A discourse of naturall bathes, and minerall waters. Wherein first the originall of fountaines in generall is declared. Then the nature and differences of minerals, with examples of particular bathes from most of them. Next the generation of minerals in the earth, from whence both the actuall heate of bathes, and their vertues are proved to proceede. Also by what meanes minerall waters are to be examined and discovered. And lastly, of the nature and uses of the bathes, but especially of our bathes at Bathe in Sommersetshire / [Edward Jorden].

Contributors

Jorden, Edward, 1569-1632.

Publication/Creation

London : Thomas Harper, 1631.

Persistent URL

https://wellcomecollection.org/works/bvb439pn

License and attribution

This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

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



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





















A DISCOVRSE OF NATVRALL BATHES, AND MINERALL WATERS.

Wherein first the originall of Fountaines in generall is declared.

Then the nature and differences of Minerals, with examples of particular Bathes from most of them.

Next the generation of Mineralsin the earth, from whence both the actuall heate of Bathes, and their vertues are proued to proceede.

Alfo by what meanes Minerall Waters are to be examined and difconcred.

And laftly, of the nature and vies of Bathes, but especially of our Bathes at Bathe in Sommerfessbire.

By ED. IORDEN Dr. in Phylicke.

Printed by THOMAS HARPER. 1631.



TO THE RIGHT HONOVRABLE, SIR FRANCIS COTTINGTON, Barronet, Chancellour of the Exchequer, and one of his Maieflies moft Honourable Priny COVNEBLE.



He profitable vse of Bathes, both for necessity and comfort, is such, and so well confirmed from all antiquity, as I need not labour to illustrate it more; onely it hath beene the

ill hap of our Country Bathes to lye more obfeure then any other throughout Chriftendome, although they deferue as well as the beft, becaufe very few haue written any thing of them, and those haue either not mentioned, or but flightly passed ouer the maine points concerning their causes and originals; contenting themselues with an empericall vse of them. This hath made methrough the inftigation also of some of my worthy friends, to attempt somewhat in this kinde : which if it giue not fatisfaction according to my defire, yet it may be a prouocation to some others, to A 2 perfect

The Epistle Dedicatory.

perfe & that which I haue begun. And feeing I doe it for the vse of my Country, I haue neglected curious ornaments to garnish it withall, but haue clad it in a plaine suit of our country Cloath, without welt or gard : not defiring it should shew it felfe in forraine parts: Mea cymba legat littus.

But in this mine vndertaking, I finde my felfe exposed to many censures, both concerning some paradoxicall opinions in Philosophy, which not with standing I deliver not gratis, but confirmed with good grounds of reafon and authorities: as also concerning the reformation of our Bathes, which doe daily fuffer many indignities more waies then I have mentioned, vnder the tyranny of ignorance, imposture, priuate respects, wants, factions, diforder, &c. fo as they are not able to difplay their vertues, and doe that good for which God hath fent them to vs: and all for want of fuch good gouernement as other Bathes doe enioy. I blame not our City herein, vnto whole care the ordering of these Bathes is committed, the diforders and defects being fuch as are out of their verge, and neither in their power, nor in their knowledge to redreffe. For they have fufficiently testified their defire

defireoft voluntari Kaz Ian by whole heykne that mu of lome bothme VICODIDE to their d take, wh extent of impedim may hu tues, Th dedicate who ha viesand both by and by andwilli cipline, Belle, and Sir, that TRATICS IN andthe your Co

The Epistle Dedicatory.

defire of reforming all fuch abuses, when they voluntarily did ioyne in petitioning the late King James of bleffed memory, to that end : by whole death this petition also dyed. And they knew well that it must be superiour power that must effect it. In these respects I have need of some noble and eminent Patron to protect both me and my Bathes, whole caule I take vpon me to plead, and to aduance, according to their due delert: but especially for the Bathes fake, which I defire may flourish to the vtmost extent of benefit to the people; and to haue all impediments remoued out of their way, which may hinder them in the progreffe of their vertues. This is the caule Sir, why I prefume to dedicate these my labours to your Honour, who having observed in forraigne parts, the vles and gouernements of all forts, and being both by the fauour of his Maiestie well able, and by your noble disposition well inclined and willing to maintaine good order and difcipline, will, I doubt not, excuse this boldneffe, and pardon my presumption. Confider Sir, that this is your natiue Country, which naturally every man doth affect to advance; and these Bathes are the principall lewels of your Country, & able to make it more famous then A3

And feeing I I have negthir withall, tour country hot defining it ths: Meacyn-

I finde my ooth concer-· jalidgai illet Dot graunds of reaming thereloc daily fufthen I have of ignorance, rs, factions, bleto display d for which for want of Bathes doe crein, vnto e Bathes is feets being d neither in edge to re. fified their defire

The Epistle Dedicatory.

then any other parts of this Kingdome, and in aduancing them, to aduance your name to all posterity. Wherefore howfoeuer my felfe deferue but small respect from you, yet I befeech you respect the Bathes of your Country, and me as a welwisher vnto them.

Ibellan

100

tione I non

lolotori galat

commis.

JOEANNE

IOH A

SINO

THO

And as the common opinion of your great worth and abilities, have moued mee to this boldnesse, so the particular fauours of your Noble Lady, and the encouragement of your learned Phyfitian, Master Docter Bafkeruill, mine efpeciall friend, who hath fpurred mee on to this worke, haue remoued out of my minde all suspition of misconstru-Ation. But that as mine intent hath beene meerely the enlarging of the knowledge of those poynts concerning Bathes, and more especially of our Bathes in Sommersetshire; fo you will be pleafed to accept of this publike inuitation by mee to doe your Country good, and your felfe honour, which I with may neuer be difioyned. And to mee it will be no fmall encouragement to deuote my felfe and my best endeauours to your service. So I humbly take leaue this 23. Aprilis 1631.

> Your Lordships most humble Servant, E D. IORDEN.

igdome, and your name to her my felte on, yet I beour Country,

of your great ued mee to ours of your ragement of Docter Balo hath fpurme removed milconftruhath beene nowledge of s, and more merfethire; of this pubur Country hIwifhmay it will be no ny selfe and e. So I humţ,

Seruant, IORDEN. Ibellum istum DE AQVIS MEDICA-TIS, à Doctissimo IORDANO antiquisimo Collega nostro scriptum multiplici eruditione & nouarum subtilitatum varia supellectile refertissimum, legimus, & qui ab omnibus tam Philosophis quam Medicis legatur dignissimum iudicauimus.

IOHANNES ARGENT Collegij Medicorum Londinenfium Presidens.

Sustances Mary 200 1 and the and

The patrie analis departs in parties of ucens

New fame to meliks mernis out in

Dai minge and mich and and model Babalan

IOHANNES GIFFORD. SIMON BASKERVILLE. THOMAS RIDGELEY.

In laudem operis.

Parue alacri passu liber, Liber, ibis in orbem; Dentesque spernes liuidos.
Authores pandit, sua dat Iordenus, & vsu Quasita multo protulit.
Aëra qui totus, Flammas meditatur, & vndas, Terram, metalla discutit.
Quicquid in his veteres, docuit quicquid Nouns Author, Celerinotauit pollice.
At sua dum exponit, lucem dat, operta recludit, Pennâque fertur liberâ.
Perge liber: gratus gratum volueris in Euum Lympha calentes dum fluent. Ed. Lapworth, M. D.

In laudem Authoris:

N ^pmine diuino Iordan medicabile flumen Dicitur, è gelido licèt illud frigore conftet : Iu Iordane decus medicorum, candide Doctor, Lumine diuino gnarus discernere causas Agris corporibus nôsti depellere morbos; Intima seclusa penetrâsti viscera terra, Thermarum vires aperis, reserasque metalla : De gremio Telluris aquas manare fluentes Quaratione doces, nobis priùs abdita pandis Scrutando Physices arcana indagine mira, Nec caperis famâ, nec inani laudis amore, Vt patria prosis, dignar u promere lucem: Qui memorauerant, vel qui modò Balnea tractant, Non sunt te meliùs meriti, vel iudice Momo. Io. Dauntesey.

Explication of this Books. mong the Row Turkes, Ofn effectued by O



OF NATVRALL BATHES, AND MINERALL WATERS.

CAP. I.

Explication of the word Bathe. The scope and argument of this Booke. The ancient vse and esteeme of Bathes among the Romans. The moderne vse of them among the Turkes. Of medicinable Bathes, and mineral Waters. How esteemed by Greekes, Latines, Arabians, & other nations.



What's

献,

17

M.D.

nfiet :

47,

4:

ruitest,

a. nefey.

ans Anthor.

HE word Bathe or Balneum is of larger extent then I purpole to difcourfe of : for it being the name of a forme of remedie applied to the body, it may be framed either out of liquid things, or folid fubftances, or vapours.

I

Liquid Substances are Water, Milke, Must, Wine, B Oyle:

Of naturall Bathes,

Oyle: folid substances are Sand, Salt, pressed Grapes, Corne, &c. vapours are Stuffes and hot houses.

My intent is onely to treate of waters, and principally of those which be called Minerall, whether they bee vied in Bath or in Potion, &c.

These kinde of watrie Bathes haue beene in vie from all antiquity, and held in great effceme. Among the ancient Romans there were no Buildings more magnificent then their Bathes, whereof there are reported to haue beene in Rome, 856. The chiefest of these were the Anthonin, and Dioclefian Bathes; the walles whereof were of admirable height, with an infinite number of marble Pillars, crected for oftentation, and not to fupport any thing, 1000 Seates to fit in; Their Caldaria, Lepidaria, Frigidaria, most fumptuous and stately : the whole fabricke fo large and spacious, as they refembled rather Gities then Houfes. And fo it might well be, when as there were imployed for the building of the Dioclefian Bathes, as Baccius faith, 4000.men, but Salmuth laith, 14000. for fome yeares together. They were placed where now the Church of Saint Angelo flands. The Turkes at this day retaine that ancient cuftome of the Romans, and are in nothing more profuse, then in their Temples and Bathes, which are like vnto great Pallaces, and in euery Citie very frequent: And yet both the Romans and the Turkes vied those Bathes onely for pleasure, and delicacy, and cleanlinesse : the Romansgoing barelegged, and their waies dufty, had need of often walhing: and the Turkes lying in their cloathes, fubica to Lice and wormes, if it were not for their often bathing.

Now if those Nations would beftow fo much vpon their Bathes of delicacie and pleasure, which were onely of pure water; wee have much more reason to adorne

our

out mineral Ba

alfo meticinalla

confilingof w

ny handred ye

berecouered ...

and adorne th

as they migh

fuch as nette

Fortheren

more thefil, a

ble (man one

ninkie) then

The naturea

dilocutt, 25 0

then, holding

they indged

from God, o

whence, both

dled, by light

valderinder

ued, which a

beene alcrib

the opinion

BITIME SEDO

gin out of A

which both

Masiltants

then, the ot

open the st

their former

Inceder

With Was

the Pooleo

Nonnut

Pancirollusde deperditis. 2

Bellonins obfermat. 120, 3. sap: 34.

refied Grapes, obles. and principalaher they bee

the in vie from mongth; annore magnifireported to of these were Walles where. nite number of nd not to hop-KIT Caldaria, d flately : the sthey relem.) it might well building of the men, but Salher. They were Angelo Bands, ent cutiome of nofale, then in like vnto great tot: And yet Bathesoneeffe: the Rooffy, had need their cloathes, pt for their of-

6 much vpon ich were onely afon to adome JUO

our minerall Bathes; which (befides the former vfes) are alfo medicinalland very foueraigne for many difeafes, confifting of wholefome minerals, and approued for many hundred yeares, of many who could not otherwife berecouered. At the least wife if wee doe not beautifie and adorne them, yet we fhould fo accommodate them, as they might ferue for the vtmoft extent of benefit to fuch as neede them.

