitution and
 Distemper of the Patient. For Instance, a
 Person that is naturally rich in Blood, accus-
 tomed to a high Diet, and a sedentary, un-
 exercised Life, should be bled ten or four-
 teen Days, before he attempts the Waters,
 and that plentifully ; in Order to make Place
 for a better Circulation. But I strongly cau-
 tion here, against Bleeding but two or three
 Days before the Drinking, for Fear it should
 occasion Struggles in Nature, hard to be over-
 come ; unless some particular Necessity re-
 quires Bleeding so near, or with the Water-
 Drinking ; and then only small Quantities of
 Blood should be taken.

The Taking a Purge, before entering on
 the Course of Drinking, is universally neces-
 sary to all Patients ; and it is ever better to do
 it at the Place of Resort, where the Use of
 the Mineral Waters is intended, about two or
 three Days after their Arrival, when they are
 cooled and refreshed from the Fatigue of
 their Journey ; for, as Over-heating the Blood
 is a common Consequence of Journies, Physic
 ought

ought not to be taken immediately upon it, or till a proper Composition is restored to the Animal System and Spirits.

It is highly necessary, that the Physic be specifically appropriated to both the Disease and Constitution of the Patient. Some Constitutions, for Example, have their Juices over-proportioned to the Solids, others under-proportioned; some abound in thick, fizy, gross Juices, which require in Course to be prepared and predisposed for a Discharge, which there is no Occasion for, when the Juices are thin or saltish. But particular Regard should be had, that the Physic be not too strong, that the Tone of the Stomach and Intestines be not weakened thereby, nor the *Crisis* of the Humours too much agitated or disturbed. Nor must there, by any Means, be shewn an Inattention to the Distinctions of Physic, according to the different Constitutions; for Example, the *bitter purging Salts* are improper for those whose Juices abound in *Acids*. The *Scammony* is detrimental to the Weak. The *Aloe* disagrees with those that are of a sanguine, hot, dry Nature, and inclinable to Bloody Fluxes. *Neutral Salts* are pernicious to weak and phlegmatic Intestines. The *Sena* is not safe for those that are apt to have the Cholic, and Pains in the Bowels. *Rhubarb* is hurtful to such as are subject to Giddinesses in the Head, and so *vice versa*. Therefore it is always the safest and surest Practice to prescribe such Physic, as is indicated by an exact

Diagnosis of the Constitution and Distemper ; and, the Day after the Purge is taken, the Course of drinking the Waters should commence.

Sect. II. *The Rules necessary to be attended to, during the Course of drinking these Waters.*

Under this Head, falls first under Consideration the *Time* of the Year, or proper *Season* for drinking these Waters ; though I am of Opinion, that the Use of them may be recommended at any Time of the Year, as I have hinted in the third Chapter, on the Waters at *Tunbridge* in *Kent* ; as conceiving them constantly beneficial, especially to those in a sedentary Station of Life. But, generally speaking, I apprehend the most particular and proper Season for drinking them, to be from the Middle of *May* to the latter End of *September*, in the Meridians of *Germany* and *England* ; that being the fittest Time to go to Work with those chronical Disorders, that chiefly exist in the Complications of many Diseases ; for it is in this Time of the Year, that the Animal Fluids are more disposed for a Change or Alteration : But however, where Necessity evidently remonstrates against a Delay, I would not have a *Person* stay for any Consideration of the Season, but to make Use of them at any Time of the Year ; since, at all Seasons, they may perhaps be less beneficial indeed, but still beneficial.

As to the Time of the Day, the *Morning* is undoubtedly the properest Time for drinking these Waters, and that from *Five* to *Seven* of the Clock, according as the Weather will permit, in Point of Warmth or Cold; but I would, on no Account, have any one begin his Draught in the Summer, after Seven at farthest.

The Coming or Repairing to the Well should be effected with all possible Ease, either in a Coach, on Horse-back, or Walking; so as, by no Means, to be heated in getting thither. To those that are able, gentle Walking is in every Respect the best; for the Water not only tastes the more agreeable, but even the Success of the Operation is thereby greatly forwarded.

The necessary *Quantity* is next to be consulted: The Patient should begin, on the first Day, with four Glasses, and each Glass to contain no more than one Quarter of a Pint; so that the Quantity on the first Day is not to exceed a Pint, and the succeeding Days two Glasses may be added, and this for eight, ten, twelve, or sixteen Days successively; so as to come to the Number of twenty to thirty-two Glasses a Day. But the specific Quantity should be determined by the Physician at the Wells, who has the Care of the Patient, and will increase his Doses, according as his Constitution will bear it.

For too large, or intemperate a Number of Glasses, is very often more detrimental

than serviceable, where an Over-load will weaken, or too much cool the Intestines, whereon a Train of bad Consequences would ensue; and to this Danger are equally liable such as set out with drinking large Quantities at the first, without duly graduating their Advances, from being in too great a Hurry for their Cure, or hoping to shorten their Course of Drinking: But it behoves every Person, who expects a Benefit from these Waters, to proceed with no more Haste, than will ensure them good Speed.

Entering next on the Consideration, how this Water should be drank; I would advise those who are of a robust, hot Constitution, those of a sanguine, choleric Temperament or Disposition, to drink these Waters cold, and swallow them leisurely, as they are taken out of the Well.

The weak, the lean, the phlegmatic, such as are inclined to Melancholy, the Ladies of a tender leuco-phlegmatic Complexion, and all those that, by drinking cold Liquors, are affected with a Pressure upon the Stomach, Hoarseness, Coughs, and Shiverings in the Limbs; all these will do well to have the Water filled out in Bottles, or such earthen Jugs, as the *Selter Water* is sent over in, well corked, and just shewn to the Fire, in Order to take off the great Chill, or dipped in warm Water, for the same Purpose; which is frequently obtained by many other Methods; but none, I presume, better than those hereby pointed out.

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If those that drink these Waters cold, perceive a Weakness or Indisposition of their Stomach, they should chew along with it *Coriander-seeds, Carroways, Galangal, Zedoary, Elicampane, Angelica-root, Calamus-root, Orange or Lemon-peels*, all of these just pleasantly candied over with Sugar; and any of them may be chosen, which is most agreeable to the Palate, and Nature of the Patient's Disease; or a Mixture of grateful Aromatics into a Sort of Sweet-meat or Confection, peculiarly adapted to the Water-Drinker's Taste. But, on the whole, Regard must be had to be as sparing of the Sugar as possible, in the Course of drinking the Mineral Waters; for the Sugar is apt to breed many Disorders, such as Purple Fevers, &c. when it encounters with the *Chalybeat* Contents, in the Animal Fluids.

From eight to sixteen Days proceed, increasing the Number of Glasses; and from four to ten Days, or longer, if the Circumstances require it, continue drinking the highest Number of the Glasses; after which, the Patient must decrease daily his Number, in the like gradual Proportions as he increased them; continuing thus till he comes down to the Number he began from: And thus, by easy Degrees, disengage Nature from the Water again.

These Waters should never be used without gentle Exercise. Those, for Instance, that are able to come to the Head of the Well, should, between each Glass, take an easy a-

agreeable Walk. And as to those, that are not able to come themselves, but are obliged to send for the Water into their Chambers; it is necessary to contrive such Exercise within Doors, as their Constitution can comport with: For, by Means of easy Exercise, the Water readier unites with the fluid Juices, passes through the Blood, and discharges itself by Urine.

We have next to consider, how long the Course of drinking the Mineral Waters is proper to be continued; which must be determined from the Constitution of the Patient, and the Nature of the Distemper: For those that drink them as a Preservative, a Course of fourteen Days is a sufficient Time. In slight simple Distempers, three Weeks is commonly long enough; but complicated chronical Disorders will, at least, require five or six Weeks, and sometimes more; especially where the Animal Juices are thick, fizy, or acrid; and, agreeable to these Circumstances, the Course of drinking these Waters must, in Point of Duration, be directed and ascertained.

It is very beneficial also, in chronical Disorders, to use proper *Medicines*, at the same Time, with a Course of *Chalybeat* Waters. Some, indeed, there are of the Gentlemen of the Faculty, who strenuously oppose these collateral Aids, and are absolutely for leaving the Mineral Waters to work a Cure, unassisted by other Physical Remedies; but the best and most approved Practice, ancient and modern,

modern, suggest the contrary: And indeed, Dr. *Schutte* at *Cleves*, and Dr. *Scipius* Physician at *Pyrmont*, deserve the most to be credited on this Head; as these two Gentlemen have had a more continued and extensive Practice in the *Chalybeat* Waters, than any two that any Age can boast of; and they firmly and positively affirm and attest their Observation of many signal and salutary Effects to have taken Place in chronical Disorders, when proper Medicines have been used, to second the Efficacy of Mineral Waters.

The *Diet*, or proper Regimen, demands an Observation of certain Restrictions and Rules, by whoever hopes for any Benefit from a Course of these Waters: For it is on a suitable Diet, that chiefly depends the Success of their Operation, as an improper one will rather occasion or super-induce fresh and innumerable Disorders: For it is a general Law to the Sick, that, whatever Remedies they may betake themselves to, they must indispensably govern their Diet, so as respectively to favour and second their Effects.

In Regard to the *Regimen*, then, it is required, that the *Non-naturals* be strictly attended to. (1.) The Air, or Atmosphere, we breathe in. (2.) Eating and Drinking. (3.) Exercise and Rest. (4.) Sleeping and Waking. (5.) The necessary Evacuations. (6.) The Passions of the Mind. And, in any of these Points, *Errors* must be carefully avoided.

First

First *the Air*. A serene, warm, clear Air is certainly the best: The Glare of the Sun and the Beat of its Beams should be studiously avoided. Pleasing Fresco's, agreeable Shades, under Trees, Vista's, &c. with the gentle Motion of Walking, exercise both Body and Mind. But, when the Air is intemperate, inclement, as cold, foggy, rainy, or the like; it is best for the weak, and tender of Constitution to keep within Doors, in a Room temperately warm, or drink the Waters before a Fire. But if it is not too cold indeed, those of a stronger Constitution should seek for a due Degree of Warmth in their Cloathing, and not refrain from repairing to the Fountain-Head, where the Waters are ever drank to most Advantage.

2dly, *Eating and Drinking*. In these Points, Regard should be constantly had to the two following Rules: First, never to eat too much at a Time. Secondly, that the Aliments be good and nourishing. Neither do I here enjoin to such, as expect to reap a Benefit from a Course of Mineral Waters, too strict an Abstinence: That Patient will have the best Chance, who observes the golden salutary *Medium*. He should rise with an Appetite from Dinner and Supper; yet, at the same Time, not take less Food than the Constitution requires, or chearfully bears the Load of. The Supper should never be taken later than Six or Seven in the Evening. Meat Suppers are never innocent, and therefore positively to be renounced. And these Rules must

must be respected and observed, if the Patient expects good, and not bad Consequences, from his Course of Drinking these Waters; and therefore I apprehend he cannot be too careful of his Duty: For as most Disorders, for which a Cure is sought at their Hand, are owing to gross Juices, and a high pampering Diet, the Cause, whence the Distemper proceeds from, must be laid aside, before any Good can be reasonably hoped for.

For the proper *Foods* and *Liquors*, I refer to the third Chapter, where they are sufficiently and competently pointed out by Dr. Rouzee, treating of *Tunbridge Wells*.

3dly, *Exercise* and *Rest*. I have already incidentally observed, that the Exercise cannot be too mild and gentle. It is therefore necessary to sit down, and rest a little between the Walking, but yet not so long as to become cold or chilly. Those, indeed, that owe their Complaints to a sedentary Life, where the minute Vessels are obstructed, or where the scorbutic Taint prevails, will do well to promote constant, gentle, breathing Sweats by their Exercise; but, at all Times, have a special Care and Regard, not to catch Cold upon them.

4thly, *Sleep* and *Waking*. It is well known, and I have already observed it in the proper Place, that the Mineral Damps associated with these Waters always make those, who are in a Course of Drinking them, sleepy after Dinner; which Doziness must by no Means be indulged, but utterly avoided, diverted,
or

or put off, by any Means of Amusement, consistent with the general Rules of Exercise and Diet. Neither must *Sleeping* be resorted to or yielded to immediately after Supper, which will be much more beneficially crowned with any gentle Exercise, as Walking, or the like. But the properest Time of going to Bed is about *Nine* or *Ten* o' Clock at farthest.

5thly, *The necessary Evacuations.* Under this Head, I must acquaint every Water-Drinker, that he is not *proper*, unless he has the Benefits of the Stool, two or three Times a Day, and a plentiful Discharge by Urine; and if this is not regular, the Patient must apprize his Physician thereof: And here I enter strongly my Protest against the Prescription of Minerals in any Shape, on this Account; but especially *Mercurials*, which have lately been too much the Fashion, to such a Degree, that some Gentlemen of the Faculty have even advised and ordered Mercurial Purges to be administered with *Chalybeat* Waters, and even with the *Pyrmont* Water, to Ladies of the most tender Constitution: But these I would beg Leave to remind, that the Mercurial Contents expand themselves through the whole Animal Machine, as well as the Iron-Earth, and wherever they meet together in this Fabric, they unite on such firm Principles of Cohesion, as not to be dissolved again by any Liquid, unless it be *Aqua-fortis*; and with this we know it cannot be done, since there cannot be a Quantity poured in, or sent after them,

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to do the Business, without destroying Life. And, by this Manner of Proceeding, many grievous Distempers have been hatched: For it is indisputably obvious to Sense and Reason, that where such a hard Stone-like Concreate lodges in the human Body, over which the Fluids have no Power, it must greatly endanger the Parts. Those, indeed, who judge superficially, and have not sufficiently examined, by *Chemistry*, the Analytical Principles of the *Materia Medica*, as well as of all the *Solids* and *Fluids* in the Animal Kingdom, and joined thereto the Lights which *Anatomy* gives into the human Texture, may perhaps not readily adopt, or receive this my Caveat against this Abuse of *Mercurials*; but I firmly depend that I shall have every truly learned and candid Professor of the Faculty on my Side.

I could also illustrate this my Assertion with indisputable Instances and Conclusions, but that it would engage me into too long a Digression; but should I ever have Leisure to write a Treatise on the *Asthma Montanum*, or the Miners Distempers here in *England*, and the Causes of the Consumption more especially endemial to *London*; I shall then give a full Elucidation of this Point, when too it will appear more in its Place.