For there is nothing in our profession of Physicke more vlefull, nor in the workes of nature more admirable, (man onely excepted, which Place cals the great miracle) then naturall Bathes, and minerall Waters. The nature and caufes whereof haue beene fo hard to discouer, as our ancient Authors have written little of them, holding them to be facred or holy, either for that they judged them to have their vertue immediately from God, or at least from the celestiall Bodies; from whence, both their actuall heate was thought to be kindled, by lightnings or fuch like impreffions, and other admirable vertues, and sometimes contrary effects deriued, which appeare in them: Alfo divers miracles have beene afcribed vnto thofe naturall Bathes, to confirme the opinion of a supernaturall power in them, as Guay- Cap 2. nerius reports of the Bathes of Aque in Italy: and Lan. Epift. 53. lib. 2. gius out of Athenaus, concerning the Bathes of Edep fus, which both loft their vertue for a time. The one by the Magistrates prohibiting poore discased people to vie them, the other by impoling a taxation vpon them: but vpon the reformation of those abuses, were reftored to their former vertues againe.

I neede not herein auerring the opinion of Diuinitie which was held to be in Bathes, make any mention of the Poole of Bethefda, written of by Saint John, and Nonnus the Poetinor of the river Iordan, which cured Naman Bz

3

Ofnaturall Bathes,

bians filecender

cen, Rhofe, St

force fmall me

Satandnitro

worth toward

them. It is his

sealon of th

them, or that

Batinkertin

(from moon)

Bathesprocee

ofthemboth

mais and mig

and obleruati

bowels of the

afterwards p

strayned to

Ancients cou there will be

fals out in th

Andalehous

Solinander,1

which was t

med many

they have h

foure, contro

in the difco

worths, 25

which elle]

knowledge

in the adua

名歌版面

hildring con

maybefut

Naman the Affyrian of his Leprofie being indeede true miracles, and done by a fupernaturall power : yet it is likely that those and fuch like examples bred in the mindes of men a reuerend and duine opinion of all Bathes: especially where they faw fuch strange effects as they could not well reduce to naturall causes.

And this hath beene the caufe that in old time thefe minerall fountaines haue beene confectated vnto certaine dieties: as Hamon in Libya, vnto Iupiter : Thermopyla, vnto Hercules, by Lallas among the Troglodits, another to the Sun, &c. And at this day we have divers Bathes which carry the names of Sunne, Moone, and Saints: and many Townes and Cities named from the Bathes in them: as Therma in Macedonia & Sicily, Ther. midea in Rhodes, Aque in Italy, Aquifgran in Germany, Baden in Heluetia: and our ancient Citic of Bathe in Sommerfetshire, in honour whereof I haucespecially vndertaken this labour, and I perfwade my felfe, that among the infinite number of Bathes and minerall waters which are in Europe, there are none of more vniuerfall vfe for curing of difeafes, nor any more commodious for entertainement of ficke perfons, then thefeare.

Befides this facred conceit of Bathes, where with in ancient times, the mindes of men were poffeft, we may adde this, that the nature of Minerals was not fo well difcouered by them, as it hath beene fince : and therefore wee finde very little written of this argument, cither in Ariftotle or H ppecrates, or in Galen, who wrote most copiously in all other points of Physicke, yet concerning this hath little; and neuer gaue any of these wa-

ters to drinke inwardly, although hee acknowledgeth

that they were in vie: and for outward vies, held them

De tuenda famil. lib.4.cap.4.

> all to be potentially hot. After these Grecians, the ancient Latines and Arabians

g indeede true wer: yet it is is bred in the opinion of all range effects as afes,

old time thefe ated vnto ceriter : Therma. C. Trogladits, ve haue divers Moone, and uned from the X Sicily, Ther. ran in Germaatic of Bathe in haucelpecially ly felle, that amineral waof more values. ve commodious theleares wherewith in polieit, we may as not lo well t: and thereargument, ciwho wrote licke, yet cony of these wa.

acknowledgeth ices held them

incs and Ana. bians bians fucceeded : Pling, Celfus, Seneca, Lucretins, Auicen, Rhafis, Seraphio, Auerrhoes, in whom wee finde fome fmall mention of naturall Bathes, and fome vfe of Salt and nitrous, and Aluminous waters, but nothing of worth towards the discouerie of the naturall causes of them. It is likely they did paffe it ouer flightly, either by reafon of the difficulty in fearching out the caufes of them, or that they iudged them meerely metaphyficall. But in later times the nature and generation of Minerals (from whom the Bathes proceede, and from whence the Bathes proceede, and from whence the whole doctrine of them both for their qualities, and differences, originals and vfe, must be derived) being better looked into, and observations taken from such as daily labour in the bowels of the earth, for the fearch of Mines, or fuch as afterwards prepare them for our neceffarie vles; we have attayned to better knowledge in this kinde, then the Ancients could have, although in all new difcoueries there will be defects for fucceeding ages to fupply, fo it fals out in this: Dies Diem docet: Alpham Beta corrigit. Andalthough Agricola, Fullopius, Baccius, Mathefius, Solinander, Libanius, &c. haue added much vnto that which was formerly knowne in this point, and reformed many errors and miftakings in former writers: yet they have left many things imperfect, doubtfull, obfcure, controuerted, and perhaps falfe, as may appeare in the difcourfe following. I doe reuerence all their worths, as from whom I have learned many things which elfe I could hardly haue attained vnto; and I acknowledge them to have beene excellent inftruments for the aduancement of learning : yet I hope it may bee as free for me without imputation of arrogancie to publifh my conceits herein, as it hath beene for them, or may be for any other: Hanc veniam petimu fque damufque B3

Of natural Bathes,

gue vicifim. My end and ftudie is the common good, and the bettering of this knowledge: and if I shall bring any further light to increase that, I shall be glad : otherwise my intent being to search out the truth, and not to contradict others, it will or ought to be a sufficient protection for mee, wherefore I come to discourse of Minerall waters.

CAP. 2.

Definition of Minerall waters. The nature whereof cannot be wnderstood, except first confideration be had concerning simple water. Of which in this Chapter are showed the qualities and wse.

Libauius de iudicio aquarum miner. cap. 1.

6

Inerall waters are fuch, as befides their owne fimple nature, have received and imbibed fome other qualitie or fubftance from Subterraneall Mynes. I fay, besides their owne nature, because they retaine still their liquidneffe and cold, and moyfture, although for a time they may be actually hot from an externall impreffion of heate, which being gone, they returne to their former cold againe. I fay imbybed, to diftinguish them , from confuled waters : as earth may bee confuled with water, but not imbybed, and will finke to the bottome againe: whereas fuch things as are imbybed, are fo mixed with the water, as it retaines them, and is vnited with it: being either Spirits, or diffoluble Iuyces, or tinctures; I fay from Subterrancall mynes, to diffinguilh them. from animall or vegetable substances, as infusions or decoctions of hearbs, flefh, &c.

Seeing then that the Bafis of these Bathes or minerall fountaines, is water, we must first confider the nature of fimple water, and from thence wee shall better iudge of Minerall Mineral Wate By Imple wa ter, for that is no but I meane for admixture, which colour, or fime qualitie, which by the effects, per colour and cold, and moyf or my redown

Coldand in any other L being heated b his cold natur moned. And most cold an the reason the morecold, be weter, and to finiteholds t which tarefie then water (t is of neither ther doth hee of his tenuity. for moyilture, and water mo month. Arifle fure in Ayr within his bo centes from a minated by (drynelie doi

Minerall Waters and their differences.

By fimple water I doe not meane the Element of W2- Bactius lib.1. ter, for that is no where to be found among mixt bodies, cap.6. but I meane fuch water as is free from any heterogeneall cap. 3. admixture, which may alter either the touch or taffe, or colour, or fmell, or weight, or confiftence, or any other qualitie, which may be difference either by the fenfes, or by the effects. This water therefore must have his proper colour and tafte, without fauour, or fmell, thin, light, cold, and moyft; if any of these properties be wanting, or any redownd, it is mixed and infected.

Cold and moysture doc abound in water more then solinander lib 1. in any other Element. For cold appeares by this, that cap.3. being heated by any externall caufe, it foone returnes to his cold nature againe, when the caufe of the heate is remoued. And whereas Ayre is held by the Stoicks to be gueft nat.2. most cold, and confirmed by Seneca, and Libanius, yet Libau.protech. the reason they give for it, doth prove water to bee cap. 20. more cold, because they make the matter of ayre to bee water, and to have his coldneffe from thence. But Ari- Mettor. 4. stotle holds the ayre to be hot from the efficient caufe which rarefied it, being of more validitie to make it hot, then water (the materiall caule) to make it cold. Galen De ofu partium is of neither fide, for he doth not judge it to be hot, nei- 46.8.60 p.3. ther doth he cuer pronounce it to be cold: but by reafon of his tenuity, apt to be altered either by heat or cold. As De ortu & inter for moyfure, Ariftotle holds the Ayre to be moft moift, 4. cap. 1 & 4. and water most cold. Galen holds Water to bee most Galde fimpl. moyft. Aristotles reason for the predominance of moy- med.faclib.12 cap.8. Item de fture in Ayre, is, becaufe it is most hardly contained Elemention. within his bounds : but the termination of things, proceedes from their oppolite qualities, as moy fture is terminated by dryneffe, and dryneffe by moyfture: and dryneffe doth as eafily terminate moyfture, as moyfture doth

if I Ihall bring e glad : other. th, and not to alufficient procourle of Mine-

ommon good,

rembereafcanion behad coniapter areform.

their owne fimbed fone other I Mynes. I fay, ey retaine fiill e, although for a enternall imprefeturne to their iftinguift them to the bottome ed, are for mixlis vnited with es, or tin flures; finguilh them nfulions or de-

hes or minerall er the nature of better indge of Minerall

Of natural Bathes,

doth terminate drynesse. And this difficulty of termina tion in Ayre, may more properly bee afcribed to his thinneffe and tenuity of parts, then to his moyfture. For dry exhalations will extend themselues as well as moyft vapours; and as it is denfity that compacts, fo it is rarity that extends. Fire it felfe is hardly bounded, and yet, not moyft. Those that would reconcile these differences, doc alledge that Galen speakes as a Physitian, and meant that water was hamidisimum medicamentum : Aristotle as a Philosopher meant it to be bumidisfimum elementum. But this reconciliation giues little fatisfaction. For how could water be humidisimum medicamentum, if it were not humidissimum elementum ? Welpeake of the proper operation of water according to his naturall qualitic, and not as it may worke by accident. Thinneffe and leuitic are two other qualities of De morbis popu. fimple water, which Hippocrates commends, and addes lardib.2. fift.2. this experiment in another place, that it is quickly hot, and quickly cold. Galen addes another experiment in the quicke boyling of Peafen or Beanes. And it is requifite that water should have these qualities, in regard of the manifold and neceffarie vies of it, both for Man and Beaft, and Plants: infomuch, as there is no living for any Bruerinus dere creature, where there is no water. It was our first drinke to quench our thirst, and to distribute our nourishment as a vehiculum, which it doth by his tenuitie; and after the inuention of Wine, it was mixed therewith, as Virgil faith of Bacchus, poculaque inuentis Acheloia miscuit whis, where, by Acheloia, he meanes not onely the water of the River Achelous in Etolia, but all other waters, as Macrobius proues out of Aristophanes and Ephorus. And fince the planting of Vineyards, feeing all Countries could not beare Grapes, Bacchus alfo taught the world to make vinum e frugibus with water, as Diodorus Siculus

Valesius cont. lib. I. cap 2.

8

De aere, aquie & locis.

cibarialib.16. 6ap.7 .

Saturnal.lib.s. sap.18

Sicular reports, Zitham and C Turkstheir C which are extr muitic of wa Brothes, Syrt afit menitru ments and not ties, and there befides the m which [will note of pure w to diffinguilly relate the m brends in the ly diferned t doe very littl waters, if the corporall feb heatinelic Wi to hant gre may be difee convie of the dram keller therefore th held it in gri Coalpis. Th water should net need to f the lenfes w attolich; or untons, da

Siculus reports, from whence the Egyptians had their Rerum anti-Zithum and Curmi, the Spaniards their Cerea, the quar. lib.4. 6,20 Turkes their Cowfet, and wee our Ale and Beere; all which are extracted out of Corne, by the purcheffe and tenuitie of water. By meanes whereof wee haue our Brothes, Syrupes, Apozemes, &c. extracted with it, as a fit menstruum to receive the faculties of all medicaments and nourifhments, especially the second qualities, and therefore it was anciently called Panspermia : befides the manifold vies in walhing, dying, &c. of which I will not discourse farther. Leuitie is another note of pure water, alledged by many, and ferues well to diftinguish it from many mixed waters, whether wee respect the weight of it, or the molestation which it breedes in the bowels. This difference of weight is hard- Baccinstib. I & y ly difcerned by ballance, both becaufe fimple waters doe very little differ in this point, and also many mixt waters, if they be onely infected with Spirits, and not corporall substances, retaine the same proportion of heauineffe with simple water: and also because it is hard to have great ballances fo exact, as a fmall difference may be difcerned by them, yet Agricola reports that a De nat. eor. qua cotyle of the water of Pyrene and Euleus, did weigh a eff. e terratio. 15 dram leffe then the water of Euphrates, or Tigris, and fap.15. therefore the Kings of Persia vsed to drinke of it, and held it in great account, as also the water of the River Iangius Epif. Coaspis. Thus much for the qualities which simple lib.1. Epist.31. water should have; for fuch as it should not have, I shall not need to spend time in discourse, being either fuch as the fenses will discouer, if it bee in tafte, colour, smell, ortouch; or the effects, if it be purgatiue, vomitory, venomous, oc.

CAR.

9

ity of terminal foribed to his his moyfture. TUES as well as compacts, fo it y bounded, and cile thelediffeis a Phylitize medicamen. to be bamidif. gues little fatidi and men m elementam? ater according workeby accir. her qualities of inds, and addes is quickly hot, experiment in Anditisrequies, in regard of th for Man and o liming for any s our hift drinke ur nourilhment nitie; and after tewith, as Vircheloia mi fcuit nely the water ther waters, as dEpharm. And all Countries ight the world , as Diederas Sicalus

Of natural Bathes,

we much school ter this way. Bo

the ann with

and for perpet. Janua faith th

foot into the

into the bown

be imployed

uers into the S

yeelded to th

loow, and hail

ane perpetus

my countries.

foare, and yet

ale his opinion

Aupours, from

by our count

Endeoutlan

water for the

earth they m

and Rivers,

care onely f

cardo, which

water, whe

plants and t

nibment, W

and for Subt

cente withou

obwatt with

leite is const

matable and

states fire s

ing heperion

cold, milt

CAP. 3. Of the three originals of simple waters.

Baccius lib. 1. cap.3.4, Agric: de ortu & caufis fubterr.lib.1. cap.1.2.3.4.5. 6.7.8.9. Solinander lib.2. cap.1. & lib.2.3 sap.3.

126 16.1.1.0

io

Now it followeth that we fhew from whence these waters have their originall, which is no other then of the mixt waters, fauing that the mixt waters doe participate with fome minerals which are imbybed in them.

They have three feuerall Originals: the one from moyft vapours congealed by cold in the ayre: the fecond from the earth; the third by percolation from the Sea.

For the first, it is certaine that our Springs and Riuers doe receiue great supply of waters from the Ayre, where vapours being congealed by cold, doe fall downe vpon the earth in raine, or fnow, or haile, whereby the ground is not onely made fertile, but our Springs are reunued, and our Rivers increafed. As wee fee the Rein and Danubius to fwell more in fummer then in winter, becaufe then the fnow which continually lyeth vpon the Alpes, doth melt by the heate of the funne, and fils thole Rivers, which have their Originals from thence vp to the brinkes. Allo we fee daily after much raine, our fmall Lakes and Rivers to be very high. Allo vpon much dryth our Springs faile vs in many places, which vpon. ftore of raine doe fupply vs againe with water. And this is the caufe that in most parts of Africa, neere the Equinoctiall, where it raines little, they have little water; and many times in two or three dayes iourney, can hardly finde to quench their thirs and their Gamels. Leo Africanus speakes of an Army wherein were many Camels, which in their marching, comming to a River (perhaps it was but a Brooke) did drinke it dry. So that we

tters,

whence thefe no other then vaters dot parimbybed in

the one from ayre: the feation from the

rings and Ri. rom the Ayre, ,doefall downe is, whereby the it Springs are te fee the Rein then in winter. ally lyth vpon funne, and fils ls from thence much raine,our Ho vpon much s, which vpon ater. And this seere the Equiinle water; and ey, can hardly Samels, Leo A-Fore many Ca. ing to a Riner e it dry. Sonhat We

II we must acknowledge that the earth receives much water this way. But how this should ferue the bowels of the earth with fufficiencie for the generations there, and for perpetuall fprings, is very doubtfull; whereas Seneca faith that these waters doe not pierce aboue ten Quefi natur. foot into the earth : neither if there were paffages for it "b.3. cap.7. into the bowels of the earth, can the hundred part of it be imployed this way, but is rudely conueyed by Riuers into the Sea. Wherefore although much water bee yeelded to the superficies of the earth by raine, and Inow, and haile from the ayre, yet not fufficient to maintaine perpetuall Springs; feeing many times, and in many countries these aeriall supplies are wanting, or very fpare, and yet the Springs the fame. Wherefore Arifto- 2 Meteorol. tle his opinion, which attributes all to aeriall water and & 1'3. vapours, from thence, is iuftly reiected by Agricola, and by our country-man Mafter Lydiat. So that wee must fis fubt lib 1.6 6; finde out some other Originals, or else wee shall want De orig. font. water for the manifold vies the earth hath of it: from the cap.1. earth they make another originall of perpetuall Springs and Rivers, feeing the first feemes to be ordained by nature onely for the irrigation of the fuperficies of the earth, which elfe would be in most places destitute of water, where Springs are not, and fo would be barren, plants and trees wanting due moyfture for their nourishment. Wherefore for the perpetuitie of fountaines, and for Subterraneall generations, which cannot proceede without water, they have imagined a generation of water within the earth; fome holding that the earth it felfe is conuerted into water, as elements are held to be mutable and conuertable, the one into the other. But neither fire will be conuerted into any other element, being fuperiour vnto the reft, and not to be maftered by cold, which onely must be the agent of the conucrsion of C2

Ofnaturall Bathes,

Arißotl.4.meteor: cap.10.Gr ultimo.

TZ

Valefius de fasxa philosoph, pasfum. of it by condenfation : neither will earth be conuerted into water, for either heate or cold muft conuertit. Heate cannot doe it, although it rarifie and attenuate, both for that it confumes moy fture, and allo becaufe water is cold, which it fhould not be, if it were made by heat; for cuery naturall Agent workes to that end that it may make the Patient like it felfe: and heate may conuert carth into fume and dry exhalations, but not into water, for all water which is not eternall, is from cold; likewife cold cannot conuert carth into water, becaule cold doth congeale, condenfe, and congregate, and indurate, and not diffolue and attenuate, &c. as wee feein Amber and Gummes. Others will have great receptacles of ayre within the earth, which flying vp and downe, is congealed by the coldneffe of Rockes into. water, to supply all wants. Others imagine huge Lakes and Cifternes, primarilie framd in the earth, and fupplied with water, either from vapour or ayre, or from the fea; which water either by agitation, by winds, or by impulsion from the fea, or by compression of Rocks, is cleuated to the Superficies of the earth: or els vapours from thence, made by attenuation, either from the Sun and Starres, or from Subterraneall fire kindled vpon Sulpher and Bitumen; which vapours afcending to the tops of mountaines, are there congealed into water by the coldneffe of the Rockes; where there must be other Cefternes or Caftles in the ayre to feede the inferiour Springs. Thefe and fuch like deuices are produced for the maintaining of theil Originall; which as they are all infufficient to afford fuch a proportion of water as is requifite, fo most of them are fo improbable, and full of defperate difficultics, as I am vnwilling to fpend time in the rehearing of them, or their Authors, much more wnwilling in confuting of them, to trouble my felfe, and offend offend my Rea fire which hath mindes I shall the calles of th nginall is from andwhereun which fals fro carth, doe pri for feare of wa to admitof all store the Sea to the heads ferve for low ber I have lee colated from make no dol ther Springs farre scattote ther thall we concetts of Suction, A facred Cano the Sea, &c. realon for of Foundain beene dilcou ned will not Myconc calia, that w the other vie ther by his kel wi the entry of firme to no

be conjugated

nuertit. Heave

mate, both for

caule water is

de by hear; for

id that it may

may connert

not into wa-

is from cold;

vater, becaule

gate, and indu-

25 wee feein

great secepta.

ying vp and

of Rockes into

int mge Lakes

earth, and fup.

ayre, or from

, by winds, or

ethon of Rocks,

t: or els vapours

r from the Sun

e kindled vpon

alcanding to the

into water by

mult be other

e the inferiour

e produced for

hastheyareall

water as is re-

able, and full of

to spend time

rs,much more

ble my felfe, and

offend

12

offend my Reader, onely the poynt of Subterraneall fire which hath taken deepeft impression in most mens mindes, I shall speake of hereafter, when I come to shew the caules of the actuall heate of Springs. The third Originall is from the Sea, a fufficient ftorchoulefor all vies, and whereunto the other two may be referred. For that which fals from the ayre, and that which is bred in the earth, doe proceed principally from the Sca. Agricola De orth & canfor feare of wanting water for his Springs, is contented fis fubrer. lib. 1. to admit of all these Originals, although he relyeth leaft vpon the Sea, becaufe he knowes not how to bring it vp to the heads of his fountaines, but is contented it should ferue for lower places neare the Sea cofte. As I remember I haue seene in Zeland at Westcapell, fresh Springs colated from the Sea, through bankes of fand. But I make no doubt but that the Sea water may ferue all other Springs and Rivers whatfoeuer, although both farre remote from the Sea, and high in fituation. Neither shall we neede to flye for helpe to those monstrous conceits of Agitation, Compulsion, Compression, Suction, Attraction by the Sunne, &c. But holding the facred Canon of the Scriptures, that all Rivers are from Ecclefiafiess, the Sea, &c. I perfwade my felfe, that there is a naturall reason for the elevating of these waters vnto the heads of Fountaines and Rivers, although it hath not yet beene discouered. For those opinions formerly mentioned will not hold water.