Yet I would not be understood here, as if I meant to reject, or condemn indiscriminately, the Use of *Mercuries* in the Practice of Physic: On the contrary, I know too well their Efficacy and Value, not to esteem them,
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when they are rightly prepared, and judiciously administered in the proper Cases; but there is no exclaiming too much against the Abuse, and empirical Prescriptions of them, we daily see Instances of. It is not in Nature, they should be indifferently good in every Circumstance and Constitution, or agree with all Things. Then there exists a most crying, pernicious Practice of bad Preparations, or rather Adulterations of the Mercurial Medicines; insomuch, that for my Part, if I am not very well assured that they are genuine, and authentically elaborated, I make no Use of them; but chiefly trust to *Cinabar*, *Æthiops Mineral*, and *Mercurius dulcis*.

The most suitable *Purges* with Mineral Waters, or Promoters of the necessary Stools, should be Nothing, but such as are made of *Vegetables* or *Salts*, but both properly adapted to the Constitution and Distemper of the Patient.

6thly, *The Passions*. A Mind easy, serene and composed, is a Disposition highly necessary; and without which the rest is of no Avail. It is therefore absolutely required of those, that enter into a Course of *Chalybeat* Waters, that they should leave all Pressure of Concerns, public or private, at Home. No Fear, Grief, Thoughtfulness, or Meditations should engross the Mind; but a constant Disposition to Chearfulness be aimed at, and cultivated by all the innocent Amusements and Diversions fit to inspire Mirth, and chear the Spirits; so that the Mind unruffled, calm, and tranquil,

tranquil, may leave the Body more at Liberty, and free to receive the Benefits of the Waters.

Sect. III. *How to manage, after the Course of Drinking is compleated or left off.*

When the Course is thus finished, and the Waters gradually left off; the Patient should, within the Space of ten Days after, take two or three proper *Purges*, or even more if requisite, at easy Intervals; in Order to carry off any Relicks of the Water that may lurk in the Body; which Purges should be taken where the *Chalybeat* Waters are drank: For it is very improper to travel immediately after giving them over. The same *Regimen* and *Diet* should also be continued for some Time after; and if the Patient must resume his old Course, and Habits of Life, he should at least do it gradually, and not abruptly. For gross and fatal is the Error of those, who think that, by a Course of these Waters, the Intestines are so scoured and purified, and the Liver cooled, that they are therefore refitted for any new Debauch whatever; and from thence date a new Commission to replunge into the same Irregularities that occasioned the Complaints, that first sent them to the Waters; and which will infallibly, on fresh Provocation, break out again with fresh Violence. How much happier those, who,
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having been brought on their Resort to these Waters, into a Course of Medicinal temporary Temperance, convert its Institutions into a rational and lasting Rule of Life, and achieve the inestimable Blessings of Health and long Life, at the Expence of a few sensual Appetites, best kept unhumoured, and once for all subdued !

Sect. IV. *Considerations on the Distempers and Revolutions of the Animal System, that incidentally arise in the Course of drinking these Waters.*

The most salutary and approved Remedies are seen sometimes to produce Effects very opposite to their Design : Thus, common *Cathartics* prove oftentimes *Emetics*, and cause violent Vomitings, fainting Fits, Pains, or Gripings in the Bowels, and sometimes other Symptoms equally distant from their common known Course of Operation. Now, it is clear, that these Perversions are either owing to the Nature of the corrupt Juices of the Body, conflicting with, and over-powering these Medicines where they meet ; or to the Regimen or Management of the Patient, in his taking them. It is not therefore at all surprizing, that the *Chalybeat* Waters should sometimes produce uncommon, untoward, and even *Effects* opposite to their real Nature ; for they act agreeably to the Animal Juices they meet with, or according as the
Course

Course of Drinking is regularly or irregularly conducted.

The *Vomiting* that is occasioned by these Waters, in the Beginning of drinking them, is very common to those, whose Stomach is full of slimy Matter, or bilious Impurities; therefore Nature endeavours with the Excitation of these *Chalybeat* Waters, by this short Way, to get rid of these heterogeneous Matters: With Drinkers thus affected, the Vomiting continues for two or three Days, rather with Ease to them gradually composing, tempering, and strengthening the whole Body; but if it should continue longer, and weaken the Patient, then proper Remedies, such as *Alkaline* Salts or Salt-Petre, vegetable Purgatives, or even easy Vomits, ought to be administered to follow the Hints of Nature, and to relieve the Constitution from these corrupt Juices, as the Cause from whence the Complaint proceeds.

Costiveness is common to almost all who are in a Course of drinking, but more especially to such as are of a choleric Disposition; the *Purging Salts* are therefore commonly used with these Waters: But the better Way seems to be, first, to try if two or three Stools a Day cannot be obtained with stewed *Raisins*, *Corinths*, *Prunes*, or a laxative Vegetable Diet; for if, by these Means, the necessary Evacuations may be promoted, they are better gained, than by Medical Cathartics; and the *Chalybeat* Waters will act in more salutary Concert with them. Some *Chalybeat*

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Waters,

Waters, indeed, especially those of *Cleves*, are so salubrious, as spontaneously to promote these necessary Evacuations; after they have been taken regularly for six or seven Days.

An Obstruction of the *Urine*, whilst drinking, is a Case that rarely intervenes; yet there are Instances of it, occasioned by a slimy, fizy, tough Matter, or by Gravel that obstructs the *Ureter*; or sometimes an irregular Course of drinking will give Rise to such Obstructions: When this happens, there must, without Loss of Time or Delay, be applied the Means of Relief. And the best Method, I know of, in these Circumstances, is, to open a Passage with a proper Instrument through the obstructing Matter, for the immediate Discharge of the *Urine*: Then use the warm Bath a few Times, which, with proper nephritic and diluent Medicines, will soon subdue this Complaint.

A total *Obstruction* of all the evacuating Faculties, as *Stools*, *Urine*, and *Perspiration*, is the worst of all Circumstances, that can happen in a Course of drinking these Waters; and if not the Fore-runner of very bad Consequences, is at least a shrewd Indicant, that the Waters will not agree with the Constitution of the Patient: Whenever therefore this Symptom declares itself, the Physician must be instantly acquainted therewith; and, if he cannot, in two or three Days Time, recover to the Patient these indispensable Evacuations; then the best Thing the latter can do, is to leave off the Waters immediately, to take two or
three

three *Purges*, to ease and relieve the Body from any Impressions of the Water taken; and to resort to other Remedies for the Recovery of his Health: Seeing it would be in vain, and even dangerous, to attempt it with *Chalybeat Waters*.

Flatulencies, *Gripes* in the Bowels, and *Cholics*, are owing to the Tunning in this Water all at once, cold into the Stomach; and therefore, in this Case, the Water should not only be drank slightly warmed, as above directed; but corrected also with proper *Carminatives* or *Essences*, that destroy and break the *Flatulences*, and warm the Intestines again: But if these Complaints are owing to *Costiveness*, then a proper *Purge* must be given to remove them.

A *Burning Pain* in the urinary Passage, is frequently occasioned by acrid saline Humours in the Juices; or by an ill-cured *Gonorrhœa*, which the *Chalybeat Waters* generally remove: But if it should not abate and give Way to the Use of these Waters, in five or six Days Time; then proper Emulsions and Remedies must be joined to the Water-Course.

Inflammatory Pains and Ulcers, or Eruptions in the Fundament, or *Intestinum rectum*, happen to some Water-Drinkers; this Complaint is frequently occasioned by the same Cause, as I have before mentioned, *viz.* acrid saline Juices; or by a sharp Humour from the Bile: And generally, and indeed most commonly ceases on four or five Days drink-

ing these Waters. But, if it should continue longer, then proper Remedies are requisite to be joined with the *Chalybeat* Waters.

A Sort of *Itching*, or Breaking out in the Skin, is common to those who are afflicted with the *Scurvy*; or where the Blood is full of bilious, acrid, sharp, saline Matter: But this must be borne with Patience, and nothing taken, or applied to, in Order to discourage or suppress it: For the same is a certain and favourable Indication of the salutary Effect of these Waters, which eliminate and expel the undue Juices, or unnatural Matter, between the Flesh and Skin through the perspirative *Pores*: And this cutaneous Disorder commonly goes of itself, as soon as the Malignity of those Humours is by this easy Way sufficiently exhausted: But if it should still continue, after the Course is compleated, then a proper Sweat, or Bathing a few Times in the Artificial *Chalybeat* Baths, will effectually remove it.

Returns of the Pains of past Diseases, the Breaking out, or Opening again of old *Ulcers* or *Sores*, or the Return of an *Ague*, that has been immaturely or improperly suppressed by the *Peruvian Bark*, during the Course of drinking the *Chalybeat* Waters; are a certain Sign that these Diseases were never fairly well cured, and that the Seeds of them were left lurking in the Animal Fabric; but, those to whom these Renewals happen, may expect fundamental Relief from the Mineral Waters:

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For they are certain Assurances, that they will radically remove the Cause.

The *Cramp* in the Calf of the Leg, or in any other Part of the Body, is also a favourable Sign of the good Effects of the Waters, however troublesome and inconvenient the Sensation may be for the Time; which too may easily be removed by the Artificial *Chalybeat* Baths, or by exterior Anointing with proper Oils; amongst which the *British Oil* may claim the first Place, as undoubtedly the best for this Purpose.

Sect. V. *Of the Effects, that sometimes ensue the Course of these Waters; after the same is compleated or left off.*

As all Distempers, especially chronical ones, are not only confined to the Juices and Fluids; but are more or less dispersed through, and seated in the Solids; as *Nerves, Sinews, Muscles, Membranes, minute capillary Vessels, &c.* which continue obstructed, or in various Modes affected with the Relics of peccant Matter. All the Symptoms, therefore, of a perfect Recovery cannot be always expected in the Course of drinking, or immediately after it; and we have very frequent Instances, that a consummate Cure or Recovery of the Malady has not taken Place, till from six to fourteen Weeks, or longer; after the Waters have been left off, on the Completion of their

Course. It is therefore a necessary Caution to those, that are not immediately relieved by the *Chalybeat Waters*; to assist their Constitution by a salutary Diet or Regimen, to expect patiently the After-Effects of the Mineral Waters that so frequently answer their Intention; and by no Means to ruin or retard the Operation by an impatient Recourse to other Medicines and Drugs; of which there are so frequent and fatal Misappropriations, both in Quantity and Quality.

Sect. VI. *How the Patients are to prepare their Bodies for Bathing; the Time of Bathing; the Term for continuing in the Bath; the Manner of Bathing, and Directions therein.*

The best and most requisite *Preparation* for Bathing, is to purify and cleanse the Body of all unhealthy Juices, or at least as much as can be; which is best, most compleatly and effectually obtained, by a due Course of drinking the Mineral Waters, which will not only correct and expel all unnatural Fluids; but also de-obstruct the minutest Passages; and by this Means the Body becomes perfectly well disposed, and prepared for Bathing.

But if the Case is such, that the Patient cannot, or perhaps is indisposed to undergo a Course of drinking; or that the Bathing alone is required for his Recovery: Then, the peccant

cant Matter must be discharged by proper Purges, Emetics, or Perspiratives; and the Body thus cleared, and fitted for Bathing. But still I repeat it, it would be far more eligible, and these Baths would, generally speaking, produce more effectual Benefit; if the Patient could precede them, by a Course of drinking from eight to fourteen Days, or longer, as the Circumstances of the Distemper might require, and bathe afterwards.

Such Constitutions, as naturally abound in Blood, and have neglected the usual Bleeding, must be blooded at least three or four Days before Bathing; and this Bleeding must especially not be omitted by such as are any ways inclinable, or constitutionally obnoxious to *Apoplectic Fits*.

The *Season*, when to bathe, is proper in all Times of the Year, whenever the Patient's Case requires it; but in chronical Disorders, it is more expedient and effectual to bathe in the best Season, that is to say, from the latter End of *May* till the latter End of *September*: And the most proper Time is, in the Morning, about Nine o'Clock; or in the Afternoon, after the Digestion is compleated, as from Five to Seven in the Evening.

Strong robust Constitutions, whose Bodies are plethoric, and abound in Juices or gross Humours, do best to bathe in the Morning: For, at this Time of Day, the lacteal Vessels are supposed to be more depleted, and the Bathing is therefore the less subject to occasion fainting Fits and Head-achs, of which they are

otherwise in Danger, who bathe in the Evening. But those that have cutaneous Disorders or Eruptions, or are scorbutically affected, must ever lay their Account with Bathing in the Morning: For the Spirits of the *Chalybeat* Waters are then at their greatest Point of Efficacy and Action on the injured Vessels.

Such as are of a tender weak Constitution, do best to bathe towards Night; for these generally have not Strength enough to bear them out in it, in the Morning; till the Effects of their Dinner-Meal have recruited it, against the Evening.

Such as have lost their Appetite by Bathing in the Morning, and perceive an unusual Drouziness or Faintness after their Meals, ought to refresh themselves with Bathing in the Evening; or trim alternately their Times of Bathing, Morning or Evening, according as they shall find them best agree with their Constitution.

The precise *Time* of continuing in the Bath, cannot be determined in general of all Constitutions; but must be regulated by the Disposition, Idiopathy, and Nature of the Distemper of every Patient: For such as are strong and robust, or such as are used to Bathing, can bear to remain longer in the Bath, than those that are weak, of a lax, flaccid, lean Habit, and not used to it. The Phlegmatic can also longer endure it, than such as are of a hot, sanguine Temperament; a Man
longer

longer than a Woman, and the middle-aged longer than the old, or very young.

Those who are advanced in Years ought not to bathe in the artificial *Chalybeat* Baths; for the natural hot Baths are more salutary for them; unless their Case or Disease especially requires a *Chalybeat* Bath (which is very rare) and then it must be administered with the greatest Caution, for Fear of weakening, instead of strengthening the Solids.

Strong Constitutions, or those that are used to Bathing, may begin with half an Hour at a Time; and daily raise it with a Quarter of an Hour, till they come to an Hour and an half at a Time; at which Pitch they may continue it for a few Days, according as the Disorder may require it, for which the Bathing is used; and then decrease daily a Quarter of an Hour, down to the primitive half an Hour, and then leave off.

But the weak, tender, hot, old, and very young Constitutions, must begin with a Quarter of an Hour, and never rise to more than three Quarters of an Hour, or an Hour at the utmost; and so descend again gradually. But, if it should happen to any one to be seized with fainting Fits, violent Contractions of the Heart, Head-ach, or other Disturbances of the Animal Machine, during the Time of Bathing; he must immediately quit the Bath, and get into a Bed, there to recover himself; and if this should happen two or three Times successively, he must entirely renounce and avoid these Baths.

As to the *Act* of *Bathing* itself, and the *Manner* how it is to be performed ; when the Bath is properly prepared, the Patient should go into it, dressed in a Bathing-Shirt, with a Cap or Napkin round his Head, and settle himself in it gradually, with as little Motion or Stir as possible : But especial Regard must be had, that the Bath be neither too hot, nor too cold ; but temperately warmed to its due Degree. The Water should come up to the Pit of the Stomach precisely, but never upon, or over it. When this is adjusted, the Bathing Machine is covered so, that none of the Steams exhale.