My conceit therefore is this, that as we fee in Siphanculis, that water being put in at one end, will rife vp in the other pipe, as high as the leuell of the water (whether by his waight, or by the correspondence with his leuell, I will not dispute) fo it may be in the bowels of the earth; confidering that the passages there are more firme to maintaine the continuitie of the water with the C 2 Sea,

C 3

Of naturall Bathes,

14

Sea, then any leaden pipes can be, being compassed on euery fide with many Rockes: as we fee in Venis, fibris & commiffuris faxorum. Now although perhaps this water enters into the earth very deepe, yet the levell of it must answer to the superficies of the Sea, which is likely to be as high as the superficies of the Land, feeing the natural place of waters is aboue the earth. And although neere the Coafts it bee depreffed and lower then the Shoare, yet there is reafon for that, becaufe it is terminated by the dry and folid body of the earth : as we fee in a Cup or Bowle of water filled to the top, we may put in a great bulke of filuer in pieces, and yet it will not run. ouer, but be heightened aboue the brims of the bowle. If this be cuident in fo fmall a proportion, we may imagine it to bee much more in the vast Ocean: and our Springs being commonly at the foot of hils, may well be inferiour to the Globe of the Sea, if any bee higher, they may perhaps be fed from raine and fnow falling vpon the mountaines. But if Tosephus a Costa, his affertion bee true, that the Sea towards the Equinoctiall, is higher then towards the Poles, then the levell of the Sea may bee much higher then the top of our highest hils, but this is a doubtfull affertion : yet I dare beleeue that if it were poffible to immure a Spring without admiffion of ayre, which might breake the continuitie with the Sea, our Springs might be raifed much higher. At Saint Winifrids Well in Flintshire, though there be no high land neere it, yet the Springs rife with fuch a violence, and to plentifully, that within a ftones caft, it driues a Mill. It is likely that this Spring might be raifed much higher. And whereas we fee that Rivers doe run downewards to the Sca per decline, it doth not proue the Sea to be lower then the Land, but onely neere the fhore where it is terminated, and in lieu of this it hath. fcope

d front affigued is as the Land if it taken of the Gi theops of the Sta, and not f This concein therefore had ent friend, for was well find ford, he was d Likh to fir vy better then has d, fanger via

> Dinifan y Their kindes ther it gine at the reft in th

This mu which m ed and infe fpeakes of an rule to differ diss. And the definition of New I co part of the ten Subter The M pound, Imp

terraneal)

compalied on

Venius fibris (5

thaps this wa-

the leucil of it

which is likely

and, feeing the

And although

ower then the

le it is termina-

1: as we feein

we may put

tu will bot run

of the bowle, we may imacean: and our Ahils, may well

my bee higher,

id laow falling

Colla, his allerti-Equinoctiall, is

he levell of the

of our highest

t I dare beleeve

ing without ad-

ontinuitie with

tch higher. At

igh there be no

with fuch a vi-

ftones calt, it

might be raifed

Rivers doc run

doth not prote

mely neere the

of this it both

fcope

15

fcope affigned it to fill vp the Globe, and fo to be as high as the Land, if not higher. For if a measure should bee taken of the Globe of the earth, it muss be taken from the tops of the Mountaines, and from the highest of the Sea, and not from the Vallies, nor from the Sea-coasts. This conceit of mine I was fearefull to publish, and therefore had written vnto Master Brigges, mine ancient friend, for his aduice in it, being a point wherein he was well studied: but before my Letter came to Oxford, he was dead. But now I have aduentured to publish it, to ftir vp others to fearch out the causes hereof, better then hath yet beene discourred. Exors ipse second di, funger vice cotis.

CAP. 4.

Dinision of Minerall Waters. Minerals described. Their kindes recited. Of earth, simple and mixed. Whether it give any medicinable qualitie to water. And so of the rest in the following Chapters.

Thus much of fimple waters, and their originals, which may ferue as *Polycletus* his rule to indge mixed and infected waters by: as *Galen* in many places speakes of an exact and sound conflictution of body, as a rule to different differenced and disproportionated bodies. And thus much in explication of the *Genus*, in the definition of Minerall waters.

Now I come to Minerall Waters, and to the other part of the definition which wee call difference, &c. from Subterraneall Mynes by Imbibition.

These Minerall waters are either fimple or compound; fimple, which partake but with some one Subterraneall Minerall; compound, which partake with mos

Of naturall Bathes,

16

moe then one. And these waters partake with Minerals, either as they are confused with them, or as they are perfectly mixed. Also these minerall waters, whether simple or compound, are actually either hot or cold; the reason whereof must proceede from some Subterraneall cause, as shall be shewed hereaster. the earth, is not

effentially, bot o

calledan inconce

dance from it

mojilture, and

dift: yet to as

qualitie which

neitheralimpi

in operation

animale stat

transmood into

Narfe to all to

isdyandcold

commonly it i minure, Min

loof the reit.

of no vie in P

perals, it mak

of those Min

Fallers earth :

like Soape.If

more defices

men, fattic at

We have di

Mount Othor

of Bole. The

of Sant Peter

with forme of

indeed of acc

comine Bas

Info with D

Witters, which

izend any ti

Simplecan

Simplecan

Wherefore wee must first know the nature of these Subterraneall Minerals, and their generation, from whence Minerall waters receive their difference, from common fimple water, before wee can judge of the nature and qualitie of them, either Actuall or Potentiall.

By Minerals, we vnderstand all Inanimat perfect bodies, bred in Mynes within the bowels of the earth. I dare not vndertake to muster these in due order by Dicotomyes, seeing neither Agricola nor Fullopius, nor Libanius, nor any other that I know, have exactly done it, nor satisfied either others or themselues in it: and seeing there are divers Minerals lately discovered, and perhaps more may bee hereaster, which have not beene knowne in former times, and therefore not mentioned; as Calaem in the East Indics, Rusma and serva ghetta in Turkey, &c. Wherefore I will make bold to reckon them vp as they come to hand in feauen rankes.

The first shall be Earth.

Earth whether it bebred ab exhalatione ficea refrigerata, or ex missi per pusredinem in fimum couerfis, or ex lapidibus fole ant calore coët is & deinde aqua folutis, &c. it is all inconcrete. As a little water gleweth it together in Lutam, fo a great deale diffolues it. But this is no proper diffolution, but onely a difioyning of parts by Imbybing the moyfure which conioyned them, into a greater proportion of water; for waters doe naturally runne together, like drops of quickfiluer, or melted mettall: Wherefore feeing the moyfure which is in the

and the state of the state of the

te with Minem, or as they raters, whether tot or cold; the sobterraneall

nature of these cration, from ifference, from dge of the na. a Potentiall. nat perfect boof the earth. I due order by Fallspins, nor meenafily done ucs in it and leesered, and pernaue not beene not mentioned: d terra ghetta in bold to reckon rankes.

e ficca refrigeraoverfit, or ex lagua folutis, dre. veth it together ut this is no proof parts by Imed them, into a ers doe naturally fluer, or melted ure which is in the the earth, is not naturall, bur aduentitious, not vnited effentially, but onely mixed accidentally, it may well be called an *inconcrete* fubftance, whofe moyflure is eafily drawne from it, being readie to vnite it felfe with other moyflure, and leaue his old body as it found it, that is, duft: yet fo as that water retaines with it fome tafte or Agrie.de need qualitie which it received from the earth. This duft is forfil. *Ub*, 12 neither a fimple body, as Elements are, nor permanent in one and the fame kinde : but as it participates with animales vegetables, and minerals, fo it is apt to bee tranfmuted into any of them, being both Mother and Nurfe to all terrefiriall bodies.

17

Simple earth, if it be not mixed with other fubftances, is dry and cold, and Aftringent. But if it bee mixed, as commonly it is, it altereth his qualitie according to the mixture. Mine intent is to write of it as it is fimple, and fo of the reft.

Simple carth yeelds but a muddie water of it felfe, and of no vie in Phylicke, but if it be mixed with other Minerals, it makes the water to participate with the quality of those Minerals also. As if it be mixed with niter, as in Fullers earth and Marle, it makes the water abftergent like Soape.If with Allum or Coppereffe, aftringent and more deficcatiue, as in all forts of Boles. If with Bitu . men, fattie and Vnctious, as in Turfe and Peate, &c. We have divers examples of all forts. The Bath of Baccius lib.5. Mount Othon in Italy is full of clay, which is a kinde cap 1. of Bole. The Bath Caldaria, full of Ocre. The Bath of Saint Peter full of a yellow earth, tincted belike with fome other Minerals. Wherefore thefe are to bee judged of according to the feuerall Minerals which they containe. But seeing earth it selfe makes little impreffion into water, neither doe wee make any Phyficall vfe of waters, which containe nothing but earth, I neede not CAP. fpend any timeabout them. D
CAP. 5. Of Stone.

De manalis cop. 6. 18

He fecond shall be Stone. Stone is another Minerall fubftance, concrete and more heavie then earth, and our Minerall men confound themselues much in the definition of it. Wherefore Fallopius implores the helpe of Marcus Antonius Iunica about it, as one of the most difficult points in Philosophie: but in the end, defines it by his want of diffolution, either by heate or moyfture. And whereas it is manifest that fome Stones will melt, he imputes it to the admixture of fome mettall, among which he receiueth glaffe. Others define it by his hardneffe, wherein commonly it goeth beyond other Minerals. But you shall have fome stones foster then fome of thole, and therefore the definition is not good. Others by this, that being broken or calcind, they will not bee confolidated againe into their former confiftence or Ihape. But for breaking, the reason of that, is want offufion; for without fusion or ignition, which is a kinde or degree of fusion; Mettals also being broken, will not be confolidated into the fame Malle againe. And there is no more difference in nature or effence, betweene a whole ftone and a broken, then there is betweene a maffe of Mettall, and the powder or filings of the fame: As for calcination, other minerals may bee fo far calcind, and brought to a Crocus by fire, as they will be irreducible, therefore this is not p oper to ftone. Wherefore I am of Fallopius his opinion in this point, and the rather becaufe otherwife there would leeme to be a species in nature wanting, if there were not Minerall Species wanting, diffolution by heate or moyfure, as well as there are, having fuch diffolution. And this vacuum which nature

tature abhorres call vacnitie, ben natures power world. For if it Herica nati josethings W 100, 25 S2 15, which will be mult be floor, according to A calida, a male Stones which ay of them ha well as by cold prehend, Dia Latzenliber, ATTANS AT CRAT yetcheleared Allo all pretio they are, the or water : fo their minture. by fire or wat mide Stones i gard of other Metall, the fu Minerals, it wi theinstation ting Niter vpo Niterineybac find that de CALL BUT & C gat's: HS1 am

nature abhorres, is not onely to be vnderftood of a locall vacuitie, but alfo of a want of fuch species as are in natures power to produce, for the ornament of the world. For if it be a naturall paffion to be diffolued, it is likewilea naturall paffion not to bee diffolued : and if fomethings will bee diffolued both by heate and moyfture, as Salts, why fbould there not be other fubftances which will be diffolued by neither of them. And this mult be ftone, for nature affords none other. Moreouer according to Aristosle: Qua concreuerunt a frigido de a calido, a nullo istorum dissoluuntur. Of this kinde are Stones which could neuer attaine to fuch puritie as many of them haue, if they were not congealed by heate as well as by cold. Alfo vnder what species shall we comprehend, Diamonds, Talcum, Magnetis, Glymmer, Katzensilber, pyrimachus, amiantus, alumen plumosum, Jaxum arenarium mortuum, drc. if not among Stones? yet these are confessed to be inuincible by fire or water. Alfo all pretious Stones, the more noble and pretious they are, the more they relift diffolution either by fire or water : for this qualitie sheweth the perfection of their mixture. True it is that fome ftones wilbe diffolued by fire or water, and therefore Pliny and Agricola diuide Stones into fulible and infulible : but this is in regard of other fubftances bred in the ftone, which if it be Metall, the fulion will be Metallin: If Niter or meane Minerals, it will bee vitrificatorie. As Pliny reports of the inuention of Glaffe by certaine Merchants, who melting Niter vpon the fand in Siria, where with clods of Niter they had made a furnace for their necellary vie; found that cleere mettall which we call glaffe, Ecce liquato nitro cum arenis visi sunt riui fluxisse nobilis lignoris:

It Sulphur, as in pyrite, it will likewife melt and strike D 2 fire.

nother Mise-Die then earth, es muchia the ores the helpe ne of the molt nd, defines it or moylture. ones will melt, netrall, among it by his hard. d other Minea then lome of good, Others y will not bee confiltence or at, is want offer ich is a kinde or en, will not be And there is no tweene a whole ene a maile of fame: As for zz calcind, and beirreducible, erefore I am of the rather bea (pecies in ma-Species wans well as there VACARM which STURE 19

fire. And whereas the ftriking of fire out of a flint or pyrits, is held by all men to proceede from the kindling of ayre, by the collifion of two hard fubftances together, they are mistaken. For then Diamonds, Chrystall Glaffe, &c. fhould ftrike fire as well as fints, but it is the Sulpher contained in them: And G. Fabricius in his obferuations, although hee observes not the reason of this fire, yet he confesseth that out of any Pyrites è quo excutitur ignis, etiam excoquitur sulphur. Pliny giues the reason of the name, quia inest ignis illi. The like we obferue in Indian Canes, and fome Woods that are vn&uous, and full of oyle, which will yeeld fire by frication, or collifion, not by kindling the ayre thereby, but the inflamable oyle in them. If other concrete iuyce bee mixed with ftone, as Salt, Allum, Vitrioll, &c. it makes them to relent in water or moyft ayre; and these ftones are neuer good to build withall. But let vs take ftone as part. 2. pag. 205. it is in it felfe, without the admixture of other Minerals, and we shall find it to be indiffoluble and inuincible, either by fire or water. Metallurgians and Refyners may make vie of this for their Shirbs, Tiegles, Hearths, Tefts, &c. Stones are naturally dry and cold, and aftringent like a concrete carth.

Simple Stones which have no other Minerals mixed with them, and are come to their perfection, being indiffoluble, either by fire or water, can yeeld no qualitie or vertue to Bathes, and therefore hee that feekes to draw any vertue from stone into water, doth lapidem laware, that is, labour in vaine. But by reason of admixtures, they may, or whileft they are succe lapidescente. before they are concreted. For if it be certaine that mettals may yeeld vertue to Bathes, being alike indiffoluble by water, there is no reason but Stones also may. Fulloplus is against it in both, but contradicted by Inlins Cafar,

Eraftus difput.

20

of a flipt or py-

he kindlingof

nces together,

ds, Chrystall

nts,but it is the iciss in his ob-

ercalonofthis

tes è quo txculiny gives the

he like weed.

hat are vnchu.

te by frication, acteby, but the

rete myce bee

Loc. it makes

ad these stones

Vstake frome as

other Minerals.

muincible, ei-

Refynersmay

egies, Hearths,

old, and altrin-

Minerals mixed

Aion, being in-

reeld no quali-

that feekes to

doth lapidem

alon of admix.

ca lapidescence,

rtaine that met.

lik indiffoluble

lo may. Falle.

Ated by Inlins

Calar,

Cafar, Claudius, and divers others; yet hee confesseth In ingreffu ad that Balneum montis Grotti, hath Gypfum : and Gefner infirmos p. 373. affirmes the fame of the Baths of Eugesta. Alfo he findes filio pro Petro ramenta marmoris in Balneo Corfena do Agnano, but Picardo. he iudgeth that they receive no qualitie but from the Baccius etyms inyce, and I doubt not but he is in the right. And for succus lapidescens, we have many examples in Agre Pifano & Lucenfi in Italy, in Auernia in France, where this inyce is fo plentifully brought by a cleare Spring, that after it is congealed, the people digge the ftones, and haue made a great bridge of them. Alfo neere Vienna in Sauoy, in a village called Giaret, is a cleare fountaine which turnes to ftones as hard as flints: Pliny makes mention of the like Springs in Eubea, which are hot : and Vitrunius of the like at Hieropolis in Phrygia: Alfo Iosephus a Costa of the like hot Springs in Guaniauilica in Peru, which turnes to stone, whereof they build their houses. Anthonio de Herreza, cap. 20. tels of the fame Spring at Guainia velica, which turnes to ftone as it arifeth, and kils those that drinke of it. Also this Succus lapidescens is observed in the Bathes of Apono, where it is conuerted into ftone vpon the fides of the Bath. Alfo in the Bath of Rancolani, where this iuyce is not confused, but perfectly mixed with the water, & being imby bed by plants, it hardens them like ftone. Bac- Lib. 6.e. 14 cius tels vs of a Caue by Fileg in Tranfiluania, which turnes water into ftone. The like is found at Glainftaynes in Scotland, as Hector Boerius reports. In England alfo we have many fountaines which turne wood into ftone: which must be by reason of this fuccus lapidescens mixed with the water. Corall also being a plant, and nourished with this iuyce, turnes to a ftone: fo doth the feede of Lithospermon or Gromell. Thus much of ftone.

D3

GAP.

21.

CAP. 6.

Of Bitumen. His kindes, qualities. Of Camfor in particular. That Bitumen is predominant in the waters of Bathe.

NExt I come to thole Minerals which we call Bitumina, which are Minerall fubftances that burne and wafte in the fire without metallin fusion, or ingreffion. The greatest affinitie they have, is with Sulphur : but this hath ingreffion into mettall, and Bitumen hath none. Of this kinde fome are folid, and fome liquid. Solid, as Succinum, gagates, ambra, camphora, terra ampelitis, Litbansbrax, fine carbo fosilis, erc. Liquid, as petroleum and naphtha. All these are great fuels to fire, especially those that are liquid, which are thought to draw fire vnto them, if it be within their efflunium: So Pliny reports that Medeaburnt Creufa by anoynting her Garland with Naphtha : and Strabotels how Alexanders Bath-mafter, Athenophanes, had almost burnt Stephanus, a boy in the Bath, by fprinkling Naphtha vpon him, if it had not beene fuddenly quenched. And this is that inyce or thicke water which Plate in Timeo reckonsamong fires, and which the Egyptians vfed in their facrifices, and was hidden by the Iewish Priests ina dry pit for 70. yeares, and afterwards found by Nebemias.

But whereas it is a common received opinion, that fome of these *Bitumina* will burne in water, I cannot beleeue it: although *Plynie* and *Agricola*, and most that have written fiace, out of them doe auerreit, and bring arguments and examples to proue it: For although water were a fewell to fire, as oyle is, yet there can bee no fire without ayre, and water excludes ayre: and so doth

oyle,

oyle, if the fire b

forincied with

to safewell to

on their Sea-ce

is becaule their

makes it to a

the blaff work

barning of a, a

a Values and

when the Bitur

may be a realic

beene calcined

fer, And when

mon, and quer

example of W

fides Bromer

which by real

by the affulion

ble matter; 10

as lotte mag

heth left in I

therebe any B

ny at fuft) al

famed that be

presmitisc

although the

mis to burne a

Adicionatio

is (peat. Wh

tertion which

101,1810,021

fit calor. The they make Wi

22

Machab.2.1.

emfor in par. the maters of

WC Cal Bits-'s that burne on, or ingref. ith Sulphur : Situmen hath neliquid. Soera, terra ama. , Liquid, as reat fuels to h are thought KII Officialism; by anoynting Is how Alexamost burne ling Naphtha eached, Aud Late in Times ptians vied in Icwilh Priefs rds found by

opinion, that r,I cannot beand molt that eit, and bring although waere can beeno e: and fo doth Oyk

22 oyle, if the fire be beneath it, and couered with it. As for their arguments, they fay that Bitumen being befprinckled with water, burnes more, and therefore water is a fewell to it: as we fee that Smiths caft water vpon their Sea-cole in their Forges ; but the realon of this is because their Coale being small like dust, the water makes it to cake and bake together, where otherwife the blaft would blow it away: alfo it hinders the quicke burning of it, and fo makes it continue the longer : fo in a Vulcano after raine, they finde the fire to burne more, when the Bitumen is Imall, and in duft. Although this may be a reason of it, that the Lyme which hath there beene calcined, being by raine diffolued, increaseth the fire. And whereas they fay that water will kindle Bitumen, and quench Sulphur, it is not fo: neither doth their example of Wilde-fire proue it. For in Wild-fire, befides Bitumen and Campher, there is quicke Lyme, which by reason of the sodaine diffolution of his Salt, by the affusion of water, is apt to kindle any combustible matter; not by realon of any Bitumen in the Lyme, as fome imagine, nor of any Empyreuma which the fire hath left in it, as Tracafterins thinks : for, how can De fimpath en there be any Bitumen left in the Lyme (if there were a- antipath cap. 10. ny at first) after calcination : the fire would have confumed that before any thing elfe. And as for any Empyreuma, it is certaine that the more any thing is burnt, although the fire leaue an adultion in it, the leffe apt it is to burne againe, especial y being burnt and calcind ad calcemant cineres, where all the combustible matter. is spent. Wherefore it must needs bee by the violent motion which is in the fuddaine diffolution of the falt in it, as appeares by the crackling it makes : Et ex moth fit calor. The like we observe in Pyrite sterili whereof they make Vitrioll, which being broken and laid vp in

in heapes, and moyfined with water, will gather heat, and kindle any combustible matter put to it. The like alfo we finde in Allum myne, &c. where those minerall iuyces being concrete in the Myne, when they come to fuddaine diffolution doegrow hot, and will kindle fuell. And as for the example of the falt Lake whereof Agricola writes, betweene Strapela and Seburgh, which burnes the filhermens nets if they be put neare the bottome : and of the like Sputa, in Media, mentioned by Strabo, which burnes clothes put into it : I take that to be by reason of the corroliue quality of the falt which frets them, being ftronger neare the bottome; and not from Bitumen, as Agricolathinks. The like I judge of the Lake by Denstadt in Turingia. And it is very probable that falt being heauier then water, wilbe most towards the bottome : as it is reported of the fountaine Achillens in Mileto, whofe water is very fweet and freshaboue, and very fait towards the bottome. So is the water of Agnano in Italy, as M. Sandys reports in his trauels. And the more heavy and terreftriall any falt is, the more corroliue it is : and fo contrariwife, the more corrofiue, the more heavy: Aristotle affirmes the fea water to be more falt at the bottome then aboue: and fo doth Pliny, who likewife makes mention of the Lake Ascanius in Chalcide, whole top is fweet, and bottome nitrous. Baccius writes the like of a Well neare Toletum in Spaine, the water whereof is fweet aboue, and corrofiue beneath: which he judgeth to be from Quick-De Thermis, c. s: filuer. Fullopius is allo of opinion, that Bitumen doth

Denat.cor.q. effu. è terra. 64.6.22.

24

Mettor.2.

Lib 6.4.111

not only burne in water, but is nourifhed by water, becaufeit makes the fire to laft longer. But I haue fhewed the reason of that before. And for the burning in water, he fhould have faid vpon the water; for there it wil burn as long as it fwimmeth; but dip it vnder the water, and it is prefently extinguished. And

And where bleffermory for of fire like mute cop mean nbeleeueit, b for, I am not fon, which G might have be quentin our Ba folgedin the w folgene felfe vp bar it could be led in the wat hybood it wo then within it, port. These tially bot and concerning G ther it be a Ba hot or cold. ofabugetree many wild be there is great dryin the thi in their opinit fitama, Garria the invice of an make two fort of Chyna, For atted with Bin man vs. Butt the spound of poord wight in this Carlies

gather heat,

it. The like

hole mineral

they come to

ill kindle fu-

Lake whereof

ebargh, which

seare the bot-

icntioned by

I take thatto

e lalt which

me; and not

the I indge of

tis very pro-

hibt molt to-

the fountaine

try fweet and

attome, So is

in reports in

terreltriall any

ostrarimile, the

de affirmes che

en above: and

ion of the Lake

and bottome

Il neare Tole.

et aboue, and

efrom Quick-

Bitumen doth

by water, be-

I have the wed

ming in water,

ere it wil burn

the water, and

And

And whereas fome report that Queene Anne of bleffed memory, being in our Kings Bath, there arole a flame of fire like a candle from the bottome of the Bath to the top neare vnto her, they must give mee leave not to beleeueit, but rather to thinke they were miltaken : for, I am not bound to beleeue any thing against reafon, which God hath giuen mee to bee my guide. It might have beene fome bubble of winde which is frequent in our Bathes, or fome Bitumious matter not diffolued in the water did arife, and being at the top, diffolue it felfe vpon the furface in the forme of a circle: but it could not be kindled. And if it might bee kindled in the water (which were impoffible) yet in all likelyhood it would have burnt better aboue the water then within it, and not be prefently extinct, as they report. Thele Bitumiana (excepting Camfer) are potentially hot and dry in the fecond or third degree ; but concerning Camfer there are two doubts. First, whether it be a Bitumen or a Gum. Secondly, whether it be hot or cold. The Arabians affirme it to bee the Gum serapio de famp. of a huge tree with white leaves, vnder whole fhadow med. 6.344many wild beafts may lie : and that after earthquakes Aviunib I: there is great plenty found; that it is in quality cold and 1.2. traff. 2. cap. dry in the third degree; fome late writers follow them 133. Jum de in their opinion of a Gum, as Mathiolus, Amatus Lu- med. cordial. track.z.cap. 3. fitanus, Garrius ab borto, &c. Platearius holds it to bee the iuyce of an herbe. But we must confider that they make two forts of Camfer, the one of Borneo, the other of Chyna. For that of Chyna they confelle it is adulterated with Bitumen : and that is the only Camfer in vie with vs. But that of Borneo to bee a fimple Gum, and that a pound of this is valued as deare as an hundred pound weight of the other. So that all the doubt lyeth in this Camfer of Borneo; which whether it be a Gum E 10

25

or no, is still in controuerfie. For the Arabians not trading into those parts, had the notice hereof only from

others, as Serapio and Avicen doe confesse : and Amaitus

gers to come alhore to fee it. So as we have beene kept

in ignorance a long time from the true knowledge of it.