When the Patient is thus placed and settled in the Bathing Machine, he must sit or lie quiet without any Motion, even not to talk or speak much ; and by this Means obtain a gentle Sweat : But, if the Sweat should not ensue, which very seldom happens, then it is necessary, about half an Hour before the next Bathing, to take a gentle sudorific Powder. Eating and Drinking in the Bath must utterly be avoided, unless it be a little Tea, in Case of Thirst, which may be then indulged. Sleeping also must by all Means whatever be avoided by the Patient, whilst in the Bathing Machine.

Sect. VII. *Of Accidents that sometimes intervene in the Bathing; preventive Advice against any bad Consequences attending the Bath; with Cautions against the Abuses of improper Bathing.*

Accidents happen from various Causes: The Patient perhaps naturally cannot endure the Bath. The Bath may be too hot, or not warm enough. The Water may be upon, or over the Pit of the Stomach; or the Patient may not have observed the Rules above laid down. Now a *Deficiency* or *Error* in any of these Points may occasion a sickly Complaint or Disorder; but if proper Care is taken, these *Accidents* will generally be prevented; but if they do happen, the Animal Spirits of the Patient must be refreshed and re-invigorated with proper Cordials.

Certain it is, that nothing requires a more nice and accurate Administration, than these artificial *Chalybeat* Waters: And therefore they are by no Means to be lightly resorted to, and only in very special Cases. They are utterly to be avoided by those who are rich in Blood, or naturally inclined to a costive Habit. Women whose *Menses* are obstructed; those who have weak Eyes; whose Animal Juices are not sufficiently purified; such as labour under hectic Disorders, slow consumptive Fevers, or the like; to all, in these Cases, these Baths would

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would prove pernicious, and are therefore well forbid them.

Those, to whom these Baths are proper, must bear in Mind, not to make Use of them, till they have prepared the Body, above all, with a Course of drinking the Mineral Waters; or by other Means above suggested. They must not either force a Sweat by too hot a Bath, nor remain too long in the Bath; nor take unnecessarily, or too strong sudorific Powders, when requisite. For from these *Errors* chiefly arise any dangerous *Accidents*, which are therefore to be carefully guarded against.

Sect. VIII. *Rules necessary to be observed after Bathing.*

For those that bathe in the Morning, from Nine to Ten o' Clock, it is necessary to remain in Bed an Hour after it, in which they should also take a Glass of Wine with proper aromatic Drops, or in some Broth, a Dish of Tea, Coffee, Chocolate, or the like; and then dine between Twelve and One o' Clock; taking Care not to appear in the open Air till in the Afternoon.

But those that bathe towards the Evening, will do well not to come out at all into the open Air, any Time after it, in that Day; but drink some warm Broth or Tea, and divert themselves within Doors, as chearfully as they may: For, if they catch cold upon Bathing, the worst of Consequences is to be dreaded.

A P P E N D I X.

On the SELTER WATER, in several new Experiments, by the Mixture of TAR-WATER, CHALYBEATS, and other Ingredients therewith; with occasional Observations tending to the Enlargement and Improvement of its Use.

THIS *Selter Water* comes from Germany, and particularly out of the Circle of the upper *Rhine*. It takes its Name from the *Place*, which is called *Selter*, in whose Boundaries, Nature regales us with its salubrious Streams. It is, here in *England*, known and reckoned among the *Mineral Waters*, as the *Spaws*, *Chalybeats*, &c. It is imported from abroad, and sold by those, who make it their Business to deal in these Waters among us.

The *Selter Water* is, with Regard to other *Spaws* or *Mineral Waters*, quite of a different Nature. It partakes of nothing Metallic, like the *Chalybeats*, which participate of Iron-Earth; nor are there any Spirits in them, or scarcely perceptible, like as there are in those of the *Spaw*, *Pyrmont*, and such as are called *Chalybeats*; notwithstanding it has some Proportion

tion or Share of Spirits, of a different Nature, though they are not volatile; yet the Air is able to weaken and destroy their Nature. Therefore must it be kept close stopped or corked, which will best preserve its Virtues from the external Air; especially in those earthen Jugs or Bottles, wherein it is imported, which are preferable to those of Glafs; because these Jugs are made of a Clay, in which probably are contained such Particles, as in their Dissolution, contribute to the Virtues of this Water. And I confess, that, I never any where met with the like Clay, or could hear of any, that, in all Properties, was correspondent with that, of which these Jugs are made, except on the *Rhine*, in the Neighbourhood of this Water-Fountain.

I am requested by many of my Friends, to give a short *Narrative* of this *Water*; in what Manner it is to be used, and in what Distempers or Ailments it is salutary to be administered. Therefore it will be necessary to examine its inward Texture, and, as much as possible, to set its constituent Parts in a true and obvious Light; from whence we may be able to draw these Conclusions, which may instruct us in the best and most proper Uses of it. To these Ends, I shall repeat the *Experiments*, I have lately made on the *Selter Water*; that, by the various Discoveries of its own Qualities, they may direct to its Application.

EXPERIMENTS on the SELTER WATER.

I. It makes but very little Effervescence with *Spirits of Nitre*. It neither alters its Consistence nor Colour; a little Scum arises on the Surface, just as when you saturate the Lee of Salt-Petre with a clean *Alkali*, in Order to obtain a *Nitrum regeneratum*; but if the *Selter Water*, mixed with *Spiritus Nitri*, is evaporated to the Consistence of CrySTALLIZATION, we obtain a *Nitrum Cubicum*. These *Experiments* plainly indicate, that the *Selter Water* abounds plentifully in the soluble Alkalious Earth of common or Fossil Salt.

II. With the sweet Spirit of Nitre it makes very little Effervescence, remains clear and undisturbed; the *Spiritus Nitri dulcis* smells strong out of it, where the plain Spirit of Nitre is hardly in Smell to be discerned; which, in my Opinion, may be attributed to the essential oily Particles in the Spirit of Wine, which are the chief Cause of the Smell in the sweet Spirit of Nitre, as finding nothing homogeneous in the *Selter Water*, wherewith to unite, and therefore discover themselves so strong to the Scent.

III. With the *Pomhon Spaw*, it makes not any visible Alteration whatsoever; therefore these Waters may, in several Cases, be mixed and administered with great Benefit, as may be farther observed hereafter.

IV. With the *Oil of Vitriol*, it ferments the most, but not a great deal, nor near so much as this Oil does with common River Water;

Water ; neither does it make the same Effervescence, as with the other already mentioned *Acids*, or causes any Smell ; and the Oil of Vitriol is hardly, after the Ebullition therein, perceptible ; which, probably, is owing to the Oil in the *Selter Water*, which, as a Mineral, is related to the Oil of Vitriol, though not of that corrosive Nature, as the last mentioned ; and therefore the readier to unite with one another.

V. With the *Geronster Spaw*, it makes very little Alteration ; but more when the Mixtures with the *Pouhon*, Oil of Vitriol, and the *Geronster*, are poured together.

VI. It ferments with *Lemon Juice*, in the same Manner as with the *Rhenish Wine*. I shall give hereafter an Account, with what great Service, in malignant Fevers, it may be used ; as the common Drink, when mixed with the Lemon Juice.

VII. With the *Spirit of Salt*, it discovers itself again, in its Nature, of near Alliance to the Fossil or common Salt ; because it works in the same Manner, as if the Spirit of Salt was poured into a small Solution of common Salt.

VIII. With a Solution of *Alkali*, it shews, that it contains a saponaceous Quality ; and some of the Oil, not yet uncorroded by the *Alkaline Earth* in the Bowels of the Earth, unites with a Solution of *Alkali* ; and, as this Solution is more powerful than the natural *Alkali Earth*, it leaves the same ; and the whole soapy Mass unites with the Solution of *Alkali*,
which

which throws itself up to the Surface of the Water, in a Cloud like coagulated Milk, and has a soapy Smell, with somewhat in the Nature of *Fuller's Earth*; and in washing the Hands therewith, or using it in any Manner, like *Fuller's Earth*, it will confirm this Experiment.

IX. With *Salt of Tartar*, it produces the same *Phænomenon*, as with the Solution of *Alkali*; but not so plentifully as with the latter.

X. With *Galls*, it strikes no Purple, but it acts in the same Quality, as Galls and Soap, or Soap-Water, and strikes the same Colour.

XI. With *Tartar of Vitriol*, it discovers hardly any Alteration, at least no more than if you dissolve Tartar of Vitriol in Sea-Water.

XII. With *Roman Vitriol* it inclines to a White, and separates clear in the Middle; but on the Surface swims a thick whitish Cloud, of an oily Nature.

XIII. With *Vitriol of Iron*, it separates a Matter, very near half an Inch thick on the Surface, of an Iron-yellow, and an oily Quality.

XIV. With *Nitre*, it occasions not any Motion whatsoever.

These are some of the *Experiments* I have made with the *Selter Water*; from whence we may be able to form, not only a Judgment of its constituent Parts, or Contents, but also of its Medicinal Virtues; and how far it is able to correct the corrupt Juices in the

human Body, the Origin of almost all Distempers.

From these *Effects*, the *Selter Water* appears to me to be impregnated with a common Salt, which contains more of the common Salt's *Alkaline Earth* than of the *Acid*, which runs through a strong Bed of *Fuller's Earth*, where the *Alkaline Earth* dissolves, and unites with the Water, those slimy or greasy Parts peculiar to Fuller's Earth, which make it properly a natural Soap. My Assertion, for the Plentiffulness of the *Alkalious Earth* of common Salt, confirms the first Experiment; then nothing in Nature, but this soluble *Alkali Earth*, produces a *Nitrum Cubicum*, in Case the *Salt-Petre* Lee, or a *Spirit of Nitre*, is saturated with the same, instead of another *Alkali*.

The VIII, IX, X, XI, XII, XIII, and XIVth *Experiments* confirm my Assertion, in Regard to the *Fuller's Earth*, and the greasy Parts it receives therefrom; as indeed the foregoing seven *Experiments* are all tending to the first mentioned Opinion. The *Chalybeats*, or *Spaw-Waters*, are also of a greasy Nature, which is so obvious to every one, who has visited these *Wells*; that in a few Days, on the Glasses, out of which those Waters are constantly drank, there settles a heavy greasy Matter; but this is quite of a different Nature with that fine oily Quality in the *Selter Water*, which never leaves any such gross and greasy Sediment, to clog and cloud the Glasses, out of which we drink it. And even

even those finer oily Parts are so highly digested and incorporated with the Water, by Means of the *Alkaline* Earth of the common Salt; that they cannot be discerned in any Shape, unless discovered by the last mentioned Experiments.

That greasy bituminous Matter, which stains and clogs the Glasses, out of which we commonly drink the *Spaw* and *Chalybeat* Waters, is the gross, pinguid Substance or Mucilage of the Iron-Ore; for the richer and riper the Iron-Ore is, the more of this Grease it contains; which is of such a very penetrating Nature, that it will sweat, or stain through the thickest Leather, in less than six Hours, according to the Use or Motion it is in: For, if it is well shaken in a Leathern Bag, it will sweat the sooner through. This *Mineral Grease* easily unites with such Waters as contain *Acids*; and it has often been a Doubt with me, whether this Mineral Fat was not the chief Medicinal Agent in the *Chalybeat* Waters; considering that Quality of powerful Penetration.

Thus I think we have, with Brevity and Probability, explained the natural *Composition* of the *Selter Water*; which, as already mentioned, is a very remarkable Concrete, and in no Ways, though a Mineral in its Nature, related to the *Acidulae*, or *Spaw-Waters*. It contains a great deal of the *Alkaline* Earth of the common Salt, and more than of its *Acid*: Yet, notwithstanding, it cannot be called a downright *Alkali*, or be

said that *Alkali* therein is predominant; but it is properly a neuter or saponaceous one; which, in my Opinion, is resolved into the neutral State, by the earthy Oil it receives from the *Fuller's Earth*, through which this Spring runs; for it makes the same Motions, or Effervescence with the *Alkali*, as with the *Acids*; and with the *neuter Salt*, none at all. —Now we will consider its *Medicinal Virtues*, and how to administer it in Diseases.

In *Obstructions* and *Suppressions* of the *Menses*, where it is necessary or requisite to destroy the Viscidity or Lensor of the Blood, or lessen its Quantity; this Water, using it with proper Evacuations, as Bleeding or Cupping, is an excellent Remedy. But this *Selter Water*, in these Cases, ought not to be taken without Exercise: Therefore, such Ladies as are afflicted with those Disorders, ought to drink it in the Summer, five or six Wine-Glasses full in the Morning; not at once, but by Intermision; and Exercise with it, as much as their Constitutions can bear: And if the same Method be observed in the Afternoon, a short Continuance will produce the De-obstruction of the occluded Canals: And such Ladies, who indulge themselves in too much Rest and Inactivity, would find great Benefit, by undergoing, every Spring, a Course of the *Selter Water*.

When the *Fibres* are dried, and the *Nerves* and Springs of the human Machine contracted and shrivelled up, if a Flexibility can possibly be expected, I am persuaded it may be effected

effected by the *Selter Water*, beyond any Thing I know of in the *Materia Medica*: Because the soluble *Alkaline* Earth of the Fossil Salt is of a penetrating Quality, and imbibed with a stimulating, healing, light natural Oil, which, common Sense dictates, must be of vast Service to the Vessels, thus distempered; and in those Cases, are absolutely the best Diluters in such contracted Passages, which can possibly be thought of. But then it must be used plentifully; and it would not be amiss, if, mixed with Wine or Milk, it were taken instead of common Diet Drink.

In great *Obstructions*, where the viscous Cohesion of the Particles forms such Masses, as cannot pervade their proper Vessels of Circulation, if they are not grown too concrete or fixed, and are in the least capable of Attenuation and Dissolution, the *Selter Water* will be a wonderful Assistant therein; will open their Passages, and occasion a fresh vital Stream to flow through them. Or in such Obstructions, occasioned by general or particular Tumours, or Fulness of the Glands; in these Circumstances, I dare say, if any Thing can be expected from a Medicine, it may, with the greatest Safety, from the *Selter Water*.

The above-mentioned Distempers are, in my Opinion, those which are most incident to the large, populous, and close Metropolitan City of *London*; which seem to be much occasioned by that thick and heavy Air, which,

for several Miles round about *London*, is, from the Smoke of the Sea Coals, extremely impregnated with terrestrial Parts, which, by constant Breathing, are received, and so conveyed into the Stomach, and from thence into the whole Machine ; not to mention such Particles, as are received by the other Parts of the Body : Therefore every Year, a Course of the *Selter Water*, for a few Weeks, to be taken some Distance from this City, would be an excellent Preservative to those Persons ; and many Years prolong their Lives, whose Business requires a constant Attendance in the City of *London*.