In Diofceridem Cap.de massich. Lusitanus faith that the inhabitans will not fuffer stran-

26

Lib. ICap.9.

De nat foffil. lib. 4. cap. 2.

lib. T .: cap. 2.

Thaddao Nemi-CO.

De fimpl, med. fasthh. 6416-22.

And Garrius ab horto tels vs, that all his knowledge of it, is but by relation : himfelfenot being able to trauell to fee it ; partly by reafon of his age, and partly for his continuall imployment about the Viceroy. Only Eduardus Barbela reports that he did fee the place in Borneo, and found it to be of a minerall nature. I procured fome of that Camfer to be brought from thence by my worthy friend Captaine Beft, but whether it be a Gum or a Bitumen, by the view I cannot difcerne. But if it be a Gum, why thould it abound more after earthquakes ? and why should it burne and not diffolue in water? No Gums will burne, and all Gums will diffolue in water : and earthquakes make no trees fruitfull, but may caft forth minerals. That there is a naturall Bitumious Camphire, I make no doubt : and Agricola proues it. Infficiently : And the Bath in Romandiola neare Rhegium fhewes it. Alfo the Well by Muntzbach where Ta-Thefav. agear. berni momani faith there is mineral Gamphir. Averroes faith it is affinis Bitumini.

Now for the qualities of it, the most generall and trueft opinion is, that it is cold and dry. Matthiolus judgcomment.in Di- esh it tobe hot for three especiall reasons. First, because ofe. et Epifl.1.3. it burnes, and is a great fuell to fire. If this argument bee good, then flax, and ftraw, and paper, and touchwood, and fpunck fhould be hot, for they are apt fuelsto fire. Secondly, becaufe it is odorata, and hee holds all edoratato be calida : Galen is of another opinion, and holds the judgement of fimples by fauour to be vncertaine

certaine. And a vices finhexpre oderate, yet it is war good, the hould be hot ; linors arile from ded bodies ha predominancy the congree St and Vinger, & conclude our C cold and dry; beingvination WHER, Without may be confale taines and lake thire at Pitch [winning 17 oppia in Fra wheretheper are many for 200 84/141,20 mountaineVe Helmu, andi pitchie Bitt tackling, as 1 famous lake it hardly fuffe para in Celici ful of liquid Electric to be mons (pring Togerat Ger by Triles to

27

certaine. And as for Campher, Galen knew it not. Avicen faith expressely of Campher, that although it bee Lib. i. traff, i.e.z. odorata, yet it is frigida. And if Matthiolus his reason were good, then Rofes, and Violets, and Vinegar should be hot; for they are odorata. It is true that all fauors arile from heat, as Galen faith, and all compounded bodies haue some hot parts : but wee speake of the predominancy in the fubicat. Thirdly, because it bytes the tongue. So doth iuyce of Limons, and Barberies, and Vinegar, &c. and yet they are cold. Wherefore I conclude our Campher to be a Bitumen, and in quality cold and dry; and of very fubrill parts. Thefe Bitumina being vnctuous and oylie, diffolue not of themfelues in water, without the helpe of fome minerall iuyce, but may be confuled with it. And wee have many fountaines and lakes which participate with them. In Shropthire at Pitchford is a fpring that cafteth forth Bitumen fwimming vpon the water. The like we read of in Avernia in France betweene Claremond and Monferan, where the people gather it for their vies. In Italy there are many fountaines yeelding Bitumen, at Maianum, and Saffeli, and Salfa, and Herculanum at the foot of the mountaine Vefuvium, at Baia, and alfo at the cape of S. Helena, and in the Isle of Woolfs there are fountaines of pitchie Bitumen, which are vied to pitch ropes and tackling, as Iofephus à cofla reports. And we have that Bellonius de famous lake Afphaltites in Iudaa fo full of Bitumen, that Waphtha 6.78 it hardly fuffers any thing to fincke in it. The river Liparis in Cilicia by reason of a spring neare Solos is so Agric. de. mat. full of liquid Bitumen, as they which fwim or walh in cor que offu. d it feeme to be anointed with oyle. Alfo there are Bitu- terradia.c.7. mious fprings in Saxony at Bruno, in Sweuia, the lake Tegera at Gersedorf vnder the mount lurat ; In Afia by Tralleis and Niffa. Alfo in the Weft Indies there are E 2

bians not traof only from and Amatas t foffer ftran. incherne kept owledge of it. to sparwood ble to traneil partly for his · Only Ed. place in Bor. er. I procured thence by my Titbea Gum e.But if it be a eanhouskes? int in water? teloluc in watiall, but may rall Biturnious ricala proves in neare Rhegis ach where Taophin. Averaes

nerall and trutradicial indeg-First, becaute this argument it, and touchy are spr fuels and hee holds other opinion, auour to berncetaine

are many found which they put to vie for fhipping. And this Bitumen is the chiefeingredient in our Baths at Bath in Somerfetthire, although dilated with much Niter, which makes the folution the better, and the water more cleare. That Bitumen is predominant in thefe our Baths, may bee proued by the effects, becaufe wee finde them exceedingly to comfor the nerues, supple the ioynts, dry vp rhcumes, cure Palfies, and Contractions, being diftin &y vfed, tin & filuer into the colour of gold. &c. Alfo by the Bitumcous fauour of them, and by the neighbourhood of Cole mines in those parts. All which doe argue Bitumen to abound in them. And whereas Doctor William Turner in his treatife of thefe Baths, thinketh Brimftone to bee the chiefe minerall, and Copper next; I am out of his opinion. The actuall heat is no argument of Brimftone, as shall bee shewed when I come to that point : nether doth the fauour bewray it. But his reafon for Copper is very weake. He found a Marchefit vpon one of the hils, which hee thought to hould Copper. But Marchefits although De thermis Boll, they fhew yellow, yet they feldome hold Copper, or any other metall. But his difcourfe hath perfwaded John Baubinus to publish it confidently to the world. I shall have occasion to speake more of this hereaster. And thus much of Bitumina.

1.33.(1.

28

CAP:

of Wiserall 1 the The four Ass, Vitrie

Fourthfa Dare minera the Alchimilts municating all o terisareto diff concrete invec itances. And. quidbeing dillo crete, becaule th ous moniture n make many fo nerals which th al reduced to Vitriall. And ber and Calab genera feliana. doube whether and have rece Iron, or from I crements: For wherewith the has And Vit Jum doth, and (is teller as, and myos Agrici menturn, Sand Melanteria, dec. (hall finde, that

CAP. 7.

29

Of Minerall inyces concrete : called by the Alchimists, Salts. The foure principall forts of them ; Salt, Niter, Allum, Vitrioll.

Fourth fort of minerals are concrete inyces which Dare minerall substances diffoluble in water. These Libanius in Syntagm.p.221. the Alchimists call Salts, and are the meanes of communicating all other minerals with water. For as wateris apt to diffolue and extract vegetables, fo are thefe concrete iuvces apt to diffolue and extract minerall fub. stances. And although they are found sometimes liquid being diffolued by moifture : yet we call them concrete, because they will be concrete when the aduentitious moisture is remoued. Our minerall Authors doe make many forts of these according to the seuerall minerals which they imbibe : but in truth they may bee all reduced to fourcheads ; Salt, Niter, Allum, and Vitrioll. And each of these hath divers species, as Geber and Casulpinus say of Salt, quot genera calcium, tot genera falium. Concerning Vitrioll there may bee fome doubt whether it be a diffinct species from Allum, and and have received only fome tincture from Copper, or Iron, or from fome of their brood, which are called excrements: For in diftilling oyle of Vitrioll, the lute wherewith the glaffes are ioyned, will yeeld perfect Allum. And Vitrioll being boyld arifeth in balls as Allum doth, and thoots like Allum in globes; as Salt doth in tefferas, and Niter in stirias. Among these concrete iuyces Agricola reckons Sulphur, Bitumen, Auripig- Cafalpinus de mentum, Sandaracha, Chrisocola, Erugo, Mysi, Sori, metallis c.3.1.1 Melanteria, &c. But if wee examine them aright, wee Ihall finde, that either they are not diffoluble in water as E 3 concrete

for thipping in Our Baths d with much i, and the wahinant in thefe s, becaple wee ues, lopple the Contractions olour of gold, hem, and by e parts. All them. And catile of these iefe minerall, . Theachuall I bee thewed the lanour bey weake. He , which hee elits although d Copper, or th perforaded to the world. this hereafter.

CAP:

concrete iuyces should be, or they are some of those iuyces tincted or incorporated with other mineralls. All these minerall iuyces are accounted hot, and dry, and aftringent, and detergent, some more, some less and we take it so vpon trust. But this point requires further confideration and distinction.

Salt is aftringent, detergent, purging, difperfing, repelling, attenuating, makes an elcar, and preferues from putrifaction, as Diofcorides informes vs, and Galen confirmes the fame, adding that it is hor. But we must vnderstand Galen with this limitation, lib. 6. cap. 30. That the more it is deterfory, the leffe it is aftringent. And all aftringent things are cold, as hee auoucheth, lib. 4. cap. 6. Acida, acerba, & astringentia omnia frigida. Now if falt be aftringent, it must bee cold by Galens owne rule, and it is not enough to fay it hath warme parts in it, but being an vniforme fubstance, wee must determine of it ex predominio. Allo Galen lib. I. Symp. cap. 4. comparing pure water with fea water, feemes to affirme that fea water, before it have received any great aduentitious cold, may coole our bodyes. And fo this place is vnderstood by Anthonius Maria Venustus in confilio pro Petro Picardo, The repelling quality, and the making an clear, and the preferring from putrifaction, are arguments of drineffe, and not of heat. For as heat and movifure are principall agents in generation and corruption; fo cold and drinefle in preferuation. Allo I should impute the purgative and deterforie qualities in falt rather to the tenuity of parts, and the flimulation which it hath from thence, then to any heat; for then as Sennertus faith, all hot things fhould purge; Inflit. lib. 5. part. 1. cap. II. Valeriala in Gal. de conflit. artis pag. 447. And Melne Canon. universal. cap. 1. reicets all elementary qualities, temperaments, fimilitudes, or contrarieties

Diofe 15.c.84. De fimpl.med. facult.l.4. c.20. & l.1 1,6.50.

30

contrarieties of Allo Tanariad purgs and yet a sine faculty of apulfinefacult anraction by imagined. He firmulation, 25 tics, but acither this worke. A purge caller on ganick philogra tindted with th sations doe col not deny a diffi the respects. long experien ing medkines, vies for mens t bumors, and weake : fome or fpleen, bec. forme arectoo h But they had purging quali ence, loane to a they had faid n my, &c. For min bodies to them, which is vie to accuste t fers. It were fals without ca the talk of the

31

ount requires

contrarieties of fubstances, &c. in purging medicines. Alfo Tamarinds, Myrabolans, and Antimony doc purge, and yet are cold, Venuftus pag. 132. But the purgatiue faculty of medicines is from ftimulation of the expulsive faculty of the ftomach and guts, and not from attraction by heat of peculiar humors, as hath beene imagined. Heat may lerue as an inftrument to actuate ftimulation, as cold doth dull and benumbe all faculties, but neither heat nor cold are principall agents in this worke. And whereas Reubarb is thought to purge coller only, Sene and Polipody melancholy, Agarick phlegme, &c. becaule wee fee the excrements tincted with the fame colors, it is a deceit : for thefe purgations doe colour humors in that manner. Yet I doe not deny a diffinction to be made of purgations in other respects. And our ancient Physitians through long experience have found out the right vie of purging medicines, and their true diftinctions for feuerall vles for mens bodies : as that some doe purge groffe humors, and fome thin, fome are ftrong, and fome weake : fome are comfortable to the ftomach, or liver, or fpleen, &c. and fome hurtfull to fome of those parts : fome are too hot in fome cafes, and fome temperate, &c. But they have not difcouered the true caufe of this purging quality: some attributing it to a celestiall influence, some to a hidden quality, which is as much as if they had faid nothing : fome to a Sympathy, Antipathy, &c. For my part I hold the purgative quality of mixt bodies to lie principally in the terrestriall part of them, which is their falt : and therefore the Chymifts vfe to acuate their purging extracts with their proper falts. It were much better if they could make their falts without calcination : for then they fhould retaine the taft of the Simples, which lyeth in the falt, and much

ome of those er mineralle. tot, and dry, , fome leffe:

disperting, repreferresfrom to Galen conwe mult vah. 6. 64p. 39. is altringent. ee aucucheth, connia frigin cold by Galens t bath warme ince, we mult er lib. I. Symp. ater, feemes to ince any great es. And to this ria Vennstas in pushity, and the m patrilaction, at. For as heat generation and truation. Allo orie qualities an the filmulation heat ; for then d purge; Inflit, de conflit. artis ap. 1. reichs fimilitades, or contranctics

much other vertue which the fire confumes in calcination. And I am likewife of opinion, that as their purgatiue-qualitie lyeth in the Salt, fo it workes by Stimulation, a qualitie most proper to Salt, whereby it furthers all generations, &c.

Niter doth dry and attenuate more then falt, and although it hath not fo much aftriction as Salt is faid to have, yet it feemes to coole more then Salt, perhaps becaule it is of thinner parts, and penetrates more, and that is the reason that it serves better for the diffolution of Mettals. In phylicke we finde our Sal nitrum (which is a kinde of it) to coole the body mightily, and there. forevled in Juleps : Allum and Vitriol are much alike, but that Vitriol hath a garbe from Copper or yron. These are very aftringent, and without doubt cold, whatfoeuer hath beene held of them. The waters or phlegmes diffilled from them doe exceedingly coole in Iuleps, as Quercitan and Claudius Dariot haue obferued, and we also by daily experience doe findetrue : by reason of the intense aciditic they have, being distilled from their Terrestriall parts. Alfo those acidula which the Germans call Saurbrun, proceeding from thefe juyces, are much vied to quench the heate offeuers. It may be objected, that they are Corroliues, and will cate into mettall, and therefore must bee hot. But by the fame reafon, the iuyces of Limmons, Barberies, Howfleeke, &c. fhould be hot, for they will carue iron. To bite and cate as a Coroliue, are not arguments of heate, but of piercing: Wherefore Hippocrates faith, Frigus vlceribus mordax, and frigus est principium destructioum, ut calor generativam. And therefore it is more probable that these corroliues are more cold then hot. These two minerall inyces are not fo readily diffolued in water, as the other two, and will be more eafily precipitated by any

In pefiis Alexic. Dariot de proparat.med. Tract.2.cap.23. 24.

32

my oppolite fab. omit the fenerall admirteres with purpole : where of them in natur For fait Spri Spring at a far 1005, minuts into Art, in great al fountaines, at Li dors Halitat, 8 In Citily, at So to are the Pega Meden in Trzi Chelhire are we water by the C ria. and in Ba falt Lakes, as th eweene Strape Germany thre

eweene Strape Germany three number in oth All which receit the earth, whice as may appear monte Garpato uia, in Helnenia, falt but from ti Straights, are g Fennantals vs o can, able to fun into margaile the bowels of Rockes of Sairy

canfe of the fa

33

nes in calcina. as their pargas by Seimulati. eby it furthers

en fat, and als Salt is faid to r, perhaps beres more, and he diffolution krum (which iy, and there. re mochalike, oper or yron. it, doubt cold, The waters of lingly coole in or have oblerfindetrue : by being diltilled Acidala which rom thele juyfeatrs. It may nd will este into lut by the fame s, Howleeke, . To bitcand f heate, but of Frigus vicetieftructinum,ot more probable hor. Thele two ted in water, as precipitated by

any

any opposite substance that is more familiar to water. I omit the several forts of these concrete invoes and their admixtures with other minerals, as impertinent to my purpose : wherefore I will shew some examples of each of them in natural Springs.

For lalt Springs, Iofephus a Cofta tels vs of a rare Spring 'at a farme neere Cufco in Peru, which as it suns, turnes into very white Salt, without any fire or Art, in great abundance. In Germany are many falt fountaines, at Luncburg, Stafford, Saltzburg, Aldondorg, Halftat, &c. In Italy, in agro Volaterano, &c. In Cicily, at Solinantia, is a falt Well which is hot; and fo are the Pegafai fonts in Caria. Alfo the fountaine by Medon in Træfen is both falt and hot. Our Wiches in Chelhire are well knowne. There are allo Rivers of falt water by the Cafpian ftreights, and in Spaine, and Caria, and in Bactria, Ochus and Oxus. Alfo there are falt Lakes, as the Tarentin Lakes in Italy, the Lake betweene Strapela and Seburg (mentioned before) In Germany three Lakes, in Cicily, and befides an infinite number in other Countries, the Lake of Lakes, the Sea. All which receive their faltneffe from Mynes of falt in the earth, which are very frequent and huge in bigneffe, as may appeare by the Rocks of Salt in Bohemia, in monte Carpato, in Polonia, within two miles of Cracouia, in Heluetia, and Rhetia, where they have no other falt but from the Rocke. As also by the Caspian Straights, are great Rocks of Salt. But Marcus Paulus Venetus, tels vs of a Rocke or Mountaine of Salt in Thaican, able to furnish all the World with Salt. So that it is no maruaile that the Sea is falt, feeing it pierceth into the bowels of the earth, and discouereth many great Rockes of Salt which diffolue in it. And this is the true caufe of the faltneffe of the Sea. And confidering the F great

great vse of Salt, both for other vses, and for generations, nature hath prouided enough of it, especially in the Sea, which is more fruitfull in that respect, then the Land. Wherefore Venus was called Aargon : Est Venus orta Mari.

Niter is feldome found in Bathes alone, but mixt with other minerals, which it diffolues, and infects the water withall. Yet we reade of a nitrous Lake called Le. tis, neere Caleftria in Macedonia, where they vie to make Niter, and ventit to all parts. So they doe at the Nitrarie in Egypt. Alfo the Lake Arethufa in Armenia, is full of Niter. At Menis in Phrygia is a Spring of nitrous water which is hot: alfo in Lconteis a hot nitrous Spring, Bellonius makes mention of a Nitrous fountaine neere Belba, and of abundance of Niter vpon a Plaine neere thereunto, which feemes to be that which Pliny cals Halmiraga. But he denieth that there is any Mine of Niter vnder the earth, but that all is bred out of the Soyle as an efflorescens of the earth : Baccins faith the fame of Salt-Peter. Agricola faith, that as the true Niter is gathered vpon the Playnes of Media aboue the earth, fo is Salt-peter found about the earth in many places of Saxony : That, Niter is gathered vpon the Plaines of Media, are Plinys owne words. Exiguum fit apud Medos canescentibus ficcitate connallibus. So that it feemeth, his opinion was, that Niter is not bred in a Myne vnder the earth, but in the earth it felfe, as the chiefe fatneffe it hath to further generations. And feeing earth is the mother of all Terrestriall bodies, it is not left vnfurnished with those minerall inyces, nor ought elfe that is requifite for the production of species: It hath beene observed by some, that nitrous water is the best loyle for ground, and brings all Plants to persection farre looner then any other dung, and therefore the

Observat.1.3: 0.76,774 34

Lib.5.c.90

Lib.31.6.10.

the Egyptians p ter, Nitrals vit mendoe finde, mine and fen, 6 ducing of Hea Salt-peter, oth betweene Salt this, that a pob ounces of albes actually to cold Rome and Nag well as yce or Jukps, and the cold, 25 Bellesi Now I com nouare delorer belt benefatte fit to publish t Rio, is an Alla ero Senenti, V wills is full of kenvate, are l Shrewesbury Mynes, they the chiefest th cia, at Tolpha taw by Auffig In Ireland then magh, as Than at Mazaronne

wood, Piamb

co Sizzefe rep

200,32

Dorfetlhin,

id for generati. ; cfpecially in efpest, then the thi : Eft Venm

e,but mint with infects the waake called Le. e they vie to hey doe at the fain Armenia, a Spring of mi-13 2 hot nitrous trous fountaine vpon a Plaine ist which Phiny tere is any Mine bred out of the accius faith the it as the true Niledia above the earth in many sered upon the ds. Exignam ft libm, Sothat it s poe bred in a it felfe, as the tions. And fee. all bodies, it is call imports nor action of species: nitrous water is ill Plantstoper-, and therefore the

the Egyptians water their Coleworts with Nitrous water, Nitrofa viridis brasica fiet aqua. Our Salt-peter Martial. men doe finde, that if any fat earth bee couered from raine and fun, fo as it spendeth not his firength in producing of Hearbs or Graffe, it will breede plenty of Salt-peter, otherwife it will yeeld none. The difference betweene Salt peter and the ancient Niter, appeares in this, that a pound of Niter being burnt, will leave foure ounces of alhes; Salt-peter will leaue none. Salt-peter is actually fo cold, as being diffolued in water, it is vfed in Rome and Naples to coole their Wine, and doth it as well as yce or fnow. Alfo we vie it inwardly in cooling Iuleps, and therefore it feemes also to bee potentially cold, as Bellonius iudgeth.

Now I come to Allum (Indignum vox ipfa iubet renonare dolorem) the greatest debitor I have, and I the beft benefactor to it, as shall appeare when I shall think fit to publish the Artifice thereof. In Illua, a myle from Rio, is an Allum fountaine: alfo there are diuers in Agro Senenfi, Volaterano Lucenfic, in Italy, Balneum de villa is full of Allum: and with vs in Shropshire at Okenyate, are Allum fprings, whereof the Dyers of Shrewesbury make vie in ftead of Allum. As for allum Mynes, they are frequent almost in all Countries, but the chiefest that are wrought, are at Capfylar in Thracia, at Tolpha neere Ciuita Vectia in Italy, at Commataw by Auffig in Germany, and with vs in Yorkeshire, In Ireland there have beene Allum workes neere to Armagh, as Thurmifer reports: also at Metelin in Spayne. at Mazaron neere Garthage, at Hellespont, Massa, Montrond, Piambin, Volterra, Campiglia, &c. as Beringac- pyratechnine cio Sienefe reports. Alfo there are diuers earths yeelding 1.2.6. allum, as at Guyder in Carnaruanshire, at Camfurt in Dorfetshire, and in the Ile of Wyght. But I will contract my F 2

35

my felfe for Allum, and come to Vitriol.

Vitriol, as I haue faid before, doth participate much with Allum in the manner of fhooting or roching, which is in glebas, in the hard diffolution and easie congelation, in their arifing in balls being burnt, and in their precipitation : in fo much as it is probable, that the balis of Vitriol, is nothing but Allum. It is found in minerall waters of two forts. The one, where the very body and substance is diffolued : as in Cyprus, which Galen defcribes, where the water is greene : allo at Smolnicium in Hungary, in Transiluania ad Carpatum montem, at Nenfola, &c. In which places Copper is ordinarily made out of iron by infufing it in thefe waters. I will not determine whether this be tranfmutation of one fpecies into another, as fome doe hold, or rather a precipitation of the Copper which was formeritem, singularin ly diffolued in the water by meanes of the sharpe Vitriol; which meeting with Iron, corrodes it, and imbibeth it, rather then the Copper, and fo lets the Copper fall, and imbraceth the Iron in place of it. Wee daily feethelike in Aqua fortis, which having imbibed one metall, will readily embrace another that is more familiar to it, and let fall the first. So Allum or Coppresse water having fome ftrong Lixiuium of tartar or other calcind falt put to it, the Allum or Copprife will prefently fall to the bottome, and participate, and giue place to the Lixinium, as a thing more familiar to warer, and of more cafie diffolution. Eut as I fay, I will not determine this question, because it is not much pertinent to our bufineffe. Yet I will not omit the indgement of Lazarus Ercker the Emperours chiefe Mine mafter in the Kingdome of Bohemia, who profeffeth that he was long of this opinion, but altered it upon this reason, That by exact proofe he found more Copper.