Artificers in Metals ; as, for Example, Braziers, Pewterers, Plumbers, Smelters, and others without Distinction, who work in Metallic Bodies ; must by all Means avoid the *Selter Waters* in every Respect, both as a Preservative, and as a Remedy in Diseases. For, as those *Artificers* receive a great deal of Metallic Dust or Particles into their Bodies, it is reasonable to suppose, that the Obstructions they are frequently liable to, are occasioned thereby ; and this Metallic Concrete cannot, by the Means of the *Selter Water* in the human Fabric, be diluted and carried off ; but rather, upon the Account of the Plentifulness of the *Alkaline* Earth, it is reasonable to apprehend, that, meeting together, they will occasion a dangerous and irresistible Inflammation : Therefore it is, by those sort of People, to be absolutely avoided.

N. B. *Ar-*

N. B. *Artificers* in Metals should use as little Salt in their Food, as possible.

The Supposition, that *Artificers* in Metals are liable to Metallic Concretions in their Bodies, occasioned by the Metals they work in, is confirmed so much by Experience, that it cannot in the least be doubted. The most remarkable Instances of this Nature are recorded by *Sennertus*, Dr. *Pansa*, and Dr. *Henkel*. This last mentioned Gentleman tells us, in his Treatise *De Asthmate Montano*, p. 91. That at his first Coming to *Freiberg*, the chief Mineral Town in *Saxony*, on the Occasion of Anatomizing two *Miners*, who both died of the *Asthma Montanum*, which the *Welch* Miners call the *Bellon*, in both their Lungs he found Knots or Concretions of a grey Colour, but considerably heavy. These he ground to Powder, and separated the lighter Parts by Washing, and the ponderous Remainder he tried in the Fire; which occasioned a Smell equal, and in no wise different from the Metallic Fumes in the Smelting-Houses; which plainly indicated its Origin and principal Matter. And this is agreeable to another Account, given by *Sennertus*, in his Treatise *De Consensu & Dissensu Chemicorum cum Aristotelicis*, &c. pag. 113. I myself could illustrate this with several Instances, that have happened within my own Experience; but for certain Reasons will omit them here, and refer them to a more seasonable Opportunity, when I may, by God's Permission, exhibit my *Observations*

in a Discourse intire by itself, upon the *Miner's* and *Smelter's* Distempers *.

Artificers in Metals must never come higher in the Mineral Kingdom for Medicines, than to the neuter *Salts*, *Sulphur* and *Antimony*; and those must be administered with the greatest Caution and Judgment that is possible; and never without Preparations of *Vegetables* properly adapted, such as *Electuaries*, *Decoctions*, &c. &c. But, above all, the *Fuliginous Oils*, or the *Empyreumatic Oils*, prepared from *Vegetables*, and suitably corrected, are *Panaceas* for these *Artificers*.

In such *Hysteric Passions*, as are occasioned by the Obstructions of the *Menses*, or an Impurity of the Blood or Juices, and in the *Fluor Albus*, I have found the *Selter Waters*, mixed with equal Parts of the *Pouhon Spaw*, an excellent Remedy. This Water Mixture I have likewise found by Experience, of great Service in Obstructions of the Liver, and a great Reliever of acute Pains, occasioned by a *Schirrus*. But, in those Cases, this Mixture must be drank more plentifully, than the *Selter Water* by itself.

In the Neighbourhood of the *Selter Water Well*, on the Upper *Rhine*, and in many other Parts in *Germany*, but particularly in those where they have nothing else but *Rhenish*

* As I am requested by several of my Friends, to write a particular *Treatise* on the Distempers, to which the *Miners* and *Smelters* here in this Island, are subject to; I shall perform the same, God willing, as soon as possible; and my Endeavour shall be, for the Benefit of those poor laborious Workmen, to render it intelligible and serviceable to the meanest Capacity.

Wine to drink, they commonly drink *Selter Water* with their Wines in equal Quantity ; whereby it is observed, that, in those Parts, the People are not so liable to the Gout, Gravel, Stone, Rheumatism, and malignant Scurvy, as their Neighbours, who make no Use of the *Selter Water* in this Manner ; and this is imputed to the frequent Use of the *Selter Water*. And here, if it were to be farther explained, that the Nature of those Distempers require Sudorific and Nephretic Medicines, with a sufficient Solvent, to dissolve the peccant Matter, and that chalky Humour in the Blood, which are the Occasions of those Distempers ; and then, if it were to be farther shewn, if it is not already sufficiently done, that it is the peculiar Quality of these Waters, to cleanse and correct those Humours ; it would certainly appear the most natural and easy Medicine, for the Purposes aforesaid. Upon these Motives, I have been induced to advise those, who have been afflicted with the said chronical Disorders, to drink the *Selter Water*, as their common Diet Drink ; mixed either with a small Quantity of *Rhenish*, or any other agreeable Wine, or Lemon-juice and Sugar ; and this was never done without some Benefit or other, to the Patient.

I cannot omit Observing here, that such who are used to *Malt Liquors*, and intend to make Use, in this Manner, of the *Selter Water*, must never begin with *Rhenish* Wine ; because the *Tartar* in the *Rhenish* mixes with the *Alkaline*

kaline Earth of the common Salt, which plentifully precipitates in the Stomach; which with that *viscid*, mucilaginous, pitchy Matter, occasioned by the *Malt Liquors*, create a great deal of Mischief therein; such as *Indigestion*, where the Blood itself receives its Share. Therefore it is necessary, that those who will use this Water, as the common Drink, should in the Beginning of their Meals, drink it Milk-warm; take little at a Time and often, till the Stomach is habituated to it; and by those Means, that fizy, pitchy Matter in the Malt-Liquor-Stomachs will be dissolved and carried off.

In *Consumptions*, this Water has done very great Service; particularly to very weak Constitutions, where the natural Oil, with its stimulating Quality, has restored the almost worn out Vessels beyond Expectation; particularly in those, who have taken it with equal Parts of Asses Milk; because its Operation is of an easy, soft, alterative Nature: but where there is an Ulcer in the Lungs, it must be omitted, being by no Means safely to be used; because the *Alkalious* Earth of Salt is too great a Caustic. Therefore such *consumptive People*, who will use the *Selter Water*, ought first to consult with a Physician, who will properly recommend, how it may be used as a common Drink, mixed with any Proportion of Milk. But such as will take Water with Wines, must chuse no other than the rich and nourishing ones; such as *Cyprus*, *Greek*, *Hungarian*, and *Canary*.

Sometimes

Sometimes the Stomach is overloaded with so much *Acids*, that they occasion a continual *Heart-burn*; which the *Alkaline* Salts, and the Testaceous Powders, the usual Remedies, are not able to conquer; because, in those Cases, the *Acid* in the Stomach is of such a fizy, mucilaginous Quality, that it prevents the Effervescence with the said *Alkalies*; which is absolutely necessary to remove the Grievance complained of. In those obstinate Cases, Physicians are obliged to have Recourse, for Relief, to more violent Remedies; that is the *Elixir Vitriol. Mynsichtii*, which in itself, in proper Cases, is an excellent Medicine; but, in the *Heart-burn*, I dare venture to pronounce it violent: Because one *Acid* must overpower another, and therefore will be in every Respect superior both in Quantity and Quality; whereby the Organs of the Machine will absolutely suffer. In these Cases, I recommend *Selter Water*, as a very fit Medicine to dissolve that slimy *Acid*, so pernicious to the whole Machine, without Prejudice to the Constitution; and in those Cases, one Quart of *Selter Water* in the Morning, and a Pint in the Evening, is a requisite Dose.

In my Practice, I have found *Selter Water* of great Service in an *Anasarca*; and it is, in the Dropsy itself, a very fit Liquor for the common Drink: Because it not only quenches the Drought of the Patient, but at the same Time operates by Urine; stimulates the Vessels, and strengthens the Medicines, that are given in their Operation; particularly, the
Chalybeats

Chalybeats work much surer and safer; if the *Selter Water* at the same Time, is given as the common Diet Drink, or used before the *Chalybeats* were appointed.

In the *Gravel*, *Stone*, and other calcarious Distempers, I know *Selter Water* has been very often of singular Service. But as at present that most noble and valuable Remedy, the LIQUID SHELL is discovered, I cannot recommend it much in those Diseases; yet I think it might not be amiss, but advisable for those Patients that use the *Liquid Shell*, to take *Selter Water*, as the common Drink at Meals, as the most inoffensive Liquor; homogeneous, and not so apt to destroy the Texture of the *Liquid Shell*. Moreover, the *Liquid Shell* is in itself a wonderful Medicine; then it precipitates by the purest caustive *Alkalies*, and in Course with most Liquids in the Human Machine. How shall we account for its Operation? I will not dwell upon this Subject in this Place, as the annexed *Dissertation* is designed for the Purpose.

Since I have mentioned, above, several other Mixtures with *Selter Water*, I think it will not be amiss here, briefly to inform my Readers of the successful Mixtures of it with the *Tar Water*, and also the *Pouhon Spaw* with *Tar Water*. Of the *Pouhon Spaw* and the *Tar Water*, I ordered an equal Quantity, in Cases where the Mass of Blood was slimy and thick, and the Nervous System at the same Time out of Tone; and where the Nerves required an immediate strengthening, it has succeeded wonderfully;

wonderfully : And when I found that there was a convulsive Trembling upon the *Nerves*, I ordered a Scruple, or half a Dram of *Sal Succ.* to each Quart Bottle of this Mixture. The *Selter Water*, with an equal Quantity of *Tar Water*, I ordered to such who were in a Consumption, occasioned by Obstructions in the smaller Vessels ; and by all those Mixtures I always found such Benefits accruing to the Patients, who took them ; that I think it incumbent upon me to recommend them to farther Trial.

I think it may not be amiss, to hint here the Notion I have conceived, in what the medicinal Quality consists, or what *Partes agentes* are in the *Tar Water* ; and thereby perhaps clear up the Point, in regard to the Reasonableness of its being a Medicine for the Diseases mentioned, and fit to be mixed with these Waters.

Every one who is acquainted with *Chemistry*, knows the considerable Difference there is between the *Empyreumatic* and Essential Oils. The latter are the *Quint-essence of Vegetables* ; and the first of a pitchy, bituminous, saline Nature. It is observed, that the fuliginous Oils, made out of Animals, upon Account of their saline Nature, in a very small Dose taken, go immediately into the Sanguification, and occasion a most profuse Sweat : It is also possible to produce this Oil out of every Vegetable, and *Tar-making* is the very Method to obtain it ; and *Tar* is the *Empyreumatic Oil* of the Fir-Tree ; they are all of
one

one rank Smell, yet differ prodigiously in their Nature.

There has always prevailed a Notion among the *Chemists*, and particularly with *Paracelsus*, and his Followers; that in those Oils lay a great Medicine undiscovered. This Notion was occasioned by the strange Effects, which a small Quantity of it has upon the Human Machine. Several have been very diligent to discover this Secret, and to find out a Method to administer those Oils with Safety. Mr. *Reed* is in the right, and it was long before him observed, that the gross terrestrious Parts are pernicious to the Constitution; but he goes a little too far, when he distills also the very *Pars agens* from it, which is what we want, and leaves us nothing but a distilled *Acid*, on which I shall be fuller hereafter. Yet nothing was performed salutary on this Inquiry, till the great Bishop of *Cloyne* discovered to us the *Tar Water*; and to him alone we are indebted for rendering the *Empyreumatic* Oils, a safe Medicine in every Respect.

That great *Chemist*, Dr. *Newman* at *Berlin*, came the nearest to the Purpose intended, when he advised the Practitioners, who will make Use of the *Empyreumatic* Oils, to rectify them *absque ullo Additamento*; and also that it was necessary, before the Rectification, to elixivate *cum Aqua calida*, the saline Substance out of them, and then rectify it. He tells us farther, that, if this Water was used instead of common Water, to make *Lime*
Water

Water for Chirurgical Operations, it would be of very great and singular Service. And that a certain Practitioner, whom he knew, used also this Water inwardly with great Success, in intermitting Fevers and chronical Diseases.

I have already observed, that there is a considerable Difference between the *Empyreumatic* Oils; and that one Herb or Wood produces a better and more homogeneous *Empyreumatic* Oil than another; and also that at last, the long delayed Wishes of the most eminent Men of the Faculty are fulfilled in the Bishop of *Cloyne's* Discovery; he being the Person, who has hit upon the very best *Empyreumatic* Oil, the *Tar*: And he is also the Person who has found out its Method of Depuration by the most natural Menstruum; and Art has the least Share therein; in Consequence whereof, the Medicine is so much more agreeable with, and salutary to the Human Constitution.

I cannot help thinking, that the first Use of *Tar* was purely medicinal; which Conjecture of mine is in general supported by the antient Writers, *Pliny* especially: Though in none of them can be found, that I have yet met with, a clear or distinct Account of its Qualities, or the Manner they used it in. But it is hardly possible, that the Antients, who sought for their Medicines chiefly in the Juices of Plants and Vegetables, should overlook so considerable an Extraction. Thus we know, that the Emperor *Claudius* promulgated an Edict, commanding his Subjects to rub or
anoint

anoint the Inside of their Wine-Vessels with the Juice of the *Taxus*, or Yew-Tree; as being a Remedy or Preservative against Poison: But *Dioscorides* expressly affirms, that *Tar* itself is a specific Antidote against Poisons.

From hence we may agree with the Notion, or rather be confirmed in it, that the *Empyreumatic* Oils extend their immediate Power to the Nervous System; under which the Blood Vessels are comprehended. This System receives the first Sensation of all Distempers whatsoever, that have their Seat in the Blood. For Instance, if the Blood is too thin, the Vessels suffer by its rapid Motion; if too thick, they suffer for want of Motion; if inflamed or obstructed, the Vessels are the Boundaries of the peccant oppressive Matter, and so *vice versa*, and must split or corrode, unless timely relieved: and therefore the *Empyreumatic* Oils, if properly prepared, are without doubt the very Medicine wanted in those desperate Cases. It immediately performs its Duty, and at the same Time stimulates the Nerves, whereby they are assisted to support the Removal of the Disorder.

Last June, I had an *Experiment* communicated to me, upon the *Tar Water*, by a Gentleman in the Country, who delights in *Chemistry*; and this very *Experiment* will corroborate what I have said concerning the Affinity between the fuliginous Oils and the Nervous System. His Words are as follow:

“ I took a Piece of Hog’s Gut that was
 “ newly killed, and into one End of it I
 “ poured

“ poured two Tea Cups full of Spring Wa-
 “ ter, so softened, that it was as fine as Wa-
 “ ter distilled; then tied it up with a String:
 “ Afterwards I took two Tea Cups of that
 “ excellent Tar Water, as it may be very
 “ well called for its Goodness, and poured it
 “ into the other End of the Gut, which I
 “ also tied up. In the mean time, I had
 “ prepared about half a Gallon of Water,
 “ softened in an earthen Vessel, over a Sand
 “ Bed, which I call my *Balneum Mariæ*. Af-
 “ terwards I suspended the Hog’s Gut in the
 “ Bath, and covered it over with two or
 “ three Sheets of Cap Paper, as is usual on
 “ such Occasions; and there it was kept in
 “ the Bath for about six Days and Nights.
 “ Then I took it out, and found, that the
 “ End of the Gut, which had the Water in
 “ it, gravitated lower, as I observed before,
 “ at the first putting it into the Bath. Then
 “ I took a Pair of Scizzars and cut an Orifice,
 “ and emptied the Water into an earthen
 “ Vessel; and that End that had the Water
 “ in it, was putrified and had a fetid Smell;
 “ and the other End of the Gut that had the
 “ Tar Water in it, was of a brown Colour;
 “ and by turning the Inside out, it was a
 “ little contracted, and had a brown Fur on
 “ it as if it was tanned.”

Is it not easy to suggest, or conjecture from
 this Experiment, that *Tar Water* dissolves the
Obstructions in the Vessels, and re-instates
 them to their former Nature? Then the

Word *Tanned*, which my Correspondent makes use of, signifies nothing more, than to dissolve the slimy, corruptible Matter upon the Skins or Cuticles of Animals; and, without destroying, only cleanses and fibrates them. The *Obstructions* in the Vessels are also nothing else but a dirty, slimy Matter, in all Shapes corruptible and detrimental to the Constitution, occasioned many different Ways; and this the *Tar Water* is able to resolve and dissolve; and at the same Time strengthens the Nervous System, when Nature is performing her Duty, in removing the peccant Matter: And this is not only confirmed by the said Experiment, but also by the indubitable Testimonies of Experience, in many other Examples.

The Bishop of *Cloyne* proposes, in two Letters, the one to Mr. *Prior*, and the other to the Rev. Mr. *Hales*, *Tar Water* as a Preservative, and Remedy against the Plague; and indeed he is not mistaken. *Tar Water*, considered in the above-mentioned Light, must be therein of great and singular Service. The infectious Particles always attack first the Nervous System, and this communicates the *Loimus* to the Blood; so that an immediate penetrating Medicine is required in this Case. The Smell of *Tar* alone is esteemed one of the best Preservatives, only to use it by way Smell, to prevent the *Loimus* from taking Root; because a fragrant or sudden strong Smell has an immediate Impulse, and communicates at once to the whole Nervous System

tem the essential active Parts of the Matter smelled to *.

From what I have here said of the *Tar Water*, a Conclusion may be drawn, I apprehend, that its medicinal Power lies in the *Empyreumatic Oil*, and that this Oil is absolutely necessary for the *Tar Water*, to answer the intended Purposes: Mr. Reid has communicated a Method in a Letter to the Rev. Dr. Hales, how to extract the *Acid* from the *Tar Water*; which *Acid* he thinks will answer the medicinal Intentions of *Tar Water*. But I am afraid he is mistaken in his Notion. For, when the *Empyreumatic Oil* is entirely separated from this *Acid*, it is not in any Shape superior to any other *distilled Acids* or Vinegars whatsoever; and what those are able to perform in Physic we know, without transcribing what our Fathers have so plentifully instructed us, on that Head. The medicinal Power depends then upon the often mentioned *Empyreumatic Oil*; but we may allow at the same Time, that

* It has been frequently experienced, by many Instances, that nervous Distempers have been entirely cured by Smells. Brimstone dissolved in expressed Oils, and mixed with a small Quantity of Oil of Nutmegs, and of this two or three Drops, very often rubbed between the Palms of the Hands, and then strongly smelled to, by applying very often the Hands, so rubbed, close to the Nostrils, has been frequently known to cure the Itch. It may perhaps be here objected, that this Ointment would prove a Remedy for that Distemper, if confined to the Hands alone, and by being rubbed only between the Palms of them, without making any Application thereof to the Nose: But of this I can give Assurance to the contrary: For I have caused it to be tried by frequent Rubbing upon the Palms only, but never could produce the desired Effect; unless the frequent Smelling to it, was also observed.

its own natural *Acid* is the chief Corrector, whereby the *Tar Water* can be improved when it is requisite; and we are indebted to Mr. *Reid*, who has instructed us how to obtain it plentifully.

I doubt not, in the least, but that Mr. *Reid* is able to oppose me with unquestionable Facts, that his *Acid Juice* hath answer'd, in several Respects, the Intentions and Purposes of *Tar Water*. But, in answer to those Objections, I say thus, that I have not yet seen any *Acid Juice* of *Tar*, from which the *Empyreumatic Oil* was intirely separated, which is confirmed by Mr. *Reid's* Experiment, related in his Postscript, pag. 43. where it appears, he obtained ten Grains from an Ounce of *Acid Juice*, of an Amber-coloured Rob, as he is pleased to call it. And if there is any Thing performed by this *Acid Juice* that has answered the Ends of *Tar Water*, I am very well satisfied that it is owing, and may very justly be attributed to the oft-mentioned *Empyreumatic Oil*, which was contained in the Amber-coloured Rob. But let him separate this Amber-coloured Rob from his *Acid* intirely, and then see, if it can perform any more than the common *distilled Acid*. I grant also to Mr. *Reid*, that there are many Constitutions, to which *Tar Water* may be hurtful in some Respects, and that for these, in particular, the *Empyreumatic Oil* is not sufficiently tempered. But then, we are furnished with Multitudes of Ingredients in the *Materia Medica*, wherewith to correct it. And for this very Reason it is,
that

that I here take Notice of the *Tar Water*, that where Causes and Circumstance, require more *Acid*, in Conjunction with the fuliginous Oils, as much of Mr. Reid's *Acid Juice* may be mixed or added to the *Tar Water*, as is wanted; for, by this Means, it may be sufficiently corrected and adapted to the Occasion: But then it must here also be observed, that there is nothing in the *Materia Medica*, that can do Good, but it is able to do also a great deal of Mischief; and, in course, it is reasonable to expect the same from the *Tar Water* as a powerful Medicine: Therefore it is the Physician's Business to correct these Inconveniences.

I have myself, of late, ordered some of this *Acid Juice* to be added to the *Tar Water*, in the confluent Small-Pox; and if I had not seen the surprizing good Effect myself, I never could have believed it. Therefore, in this particular Case, it may be aided and assisted with the *Acid Juice*. In other Cases, such Ingredients, as seem most requisite, are entirely left to the Judgment of Nature's Ministers; but to rely on one Thing alone, and to maintain that it consists in that only, as Mr. Reid does, carries no *Chemical Reason* with it: Wherefore, I hope, Mr. Reid, from his *Chemical Capacity*, will recall to mind that ancient universal *Chemical Maxim*, "That all Things, both Solids and Fluids, are Compounds in themselves, and Bodies, to be separated by the *Spagyrical Art, ad infinitum.*" And if this is the Case, how can he, according to the same

Rule, suppose his *Acid Juice* to contain the only salutary Agent. I am also surprized at the many Names Mr. *Reid* gives to the Oils, supposed to be in the *Tar Water*; sometimes he calls them *Caustic* or *fiery Æthereal Oils*, Names at this Time a-day, unusual and uncommon in *Chemistry*; as we distinguish no more than the *Essential*, or the *Distilled* and the *Empyreumatica* or *fuliginous* Oils in *Chemistry*; to which some will add the *Expressed Oils*. And whereas Multitudes of Names given to Chemical Productions, have occasioned innumerable Absurdities in this noble Art; I hope Mr. *Reid* will not be displeased, that I take this little Notice hereof; and as I know, in a great many Instances, especially in green Wounds, that crude *Tar* is an exceeding good and great Consolidator, of which it may be too tedious to mention here the Particulars: therefore is it utterly impossible, that any caustic Quality can be therewith united.

Thus much, I think, is enough of the *Tar Water*, as I have already mentioned the Reasons which induced me thus to take Notice of it, in this Place. I will now set forth, of what great Efficacy I have found the *Tar Water* when mixed with the *Selter Water*, in gouty Constitutions. We know in these Distempers, the Nerves and Joints are infected with a *calcarious* Matter, which must be dissolved and expelled, before any Relief can possibly be expected; and as the *Selter Water* softly dilutes and dissolves, without any Disturbance to the natural Oeconomy; and as the *Tar Water*,
by

by its Qualities, is a powerful Dissolver and Expeller of those *terrene* Parts, and also a kind Bracer and Strengtheners of the Nerves; I have made a Conjunction and Mixture of them together, and succeeded to my Wish. In those Cases, I commonly directed, of the *Selter Water* two, and of the *Tar Water* one Part; and of this one Pint, or a Pint and half in a Day to be taken; but where the Nerves are very much enfeebled and relaxed by hard Drinking, I appoint equal Parts of the *Tar* and *Selter Water*, with half an Ounce of Mr. Reid's *Acid Juice* to each Bottle of this Mixture: But if the Nerves are so feeble, that the Weakness is itself a Distemper, I order, instead of the *Acid Juice*, half a Scruple, or more, of *Volatile Salt of Amber*, to each Bottle: And this I have frequently found of such great Efficacy, that I dare confidently recommend it to further Use.

In continual or malignant Fevers, where the Blood is inflamed and vitiated, its Texture spoiled and destroyed to that Degree, that it is become putrid; where there is an Obstruction of the Bowels, an Obstipation of the Pores, a Stoppage of almost all the Capillary Vessels, and a very sharp Acrimony, intermixed with the Fluids; in these Cases the *Selter Water*, impregnated or mixed with the Juice of Lemon, and Dr. Stahl's *Pulvis Antispasmodicus* used long with it, I have seen the greatest Success imaginable. In those Circumstances, the Patient must drink plentifully of the *Selter Water* and the Lemon Juice, or any other plea-

sing *Acid*. From what hath been said here of the *Nature* and *Quality* of the *Selter Water*, and from what may be considered of the *Origin* and *Nourishment* of these *Distempers*; this *Affertion* will not only appear reasonable, but beyond *Dispute*.

As all *Liquors*, without *Distinction*, require a particular *Manner*, agreeable to their *Nature*, for the *Management* and *Usage* of them, if they are to be preserved some *Time* for some intended *Purpose*; so indeed, the *Selter Water* requires a very particular *Method* in this *Respect*. Then, as its *Nature* is very different from those *Medicinal Waters*, which are called *Chalybeats*, it is reasonable to suppose, that, in respect to its most commodious *Preservation*, it requires another *Method*, than the *Chalybeats* imported into this *Metropolis*. And, for the *Truth* of this, I appeal to the *Mineral Water Dealers*; who can certify, how soon, and quickly after the *Importation*, it is apt, for want of sufficient and judicious *Care*, to corrupt, and putrify, to such a *Degree*, as will make it become very offensive to the *Smell*. Those *Dealers* have tried several *Means*, ineffectually, to preserve it; and finding it impossible to dispose of the *Quantities* imported, so soon, as to prevent this *Damage*; they have hitherto commonly attempted to prevent the same, by opening the *Jugs* wherein it is brought from *Germany*, and pouring a certain *Quantity* of *Spirit of Vitriol* into it; so seal it up again. By this *Method*, they do indeed preserve it from *Putrefaction*; but this,
like

like the Brewery of Wines, sophisticates the Water, and consequently disappoints us of its natural Virtues. It is hereby altered in its Nature, and inevitably contracts a different Quality, from that which it contains in its sincere and genuine Purity; and may be highly detrimental in those Cases, wherein all *Acids* are to be omitted, and it is required neat, simple, or unmingled by itself; as in Consumptions, and several other Disorders.

However, there is a *Method* to preserve it untainted, and unadulterated by any Mixture, in its own natural Consistence; and as without any Addition to the Water, for this Purpose, so without opening the Jugs: And, for as much as I can learn, there are none of the *Mineral Water Dealers* in this Town acquainted with this Method, except the Person here under-named. This *Method* consists, in giving strict Orders, that the Jugs be very well corked, and sealed with Pitch, as soon as they arrive; to store the same in a proper Place, and then to cover them with a certain agreeable Mixture, through which the Air may play upon the Jugs, that contain the Water. This is always carefully observed by Mr. *Farley Jones*, Purveyor of Mineral Waters to his Royal Highness the Duke of Cumberland, who keeps his Warehouse in Tavistock-street, Covent-Garden; and I must say so much in his Praise, that I have always found his *Selter* answer their medicinal Standard here in London: And thus much may suffice at present upon this Subject.

A
 DISSERTATION
 ON THE
 LIQUID SHELL;
 WITH

INSTRUCTIONS to prepare the same.

THIS Medicine, known by the Name of the *Liquid Shell*, deserves so much the Regard of the Public, from its signal sovereign Efficacy in nephritic Disorders, the *Gravel* and *Stone* especially; that it cannot but receive favourably the following Communication of it. Be it said, without Offence, it is a Remedy, according to all the Principles of true Physic, confirmed by Experience, far superior to that celebrated one of Mrs. *Stephens's*, though the Patronage, and easy Belief of some leading Men, raised it to the Dignity of parliamentary Notice and Reward.

The *Honour* of the first Discovery of this Process on *Shells* is certainly due to a Gentleman calling himself *Baron Schwanberg*, a Native of *Germany*, who was not regularly educated either as a *Physician*, or *Professor of Chemistry*; but being especially determined towards the spagyric Art by his Genius, or rather

rather the Genius of the Nation, which is eminently turned that Way, applied himself very diligently to the Study of that *Science*, in which a laborious, unwearied Exactness, both of Practice and Judgment, are such indispensable Qualifications, and, indeed, compose an established Part of the *German* Character.

This Gentleman then, either by the Lights of his own Genius, or pursuing the Notions of an *Alcabeft*, in the Writings of *Paracelsus* or *Van Helmont*, two Authors who are scarce ever esteemed, or despised enough, hit on this Method of a Magistery, or Solution of *Shells*, by Calcination with *Sal Ammoniacum*. But, as I never had any Intimacy with this Delighter in the Art, nor ever learned that he was communicative of such Secrets, as he discovered in his Researches in it; but was, on the contrary, unphilosophically tenacious of them, it cannot be fairly suggested, that I came at this Secret by any unfair Means; especially when I shall fully shew, that I owed my Discovery of it to a Chemical Analyzation, that soon gave up the Contents of it to my Research and Experiments.

Observing in the public Papers, that such a Medicine was advertised, under the Title of the *Liquid Shell*, and said to be prepared from *Shells*; I first began my Attempt to smelt *Oyster-Shells* with the *Alcaline Salts* and *Salt-Petre*; but the *Liquor* I obtained not answering the same Characters or Tests, as that of the Baron *Schwanberg's*, I had recourse to another Method; and, taking three or four
Ounces

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Ounces of his *Liquid Shell*, I put them into a proportionably small *Retort* and distilled them. The *Liquor* I obtained was somewhat spirituous, and made plain to the Sense, that its Origin was from the *Sal Ammoniacum*; and upon this I worked the *Oyster-Shells* with *Sal Ammoniac*, as I had before unsuccessfully done with *Alcaline Salts* and *Saltpetre*, when I readily obtained a *Liquor* identical, in all Respects and Characters, with that sold under the *Baron's Name*, which I still retained, as I very justly allow him the Honour of the Invention. But as I had perfected this Discovery long before any Attempts, that I ever heard of at least, were made to monopolize it under a *Patent*, I considered myself as under no Tie or Obligation, to conceal or withhold from *public Practice*, a Remedy so very beneficial to Mankind.

But, as since my communicating to many the Process of the *Liquid Shell*, Mr. Baker, a Person whom I am not in the least acquainted with, but by his Character of a Seller of *Nostrums*, has obtained a Patent, under which he presumes to engross the Sale of this Medicine; I think it, therefore, incumbent on me, before I proceed to the Process itself, to relate my Conduct after I had discovered the component Matter of this Medicine, and therein vindicate to the Public its Right to it in common with the rest of the *Materia Medica*. Though I am indeed not Lawyer enough, to decide, under what Suggestion or Pretext Mr. Baker could sue the Patent out,

as the Invention was *confessedly not his*, but detected, long before he obtained one. For, as soon as I had perfected the Discovery of this really valuable Medicine, I made not the least Reserve or Secret of it; or got one Farthing Profit to myself by it. I ever had too great a Contempt for any *empirical Stile in Physic*, to affect, or set to sale, Secrets in it. For though I had frequently made use of this Medicine in several Cases, with prodigious Success, I acquainted Numbers in *North-Wales, Cheshire, Yorkshire, Derbyshire, London*, both with its Ingredients, and the Manner of its Preparation. But especially when I came to *London*, finding that Mr. Baker had fixed it at too high a Price for the *Poor*, to come easily at it; upon a Recommendation to me of Mr. Proctor, who has kept a Shop for some Years behind the *Royal Exchange*, I put into his Hands the Process of this Medicine, with an Account of its *Properties*, and *Uses*, on his Engagement to make it genuine, and at an easy reasonable Price, within the Reach of the *Poor* as well as the *Rich*: And, for the Service of the Public, I wrote Directions, how this Medicine was to be used, with regard to the various Distempers, it was specifically applicable to; and permitted it to be advertised with my Name.

This Advertisement of the *Liquid Shell*, in my Name, was accordingly made in the *Whitehall Evening-Post*, of *Saturday, April 30, 1748*. And further, to evince my Disinterestedness in the Affair, and that I had no other

other Design, than that the Public should be freely and openly served, I obliged him to insert in that Advertisement, that I would shortly publish the Medicine with its proper and authentic Process of Preparation ; that the Country Practitioners might not be at the Expence of sending for it from *London*, or be any wise imposed on in the Composition of this Medicine ; which Promise I also made to several Gentlemen of Distinction, with whom I had the Honour to be acquainted with in the Country, and who, from their Regard to the Public, and the Proof they saw of the Efficacy of this Medicine, thought it could not be too soon divulged ; and indeed it is with Regret, that I saw myself obliged to delay it so long, on Account of my Publication of the foregoing Treatise on *Mineral Waters*, to which I had in a manner tied myself to annex it.

Mr. *Baker* advertised his Patent (as I apprehend) the first Time in the *Gazette*, *August* 2, 1748. But, in some of his latter Advertisements, he has inserted, that some “ People, in Contempt of Royal Authority, “ did still persist in selling this Medicine” ; and as none that I know of, but those who derive their Preparation of it from my Communication and Instructions, are concerned in vending it, I think myself so far obliged to take Notice of Mr. *Baker*’s Intimation, as to assure him, that he greatly mistakes the Point, if he brings the *Royal Authority* into the least Question, in this Affair, or imagines it to be
at

at Stake, in the honest, and innocent, and commendable Intentions of those, who sold the very identical Medicine long before he had obtained his *Patent*, and *that* under the Name of Baron *Schwanberg*, purely because the Invention is really due to him in the same Way, as other Medicines bear the Names of their Inventors; such as *Elixir Bateanum*, *Spiritus Mynderi*, *Elixir Vitrioli Mynsichti*, the *Countess of Kent's Powder*, and a Number of others, and which are generally the best Receipts in the *Materia Medica*.

For my part, I am far from contesting with Mr. *Baker* his Property in his Patent, *Valeat quantum valere potest*. He may sell, at what Price he pleases, this famous Composition; but I presume the *Prerogative*, he has sheltered it under, does not exclude the Public from its Right to a Discovery made, and advertised long *before* the Patent was obtained: And it is the Public which is now to judge of the different Proceedings of one, who, for Lucre-sake, turns this Remedy into an *Empirical* Monopoly, and of the other who gives up a Discovery, which was the Fruit of his Researches for the Analysis of this excellent Medicine, freely to the Service of Mankind, without the least Reward, but the Pleasure of doing Good.

Besides, Mr. *Baker* may make himself easy with regard to what, he calls *counterfeiting* his *Nostrum*: For I shall here insert three Processes of Preparation; two of which are considerable Improvements on the original Composition

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position of Baron *Schwanberg*, which I candidly and readily submit to the Public, and presume the *Chemists*, *Apothecaries*, or Dealers in Medicines, may take their Choice of them, without invading any one's Property, or Privilege.

PROCESS the First.

N. B. This is the one, that produces the *Liquid* identical with that of the Patentee's, sold under the Name of Baron *Schwanberg's* LIQUID SHELL, as any *Chemist* may easily satisfy himself, by reducing it analytically to its Principles.

“ Take common *Oister-shells* green, as they
 “ are brought in their Season to Town, and
 “ not such as are calcined or whitened by Na-
 “ ture; wash them clean with common Wa-
 “ ter, let them dry of themselves; then
 “ pound them in a Stone or Iron Mortar, into
 “ a gross Powder, of which take one Pound
 “ (for Instance, of a certain Quantity) of *Sal*
 “ *Ammoniac*, well powdered, one Pound and
 “ three Ounces; mix the Powders well toge-
 “ ther, and put them into a Crucible, which
 “ set in a Wind-Furnace in a quick Smelting-
 “ Fire. (N. B. *The Crucible should not be*
 “ *quite full, because, as the Matter smelts, the*
 “ *Ebullition will cause it to boil over.*) Keep
 “ it on the Fire, till all Motion or Ebullition
 “ is over, in the thus smelting Materials,
 “ which should appear to the Eye, just as the
 “ *Alcaline Salt*, or *Pot Ashes*, do in their
 “ smelting State. When the *Oister-shells* and
 “ *Sal*

“ *Sal Ammoniac* are come to this Point; take
“ the *Crucible* from the Fire, and pour it
“ into a glaz’d earthen Vessel. This *Matter*
“ will run in the Air of a damp Cellar, *per*
“ *deliquium*, which Liquor is to be filtrated,
“ and gives, or is the *Liquid Shell*.”

To the foregoing *Process*, I have the following Objections. The *Air* in a damp Cellar, or elsewhere, dissolves only the Alcalious and very little of the oily Parts contained in the *Oyster-shells* and *Sal Ammoniac*; and at the same Time that vitrioline *Acid*, with which the *Air* is universally impregnated, insinuates into this *Liquid*, and greatly divides and weakens the oily Parts, which gives this Mixture that saponaceous Quality, in which we must principally seek its medicinal Efficacy on Distempers: therefore I would recommend the *Lixivating* it with Water, as a more valuable *Process*; and is thus.

PROCESS the Second.

“ Take of *Oyster-shells* (as above) and *Sal*
“ *Ammoniac*, equal Parts; powder them as
“ pre-directed, and put into a *Crucible*, smelt
“ them as before; pour out the Contents,
“ and powder them whilst warm in a warm
“ Iron Mortar; which done, put into a strong
“ well glazed earthen Vessel, to which affuse
“ about one Pint and a half of Water, to so
“ much Matter as is obtained from a Pound
“ of each thus prepared; let it stand in a
“ warm Place, or Sand-heat, for 24 Hours;

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“ stir it often, then filtrate it, and keep it in
“ Bottles, for Use.”

The *Liquid Shell* thus dissolved with Water, is not even inferior in Strength to that obtained *per deliquium*, as in the first *Process*, and therefore to be taken or given in no greater Doses, but in equal Quantities with the first; but its *medicinal Virtues* are far superior. The Water, that is used for this Solution, must be a soft, light, and limpid Water, not in the least Degree hard, but containing as little as may be of earthy or saline Particles.

That this *Liquid Shell* made after this second *Process*, is superior to the first in its medicinal Operations, I have verified by repeated *Experiments*, as well in *Chemical Trials* of them on *Stones* and *Gravel*, obtained from Human Bodies, as upon *Patients* in Nephritic Cases, who found much speedier and more effectual Relief from this second Method of Preparation, than from the first.

Farther *Reflections* however suggested to me a farther Improvement on this powerful *Medicine*, as follows.

PROCESS the Third.

“ Take of more minutely powdered Oy-
“ ster-Shells, Ounces eight; of *Sal-ammoniac*
“ well powdered, Ounces four; mix them
“ together; put into a Crucible, and calcine
“ in a *Cement Fire*, for an Hour and an half.

“ (N. B. A *Cement Fire* is no greater Degree
“ of Heat, than that both the Crucible and
Matter

“ Matter are red hot, but not so much as to
“ smelt like as in the first and second Process is
“ necessary.)

“ When the Matter is Calcined or
“ burnt into a Lime-like Mass, take it out
“ and powder it; and whilst it is warm, pour
“ two Quarts of clear, light, soft boiling Wa-
“ ter upon it, and let it stand in a *Sand-heat*,
“ or in a warm Place, near the Fire-side for
“ 24 Hours; in which Time it must be often
“ stirred and then filtrated, when it is ready
“ for Use. Which *Dose* is a Wine Glass full
“ at a Time, as often as the seventy Drops
“ are prescribed, in the Article of *Direc-*
“ *tions.*”

Liquid Shell made after this last *Process*, I have found yet more sovereignly beneficial in Nephritic Disorders, than the *Drops*; though the last are preferred by many, on account of their being given in a smaller *Volume*, and for that very Reason they are less effectual: For in this last *Process* the saponaceous Quality and Atoms of the *Oyster-Shells* are more divided and expanded in that natural menstruum Water, the sooner they unite with the animal Fluids, readier pass through the Circulation, and do not lose so much in the Digestion, as when the Contents are concentrated into a narrow Compass: therefore I recommend specifically this last Preparation to all afflicted with Nephritic Complaints, as a *Medicine* they may expect the most signal Relief from, of which I have seen surprising Instances.

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These are the several Modes of preparing this so justly esteemed *Medicine*, that have hitherto occurred to me; to which I proceed to subjoin certain Considerations of its *Origin* and *Medicinal Use*.

Concerning its *Origin*, it is certain, that this Remedy is not of modern Suggestion; for most of the *spagirical* Practitioners in Physic, from distant down to the present Time, have had a great Opinion of the *urinal Salts*, and considered them as proper Matter to work *Medicines* out of; their Reason for which was, that these *Salts* more homogeneously conveyed their medicinal Contents into the Animal Fluids; and indeed the general Success that has ever attended a judicious Use of them, has sufficiently authorised the Practice. Thus too there is a *Powder* sold under the Name of *Baron Skwanberg*, which is also no modern Discovery, but a revived *Medicine*, being nothing else but a *Diaphoretic Antimony*, made with the *Salt of Urine*.

That once celebrated *Lithotriptic*, the true *Ludus Paracelsi*, so much mistaken by *Van Helmont*, was nothing else but the *Stone* extracted from a Human Body, Calcined into a *Salt*, and suffered to run into an *oleum per deliquium* in a damp Cellar; of which the medicinal Contents are justly pointed out, by Dr. Gideon Harvey, in his Book called the *Vanities of Philosophy and Physic*, &c. page 117. (of which by the by many Folio's might be made) where he says thus: "Whatever Virtue may be supposed to be in this Stone (*viz.* the

Ludus

“ *Ludus Paracelsi*) is to be attributed to the
“ *Sal-ammoniac* that is in it.”

On which it seems very plain, that the Capital or *Gist* of the Virtues of the *Liquid Shell* was known to the Ancients, in the same Intention it is now used.

The same Author last quoted, has also pursued this Opinion of the *Sal-ammoniac*, as to come very near indeed to the Composition of the *Liquid Shell*, in the following *Process*, which I copy out of the same Book, page 118.
§. 12.

“ In Conclusion, my Opinion, touching the
“ Virtues of those prenumerated Stones, is,
“ that *Flints* rendered brittle by Ignition, in
“ Water, or Small-beer, or Wine, wherein
“ a good Lump of *Sal-ammoniac* hath been
“ dissolved and afterward ground into Powder, taken in large Doses, in a Draught of
“ the same Liquor, wherein it hath been
“ quenched, may be endued with a far
“ greater Power to drive down *Urine*, *Slime*,
“ and *Gravel*, and dissolve the *Stone* by a
“ long continued Use, than any of the most
“ celebrated of them.”

Here we have *Sal-ammoniac*, and a *Lime* in Mixture, so as to form a *Liquid*: and indeed the *Liquid Shell* is not very essentially different from it, since the *Lime* it contains is made of *Oyster-Shells*, whereas the other is made of *Flints*.

The famous Dr. *Hoffman's Spiritus antipodagricus egregius*, which has made so great a Noise in *Practice*, on account of its sovereign *Efficacy*

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in Nephritic Disorders, and even in the *Gout* itself, of which it asswages and mitigates the Fits, giving great Ease and Relief from the exquisite Pains of that Distemper, by dissolving the malignant calculous Matter in the Joints, is nothing else but *Spiritus Salis ammoniaci sulphureus*, in which a very small Quantity of *Campbor* is dissolved, whereby it is rendered saponaceous: and this *Medicine* pervades all the animal Channels in its primitive Nature, even to the extremest Parts, where, as pre-observed, it dissolves the earthy, chalky Concretes it meets with; which penetrating Quality is obtained from the *Sal ammoniacum*.

Here we see that the *Sal ammoniacum*, or the Preparations thereof, have been esteemed as Nephritic Medicines, in too ancient *Practice* to pass for a modern *Invention*: because somewhat modified and disguised, into a Composition, to beg a *Patent* for.

There were certain *Remarks* inserted in the *Gentleman's Magazine*, for *October*, 1746; wherein a nameless Author attacks this valuable *Medicine*, and has the Charity to deter or dissuade the Public from its *Use*; but his Arguments are built on such false Principles, his Conclusions are so injudicious and unphilosophical, that I might well spare the Refutation of them, which I shall however briefly undertake, for the Sake of those, who for want of Depth enough in *Physics* and *Chemistry*, might espouse the Prejudice, the Author attempts to inspire.

The

The *Author* of these *Remarks* attacks the Trial asserted to the Public, viz. that a *Human Stone* could be and frequently was dissolved in a Phial with *Liquid Shell*; in which, he tells us, “ That he procured some of the “ *Liquid Shell*, in which he has put the Human Stone formed in the urinary Passage, “ upon which a white Sediment precipitated; “ and that he obtained the like Sediment, “ when a few Drops of Hartshorn were dropped into the same Liquor; and from thence “ he draws the Conclusion, that the Powder “ obtained by the Human Stone was nothing “ else but the burnt Lime of the *Shells*.”

I grant him readily, that such a Trial, as he mentions, would produce him no other Precipitation, than the burnt *Lime* of the *Shells*, and that his *Human Stone* remained undissolved by this *Liquid Shell*; nor ought he to have expected any thing else from so crude an *Experiment*: For I do not find that he accompanied it with a proper Share of Dilution, which is necessary to all dissolvent Menstruums. *Aqua Fortis* and *Aqua Regia* are unquestionable Dissolvents of the noblest Metals, Silver and Gold, yet are ineffectual upon them, until diluted with common Water to a competent Medium. And it is indeed the same with the *Liquid Shell*, which will without any Difficulty amalgamate, soften, and dissolve the *Human Stone* or *Gravel*, if duly diluted and prepared.

Silver, or *Gold*, or any other Metal or Mineral, that we propose to dissolve, must also

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be clean, uncloyed, or soiled with any Grease, or Dirt, or the respective Menstruums cannot well exert their dissolvent Faculty. It is the same with this *Stone* of the Human Body; for if it is become greasy by handling, or cruusted over, in Time, by the Action of the external Air upon it, when long extracted out of the Human Body, or, if recent extracted, it is clogged with digested Matter of inward *Ulcers*, then we must not expect that the *Liquid Shell* will dissolve them; and for this Reason gentle *Purges* are expedient to be taken with the *Liquid Shell*, to expel such exulcerated Matter, if any is settled on those Calculous Concretions, to clear the Way for the Powers of it, over the Root of this dreadful Disorder.

This *Letter-writer* proceeds to tell us, “ that he evaporated the *Liquid Shell* to a Dryness, and there remained a small Quantity of lixivious Salt, probably of Soap Lye.” To which there is no other Answer due, than that it is plain this *Experimentalist* was mistaken in his Conjecture; which could not be surprizing, since his Method of Analyzation had produced him so little Acquaintance with the real Principles, or Components of his Subject.

As to the *Use* of *Soap Lyes* in Physic, for which he declares his Opinion, “ of its being known to be a powerful Dissolvent of these Stones:” I shall only say, that sorry I am, that this pernicious dangerous Drug has received the *Sanction* it has, from several Gentlemen,

men, eminent not only for their *Science*, but their confessed *Beneficence* to, and Love of Mankind, with whose Safety or Relief in Nephritic Disorders there can hardly exist a more incompatible Agent. For, *Soap Lyes* being in its Nature a perfect *fluid Caustic*, or dissolved *Lapis infernalis*, what Danger must not attend its Reception into the Body, when the most common and concomitant Symptoms of those Distempers are *Ulcers* or *Wounds* in the Kidneys, uterine, or urinary Passages, in which Case this becomes a mortal Poison? Yet how fashionable is the Use of it?

Nauseating by its Volume, as Mrs. *Stevens's Medicine* may be, yet is it more rationally, more safely adapted to the Human Body, at least is not liable to that mortal Harm, as the plain unguarded *Soap Lyes*. For the *Alicant Soap*, one of its Ingredients, is not only made of the mildest *Alkali*, the *Spanish Kelp*, but its caustic Quality is also mitigated by its Grease or Fat, and therefore not so fatally obnoxious, as the *Soap Lyes*.

Too many have been the Cases that have fallen within my Observation, wherein the simple *Soap Lyes* taken inwardly, have acted terrible Tragedies, and brought on a most painful *Death*: And, considering how well known its caustic Qualities are, it is surprizing that such a pernicious Practice should obtain the Vogue it has, at the Expence of all *Reasoning* in *Physic*, and of something so precious as the Life of Man.

The

The *Letter-writer* asserts, that the Sediment in the Urine, of those that take the *Liquid Shell*, is no other than common to those who take flaked *Lime*, which will produce the same Appearance; which is no Wonder nor Detracter from the Praise of the *Liquid Shell*, whose Operations are analogous to that of flaked *Lime*, and only much more powerful from the Super-addition of the *Sal ammoniacum* to its own *Lime* of Calcined Oyster-Shells. For, known as it is that all testaceous Powders are more or less diuretic, consists it not with the Truth of *Physical Reasoning*, that the diuretic Faculty of the *Oyster-Shell Powder*, dissolved by such a Menstruum as the *Sal ammoniacum*, must be usefully carried to the Root of the Distemper, in Conjunction with this Salt, which in its primitive Nature pervades the whole animal System, without losing its Power in the first Digestions, which other Medicines are so liable to? And, being a powerful Solvent of the earthy Concretes called *Stone* or *Gravel*, it is thus urged together with the testaceous Commixture, to its Work of scouring, cleansing, wearing away, and mouldering the cruel obstruent *Matter*: Whereas other Remedies, less adapted than the *Sal ammoniacum* to its Circulation with undiminished Virtue through the animal Fluids, require more Time to prepare them for their Reception, and are ultimately transmitted to the Seat of the *Disease*, with most of their *Efficacy* lost by the Way. And for this Reason, the *Liquid Shell* is so efficacious, even in the
smaller

smaller Doses, and more so, the more they are, by the diluent Process above set forth, prepared for their readier Circulation through the animal Fluids, requiring nothing to assist their Operation, but some lenient *Purges* to precede them in Cases of inward *Exulcerations*, or *Foulnesses*, which generally accompany this Disorder, and the *Purges* are even beneficial where those Cases do not exist.

These *Purges* then cleanse and expel the *Ulcerated Matter*, occasioned by the *Stone* or *Gravel*, and likewise the Slime or fizy Matter, which commonly settles upon these *earthy* or *calculous* Concretes, wherever they are seated towards the Kidneys, Uterus, or urinary Passages: And they are also requisite to predispose the Blood for receiving the *Medicine*, and increasing the Circulation; therefore gentle, moist, aperient *Purges* are required of the Nature of those pointed out in my first Directions, I wrote for the Vender Mr. *Proctor*; but as I therein excepted against *Glauber Salts*, I shall herein, according to my Promise, state my Objections to them.

Glauber Salts are known to consist of the *Alkaline Earth* of the common Salt, and the *Acid of Vitriol*, both which Contents are prejudicial to those inward *Ulcers*, ever to be suspected in Nephritic Affections: For as a Separation of this purging Salt ensues in the Seats of Digestion, the *Alkaline Earth* is inevitably heterogeneous to these *Ulcers*; and the *Acid*, by its astringent Power, coheres them improperly, by which Means the *Medicine* is retarded

tarded in its Efficacy, and Impressions on the peccant *Matter*, and dangerous Inflammations of these Parts are the Consequences to be dreaded.

Neither are the salutary Ends aimed at in the Prescription of *Purges* obtained by these Salts; for as we want a constant gentle Discharge of the *Matter*, and a State of Fluidity in the Blood; I apprehend these are not well promoted or preserved by these *Salts*: for we may daily observe, that when *Glauber Salts* are taken, and their *Purging* is over, a *Costiveness* for several Days ensues thereon. The Vegetable *Laxatives* are therefore the properest for our Purpose, such as gently command two or three Stools a Day. And these I have ever noted for answering their Intentions the best.

Thus far may be sufficient for the present on the *Liquid Shell*; and should these my candid Endeavours, to propagate the *Use* of so salutary a *Medicine*, meet with a favourable Reception and Construction, I shall occasionally give the *Public* an Account of farther *Experiments* on it; as those have opened to me improvable Views of its being yet capable of more *Use* and Application, than I have hitherto suggested. I subjoin here the Directions for the *Use* of it in those Disorders wherein I have already seen it serviceable.

D I R E C T I O N S.

I. *For the Stone in the Bladder or Kidneys.*

SUCH as are afflicted with the Distemper called, The *Stone*, and have one or more of those pernicious clayey and calculous Concretions

cretions in the *Bladder* or *Kidneys*, must take every four or five Hours, from Fifty to Ninety Drops, in common soft Water, or White Wine, (but soft Water is the best Vehicle for this *Medicine*). In the Course of taking this *Medicine*, the Patients must keep their Bodies open, and at least have two or three Stools a Day. And if they are not naturally inclined to this Habit of Body, they must have Recourse to a small Dose of *Lenitive Electuary*, *Stahl's Pills*, or a small Draught made of *Senna*, *Rhubarb*, and *Manna*. All viscid, hard Aliments, Salt, hot Spices, &c. are to be avoided; and only Gruels, Broth, Panado, and very light Meat roasted, and such Fish, that easily digest, are to be made use of. The most suitable *Liquors* are White Wine, particularly *Rhenish Wine*, either pure or mixed, with Barley-water, or Water and Toast.—Gentle Exercise and Taking the Air are also necessary: But due Regard must be had, that the Patient does not catch cold.

II. *In the Gravel.*

In this Case, the *Liquid Shell* is to be taken every 4 Hours, from 60 to 80 Drops, in White Wine or Water, or a Mixture made of common Water, Juniper-Water, Parsley-Water and Mint-Water. The same *Rules* in Regard of keeping the Body open, and the Regimen of the *Diet*, are also to be observed, as are mentioned in the first *Directions* for the *Stone* in the *Bladder* and *Kidneys*.

III. In

III. In *Pains* in the Breast *and* Flatulences.

Whereas these Grievances generally proceed from too much *Acid* in the Stomach, or other Parts of the *Primæ Viæ*, in such Cases, certain Relief may be expected from this *Medicine*, in a very short Time. But if this Case should proceed from any other Origin than *Acid*, there can be no Relief expected from this Remedy. But where *Flatulences* do proceed from the Causes before-mentioned, as they do for the most Part, the *Liquid Shell* is to be taken from 40 to 80 Drops, 3 or 4 Times a Day, in White Wine and Water.

IV. In a Strangury, or Retention of Urine.

In the last-mentioned Cases, every 4 Hours, from 50 to 70 Drops are to be taken in Parsley-Water, or in common Water, with a small Dose of Juniper-Water in it; and if Occasion requires, and the Patient is costive, a gentle small Dose of the Physic which is prescribed in the first Direction, must not be omitted.

V. In the Cardialgia or Heart-burn.

Let the Patient take, for 2 or 3 Days, at least 4 or 5 Times a Day, 70 or 80 Drops of the said *Liquid Shell*, in soft common Water: But if Water is disagreeable to the Stomach, mix a couple of Tea-spoon-falls of Rum with it; at the fourth Day take a Dose of Physic of *Lenitive Electuary*, or a Draught of *Manna*,
Rhubarb

Rhubarb and *Senna*; and then repeat the *Liquid Shell* for 5 or 6 Days longer, as first directed; then a Draught of *Physic* again: And this Course to be continued, till you judge, that the *Matter* that occasions the *Cardialgia* is removed, which is easily perceived, by a keen Appetite and good Digestion of the Food.

N. B. A Breeding Woman may safely take the *Liquid Shell*, to ease the *Heart-burn*. But all *Purging Physic* must be omitted.

VI. In acid Eructations and four Belchings.

The *Patient*, in this Case, must take very plentifully of the *Liquid Shell*, in the first 2 or 3 Days, every Hour 50 Drops in Water; and I may venture to say that the *Liquid Shell*, in these Circumstances, occasions an Effervescence with the *Acid* in the Stomach, by which Means it creates a *Neutral Salt*, and, by virtue of this Accident, or new Concretion in the Human Machine, it intirely purges off and expels the Cause. And if the Disease decreases, then the Use of the *Liquid Shell* may be likewise abated or lessened to 6, 5, or 4 Times a Day, till the Patient is cured.

VII. In the Gout.

Whereas all Disorders, whose material and formal Cause, or peccant *Matter*, consists in a calculous or chalky Substance, have an Affinity and Connexion with, and are very nearly and essentially related to one another, as having certainly one and the same Origin; which I attribute to there being too much *Acid* lodged and deposited in the *Primæ Viæ*; and therefore

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therefore as the *Gout* consists in a *Calculus* or *Chalk*, that is chiefly lodged in the Joints, it came into my Thoughts to try the *Liquid Shell*, in this dismal *Distemper*,——to essay and see,——if I could in any Sort ease or alleviate that most exquisite Pain ; and, according to my Wishes, I have succeeded so many Times, in my Attempt to alleviate and relieve the Symptoms, and to render the Attacks or Fits of the *Gout* more tolerable and less excruciating, and perhaps much more rare than they otherwise would have been, that I am so bold as to recommend it in this public Manner : Therefore, such that are afflicted with this Malady, let them take, when they have a Fit of it, every Hour, 50 Drops in *Rhenish* or *Madeira* Wine ; and at every 3 or 4 Days, about 30 Grains of the best *Rhubarb*, till the Fit is gone off. But such as will make use of the *Liquid Shell*, as a Preservative to promote Ease, and to cause the Fits of this Distemper to be less sensibly felt, and to be more transient, let them take every Morning and Evening 60 Drops in Water, and twice in a Month a Dose of *Rhubarb*.

VIII. In *Convulsions*, *Fevers*, *Gripings*, and other *Distempers* in young *Children*, occasioned by Acids.

In *Children* and *Infants*, acid *Crudities* are the principal Origin of most of their Miseries ; and then *Gripes*, *Fevers*, *Convulsions*, and even *Inflammations* in their *Gums*, when breeding

ing their Teeth, may justly be attributed there-
to. In these Cases, the *Liquid Shell* ought in
Justice to be esteemed the best and safest *Re-
medy* in the whole *Materia Medica*. It most
powerfully absorbs and destroys all *Acids*,
cleansing and purifying the Bowels, guards a-
gainst and prevents Worms, and may be given
from 5 to 12 Drops, in common Water, 3
or 4 Times a Day. The Parents and Nurses
should be very cautious of giving young Chil-
dren testaceous Powers, or opiate Cordials;
the former clogging the Stomach, and hinder-
ing Digestion, and the latter not only has the
same dangerous Effect, but also stupifies the
animal Spirits.

*Occasional Remarks and Queries on the
GLASTONBURY Waters.*

THE great Noise these Waters have made in the
Nation, and the many extraordinary Cures that
are attributed to them, has led me to apprehend they de-
serve Inquiry, and such a one as may fully set forth,
whether they really merit that Notice and Regard which
common Fame has so liberally bestowed upon them;
for my own Part, as a hearty Well-wisher to Mankind
in general, I sincerely hope they may be found with all
the sanative Qualities imaginable; and as I shall lay
down my Thoughts openly and candidly in these loose
Remarks, I trust I shall not be suspected of Prejudice on
either side, my Design being purely to pave the Way for
the Discovery of Truth.

What is commonly said in Favour, or against these Waters has no weight with me, as Experience and Chymical Analysations are the only Touch-stones whereby their Virtues can with Certainty be determined, should they be intitled to any.

Curiosity has led me to make some Experiments on one Bottle of the Water, as sold here in *London*, for *Glastonbury Mineral Water*; but from all my Trials, I never could discover the least Mineral Contents it had, and whether there are any Salts in it or not, I do not pretend to be absolutely certain, the Smallness of the Quantity, from which I made my Experiments, not being sufficient to extract them out; some Medicinal Waters there are indeed, of which their Mineral Contents are so extremely volatile, that they exhale so quick, as never to be found after Exportation, or even carried any considerable Distance from the Place; therefore, with such, no Tryals can be certainly depended on, but such as are made at the Spring Head.

Query. *If the Glastonbury Waters are not of this Sort? and whether it would not be highly prudent and necessary, to engage some skilful Experimentalist, to try these Waters on the Spot?*

On opening the Bottle, I found a remarkable foetid Smell, such as is generally occasioned by animal Substances, in a putrefying State; but from the best Information I can get, I don't find it has any such Smell at the Fountain-head, from hence arises a reasonable Query with me:

If it would not be deem'd more satisfactory to search the Spring thoroughly, to see if the Current of this Water is not interlin'd with animal Substances?

I apprehend this so much more necessary as the visionary Director to Mr *Chancellor*, informed him, that it run through the Graves of Martyrs and Saints, and from thence arose it's salutary Efficacy.

I have

I have further Reasons for so strict a Scrutiny, which are these ; I mixed a large Quantity of Alkaline Salts with this Water, which did not in the least dissipate the foetid Smell before mentioned, nor caused any Effervescenz or Ebullition, which in my Opinion, it must certainly have done, if this foetid Smell had been produced from any mineral Substances whatever. I then poured Oil of Vitriol upon it, as much as was necessary to cause an Effervescenz or Ebullition, when there appeared on the Top a slimy Matter, very much resembling animal Substance ; and it seemed natural to conclude, that this foetid Smell was contained in the slimy Matter only.

What further Trials I made upon this Water, was with Galls, Oak, Bark, Tormentil Root, and other Astringents of the same Nature, which turn'd it of a brown Colour, not unlike the Liquor and Skins of Tanners, when these Astringents are put in to tan the Hides.

Query. *What is this slimy, brown Matter ? by what Means is the foetid Smell preserved with Alkaline Salts, and from whence does the Colour with Astringents proceed ?*

I doubt not, but the Inhabitant of Bath (whoever he is) published the many remarkable Cases of Cures, with a good Intent, and I hope they may answer all the mutual End he designed by it ; but permit me to say, there is a wide Difference between imaginary Distempers and real ones, and perhaps the Cure may stand upon the like uncertain Principal.

Query. *Then if these Persons that are related as cured in those Cases, were really afflicted with those Diseases, it is said they were healed from ?*

In all the Accounts that I have seen of the Glastonbury Water, I don't find the least Mention made, in what Manner these Waters operate, either as Evacuatives, or as Alteratives ; but all their good Effects are attributed

attributed to supernatural Causes; and here I think a strict Inquiry and Examination of the Patients that have drank these Waters highly necessary, as to the Disorder they laboured under; for I will venture to say, that if these Cures were really performed by these Waters, as reported to be, that we shall be able, on Examination, clearly to find out the natural Causes from whence they have proceeded.

If this Water is abundantly rich impregnated with Ætherial Spiritus Rector, I do not wonder at the surprising Cures that are attributed to it; 'twas from hence, that many Springs in the Days of Priest-Craft were deem'd miraculous, by the wonderful Cures they performed by the help of the Ætherial Spirit they were so richly imbibed with; and indeed it must be confessed, that the most salutary Waters of this Nature in the present Times, are too much neglected; I heartily wish the *Glastonbury* Spring may yield plentifully of this Quality.

All Cures that are reported of the *Glastonbury Waters*, have at many repeated Times been effected by the *Shadwell Waters* near *London*, and the *Dog and Duck Waters* in *St George's-Fields, Southwark*, of which indisputable Facts can be produced; but whatever extraordinary Cures have been performed by these justly celebrated Waters, they never were recommended to the Public in such an enthusiastical Manner as those of *Glastonbury*, but the natural Causes fully assigned whereby the Cures were wrought. If these healing Qualities are contained in the *Glastonbury Waters*, let them be sufficiently set forth and accounted for in the same natural Manner, as it would be unjust to deprive them of of any real Merit they are intitled too; but to attribute it to supernatural Causes, greatly weakens the Credit of it, and is highly abominable in so refined and polite a Nation as undoubtedly that of *Great-Britain* is, should run into such ridiculous Superstitions as they now do, in Respect of this *Glastonbury Water*, which equals that of Romish Idolatry, for which *Israel* of old was so severely chastized.

All Medicines that are capable of doing great Good, may (injudiciously administered) do great Harm, so as
to

to become poisonous to the Human Constitution; 'tis for this Reason, that all Medicines require to be judgmatically administer'd: This experienced and undoubted Rule, is in nothing more verified than in the Medicinal *Mineral Waters*, which ought to be used with the greatest Caution imaginable; and Experience has taught me to believe, that if all *Mineral Waters* in general, were used in lesser Quantities than the present Fashion of the Times, that they would produce more sanative Effects; whereas by immoderate Use, they do great Mischief, and oftener increases the Distemper, or brings on others, than that it conduces to Health.

Whatever Mr *Chancellor's* Visionary Director was, I will not pretend to say, but this I will affirm, that he understood Nature, by his ordering the space of seven Days between each Time of drinking this Water; therefore, if it has any medicinal Contents, there is Time for it to search and work with the Blood, into the most minute capillary Vessels, and impart it's medicinal Contents to the animal Fluids, and any where else it is required; but if every Day, large Quantities of Water is repeated, it destroys and breaks the circulatory Vessels, whereby the medicinal Contents are disabled to perform their Function; so that wherever the Reverend Letter Writer of the *Glastonbury Waters*, founds his supernatural * Suppositions upon, are in reality nothing else but natural Consequences.

If ever I live to publish my Treatise on the *Natural Salutary Use of Medicinal Mineral Waters*, I hope to have it in my Power to offer new Lights to the World in this Particular.

* Vide Virtues and Efficacy of the Water of Glastonbury, &c. &c. Page 59.

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Mineral Waters of all Kinds, sold Wholesale and Retail, at the Golden Wheat Sheaf in Tavistock-Street, Covent-Garden, by Fairly Jones, Purveyor to his Royal Highness the Duke of Cumberland.

THE following Waters are delivered fresh and in the best Perfection to any Part of the Town; and as fresh Mineral Waters are judg'd extremely conducive to Health: Therefore the above F. Jones takes in this respect all possible Care, not only to import these Waters genuine, but also to preserve the *Volatile Spirits*, as the most salutary Part these Waters possess.

The following *Testimonials* have been transmitted to Mr. F. Jones, from the Magistrates of *Spa*; and the Bottles which formerly were sealed with his Highness the Prince of *Liege's* Arms, are now sealed as in the Margin, the Magistrates having recovered the *Pouhon Spa*, by a Law Suit from the Bishop and Prince of *Liege*, before the Aulic Council of the German Empire.

We the BURGO-MASTERS and Magistrates of *Spa* do hereby certify and attest, for the Sake of Justice and Truth, that several Quantities of our Mineral Waters of *Spa*, which Mr. Alexander Hay, Merchant, residing here, has caus'd to

to

to be filled in his Presence, by Order of Mr.
F. Jones, Mineral Water Pur-



veyor to his Royal Highness the Duke of Cumberland, were filled at the *Pouhon Spring*, when the Water was in its greatest Perfection, being sealed and done up with all imagin-

able Care, agreeable to our Certificate sent with each Quantity of Water to the said *F. Jones*. In Witness whereof we have caused our Secretary to sign and seal these Presents, at the said Town of *Spa*,

Par Ordonnance,
J. Storbeaux Greffier.

Spa in Germany, April 25, 1747.

This is to certify, that I *Alexander Hay* of *Spa* have contracted with *F. Jones* of *London*, to sell our true *Pouhon Water*: The said *Jones* having engaged not to *deal in any false Water*. The Nobility and Gentry may be assured, that the *Pouhon Water*, sent to the above-mention'd Dealer, is taken up at the only proper Season, and secured in the most effectual Manner, by me,
Alex. Hay.



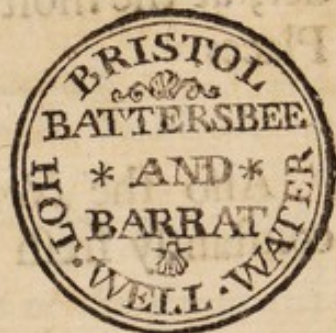
The said *F. Jones* has settled such Correspondence for the *Pyrmont* in large and small Bottles, and *Selter Water* in large Stone Jugs, that their Goodness may be entirely depended upon. The *Pyrmont Water* is sealed with the Prince of *Waldeck's Arms*.

The

The *Scarborough Water* in the best Perfection, filled by the Direction and Care of Mr. *Culmer Cockerill*, Apothecary on the Spot, sealed as in the Margin, and the Salts of this Water prepared by the said Mr. *Cockerill*, according to Dr. *Shaw's* Direction.



The *Bristol Water* of the Hot Well, only constantly fresh, and certify'd by the Proprietors of the Well.



The true *Bath Water* is sealed with the Arms of that City, and round it the Name of the present Pumper.



The said *F. Jones* sells also the famous *Neville Holt*, *Shadwell*, *Cheltenham*, *Acton*, *Harragate*, *Lincoln Waters*, &c. and in general all the medicinal Mineral Waters in Request.

The *Liquid Shell*, carefully and faithfully prepared according to Dr. *Linden's* Directions, especially the second Process, is sold by *T. Proctor*, at the *Golden Key* and Dr. *Chamberlayne's Anodyne Necklace*, under the *Royal Exchange*, or at his House in *Whalebone Court*, *Lothbury*,
at



at One Shilling *per* Bottle ; at Two Shillings
and Six-pence *per* Half-pint Bottles, and so in
Proportion, with reasonable Allowance to the
Wholesale Purchasers. The Bottles will be
sealed with Dr. *Linden's* Coat of Arms.

N. B. Any Quantities prepared according to
the third Process, may be also had upon Or-
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Also the *Neville Holt Sparw* Water is sold
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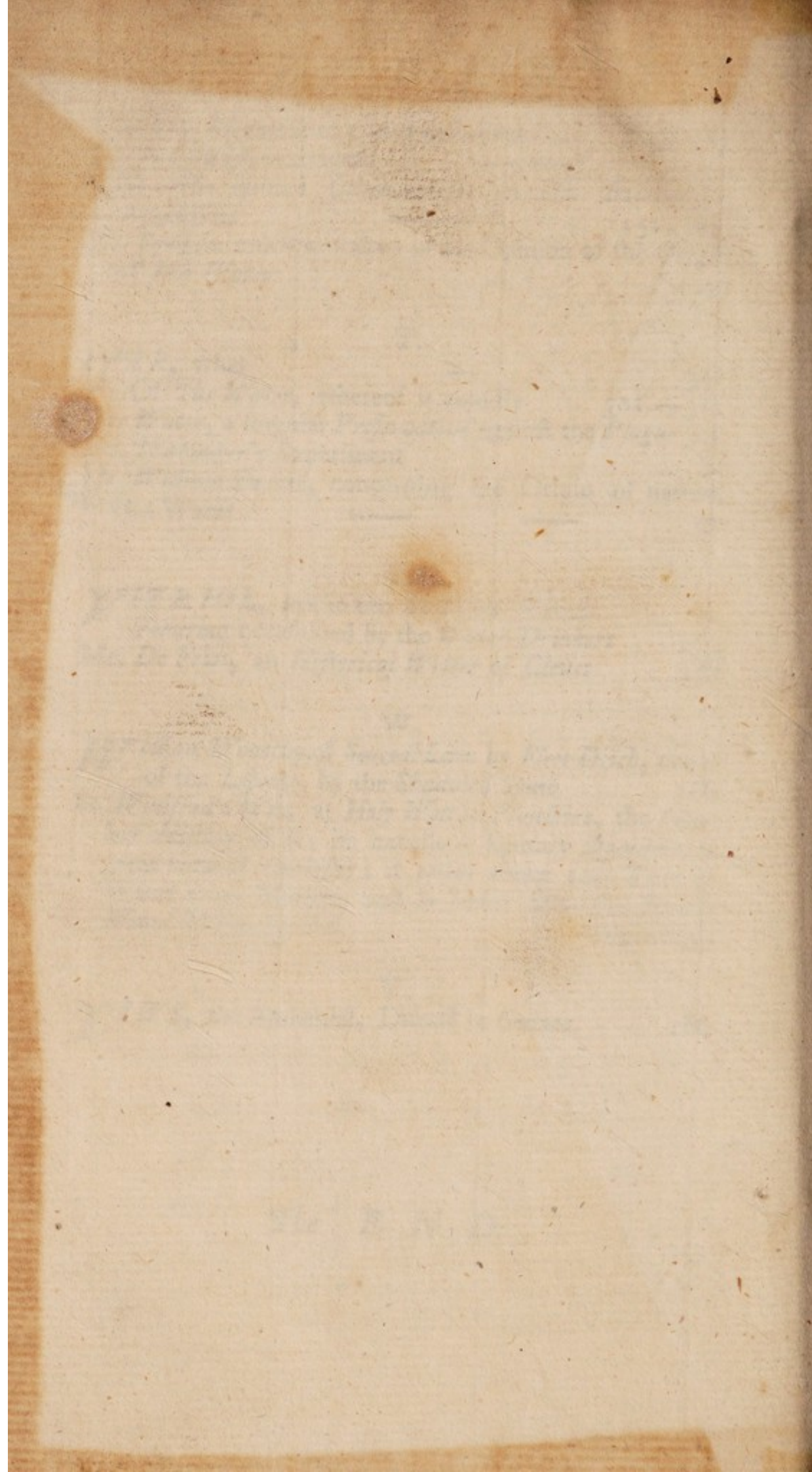
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