Simp.med.facul. 1.9.6.61.

36

Libau.in Syntag. 3. part. 1.7. part: I.

Lib.3. Von. Kupffer errz:

Copper Aricket ter bebre did co uer. Theother body and fubli rit, or vapour, of this fort are thele are in the Vitriol be prec whereof we ha neum 14 marba ad oderan, bic ham, but mild vapour being l Vitriol, but for Acidulanet Vitriol, or St lerdanssto b becauleit goes therefore to be poralifiblian in mineral) (p appeare by eua Ipint of Vitrio tion, that whi tore emporation table invec. T in diffillation, till then the var which is in Sul feth laft ; and harper it arife ch. Thus mu

Copper firicken downe this way by Iron, then the water before did containe, and with the Copper fome Siluer. The other kinde of Vitriol water is, where not the body and substance of Vitriol is diffolued, but the spirit, or vapour, or quality communicated to the water : of this fort are our Vitriol Baths for the most part. And thefe are in themfelues wholfome, and are fowre, if the Vitriol be predominant. Such are most of our Acidale: whereof we have many in Viterbie & Volaterano, Balneumad morbum dictum, Saurbrun by Franckford, ad Oderam, &c. thefe are fowre waters. Alfo from Allum, but milder, alfo from Sulphur, whole fpririt or vapour being burnt, is little differing from the spirit of 10. Baubinus de Vitriol, but fomwhat falter. But the most part of our thermis 1.2. 6.2; Acidula are from Vitriol. This fowre spirit of Allum, Vitriol, or Sulphur, Libavius judgeth with Thomas De indicio agu, Iordanus to be in the terrestriall parts of these minerals, miner. p.2.c. 36. becaufeit goes not away by boyling or diftillation, and therefore to be communicated with water by the corporall substance or invce of them. But that holds not in minerall spirits which are heavier then water, as may appeare by euaporation of any water made lowre with fpirit of Vitriol or Sulphur, where, after long euaporation, that which remaines will be more fowre then before euaporation. So it is also in Vinegar being a vegetable invce. The spirit of wine doth certainly arife first in distillation, and the first is the best, being more volatill then the vapour of water. But this firitus acetofue which is in Sulphur, Allum, Vitriol, and Vinegar, arileth last ; and the more you distill away from, it the fharper it arifeth; and the fowrer is that which remayneth. Thus much for Vitriol and concrete inyces.

Fig.

CAR.

37

ticipate much g or roching, and eaflie conount, and in probable, that a. It is found ne, where the s in Cyprus, greene: allo 112 ad Carpa. places Cop. ting it in these s be transmu. dochold, or h was former. e lharpe Viniit, and imbiis the Copper it. Wee daily g imbibed one is more famior Copprelle attar or other Coppelle will nate, and give nutar to was I fay, I will is not much not omit the perous chiefe niz, who probut altered it he found more Copper

CAP. 8.

Of minerall spirits. Quicksiluer, Sulphur or Brim-Anne, Ar lewick, with his kindes ; Cadmia.

Fift kinde of mineralls are called fpirits : thefe are Avolatill in the fire, and haue ingreffion into metals, but no metallin tufion. Thefe are Quickfiluer, Sulphur, Arfenick, Cadmia, Rufma, &c. All which being volacill will cafily fublime, and being mixed with metals, as Cadmia is ordinarily to make Braffe, will alter the colour of the metall, and make it leffe fufible, and leffe malleable. I will briefely run ouer the examples of thefe and their virtues, or qualities, being more obfure and in our Baches leffe vicfull then the former, and more rare.

Simpl. med: fasille, 1.9.6.59.

38

Vidies Vidius #.I3. Fallopius de metallis 6.37.

Quickfiluer was not well knowne to Galen, for hee confesseth that hee had no experience of it, and did thinke it to be meerely artificiall, and not naturally bred in the earth. Diofcorides makes no mention of the temperature of it, but holds it to be a pernitious venome, and to fret the entrayles : although Mathiolus affirmes that it is fately given to women to further their deliverance, and we find it lo by often experience, both in that caufe, and in Wormes, and in the French Difcafe and Leprofies, if it be skilfully prepared, and withiudgement administred. Fallopins holds it to be one of the miracles of nature. Those that take vpon them to determine of the qualities of it, are much diffracted; fome reckoing it curat.generalim to be hot and dry, and fome cold and moift; and both in a high degree. But in this account they confider not the qualities of the ingredients in the preparation; whether it be fublim'd or precipitated. For my part I know not how to reduce it to the Elementary qualities : neither

ther am I alham man hitherto ha for our owne vi by experience. attenuates, pe contram (a l dent beyond o nature, as Reno to know wheth which Fallpin Felix Plateral to it, neither h containe it. lage Alesedien ated (as is tho that minerall called Minis thence in Vale La Nana, of a Quickfilmer, are the water. the river Mini monslippings taine in Ethie Stix in Archa which perhap tinde fome fro of Quickfilter out of a floore In Germany bach, Beraun land, three mi which liste makes menti tauld not try

39

ther am I alhamed of mine ignorance in it, feeing no man hitherto hath giuen true fatisfaction herein. But for our owne vie where reason failes vs, let vs be guided by experience. We finde by experience, that it cuts, attenuates, penetrates, melts, relolues, purges both ad centrum & à centro, heats, cooles,&c, and is a transcendent beyond our rules of Philosophie, and a monster in nature, as Renod ans faith. For our purpose it is chough to know whether it will impart any qualitie to water ; which Fallopius, Baccius, Solinander, Bauhinus, and Felix Platerus doeacknowledge. But it giues no tafte to it, neither have we many examples of Baths which containe it. In Serra Morena in Spaine, neare the village Almedien is a Caue, where are many Wels, infe-Eted (as is thought) with Quickfiluer, because much of that minerall is extracted from thence, out of a red ftone called Minium nativum. About fifty miles from thence in Valentiola there is another fountaine called La Naua, of a sharpetaste, and held to proceede from Quickfiluer, and thele waters are found wholfome. So are the waters at Almagra and Toletum, and others by the river Minius, which are hot. There are many venomous springs attributed to Quickfiluer, as the red fountaine in Ethiopia, others in Boetia, Caa in Trogloditis, Stix in Archadia, Stix in Theffalia, Licus in Sicilia, &c: which perhaps are from other mineralls, feeing wee finde fome from Quickfiluer to be wholfome. For mines of Quickfiluer, we read of many in Bætica, Attica, Ionia, out of a stone which Pliny cals vomica liquoris aterni. In Germany at Landsberg, at Creucenachum, Schenbach, Beraun aboue Prage Kunningstien, &c. In Scorland, three miles beyond Barwicke, I found a red ftone, which I take to be minium natinum, feeing Agricola makes mention of it in Scotland, but by a mifchance Sulcould not try it.

har or Brim.

its ; bufe are a into meals, huer, Sulphue, h being voluith metals, as after the cothe, and leffe mples of these to obfure and at, and mote

Galen, for hee f it, and did naturally bred ion of the tem. tions venome, violus affirmes r their delinece, both in that h Difese and ithindgement of the miracles determine of me reckaingit ill;and both in y confider not paration; wheny part I know qualities : aci. ther

yet no doubt th

ous facilifrom o

ol, Sandaracha,

formed (if at al

if a house or a

fmels of Brim

Many things

not difernable

But chere are di

taine Sulphur,

water without

perfect Sulphi

Bitumen. Th

to water, and f

hath attained h

wilcit is only

milky colour.

divers hot Sal

truna ; in Sicil

Apono, 25 S

uers, alchough

Athunum, of

Brigenfis then

in Picenio, and

receives our Ba

from the relati

balladour to I

not deny forms

finde among H

metall coales,

Support. But

very little; and

OUS ATTENT

Concerning

40

Sulpher attracts, contracts, refolues, mollifies, difcuffes, whereby it fnewes a manifest heate, though not intenfe, yet the fume of it is very foure, and therefore muft coole and dry : and I perfwade my felfe that there is no better fume to correct venomous and infectious avre, then this of Sulphur, or to remoue infections out of roomes, clothes, bedding, veffels, &c. We must acknowledge parts in all compounded bodies; as Rubarb hath a purgatiue qualitie in the infusion, and an aftri-Atiue in the Terrestriall substance, where the falt hath beene by infusion extracted. The substance of Sulphur is very fat (Snlpbure nibil pinguius) faith Felix Platerus) and this is the caufe of his eafie taking of fire, and not any propinquitie it hath with fire in the qualitie of heate : for if it were very hot, Dioscorides would not commend it purulenta extußientibus, the next dore to a Hectick. Alfo Galen faith, that fat things are moderately hot, and are rather nutriments then medicaments. Now for Sulphurous Bathes, they are very frequent, and if we should beleeue some, there are no hot Bathes, but participate with Sulphur, but they are deceived, as Ihall appeare hereafter, when we come to fhew the true caufes of the heate of Bathes. Neither are all fulphurous Bathes hot. Gefner reports of a Bath by Zurich, vcry cold, and yet fulphurous. Agricola of another by Buda in Pannonia. In Campania by the Leucogæan hils, are cold Springs full of Brimftone. Alfo there are hot Bathes without any fhew of fulphur that can be difcerned, as the Bathes of Petriolum in Italy, the Bathes Caldanellæ and de Aninione in agro Senensi de Gratta in Viterbiens, de aquis in pisanis collibus, Divi Iobannis in agro Lucenfi in Alfatia, another not farre from Geberfallerum, &c. All which are very hot, and yet giue no figne of Sulphur either by tafte, or fmell, or effects. And yet

mollifies, dif-

though not

ind therefore

lic that there

ad infectious

nfeètions out

We mil ac.

s; as Rubarb

and anafri.

the falt hath

e of Sulphur

Ether Plate-

ig of hire, and

he qualitie of

s would not

nem dore to a

igs are mode-

medicaments.

ery frequent,

no hat Bathes,

re decented, as

lbew the true

re all falpha-

by Zurich, ve-

of another by

e Lencogzan Mo there are

hat can be dif-

y, the Bathes

sen a de Gratte

Divi Isbannis

fire from Ge. nd yet give no

or effects. And

yet

41

1002

vet no doubt there are many Baths having a Sulphurious Imell from other minerals; as from Bitumen, Vitriol, Sandaracha, Allum, &c. which are hardly to be di-Icerned (if at all) from Sulphur: So we commonly fay, if a houle or a tree bee let on fire by lightning, that it Imels of Brimftone, when there was no Brimftone there. Many things combusted will yeeld a Nitorous fmell, not difcernable after burning, what the things were. But there are divers truly Sulphurous Baths which containe Sulphur, although not perfectly mixt with the water without some medium, but only confuled : for perfect Sulphur will not diffolue in water, no more then Bitumen. The spirit of Sulpher may be communicated to water, and lo may the matter of Sulphur before it hath attained his perfect forme and confiftence : otherwife it is only confuled with water, and alters it into a milky colour. Sulphurea hac albus aqua. At Baia are diuers hot Sulphurous Baths, and euery where in Hetruria; in Sicily, in Diocefi Panormitana; the Baths of Apono, as Savanarola Muntagnana, and Fallopius auers, although Iohn de Dendis denieth it ; the Bath of Aftrunum, of Callatura, S. Euphemie, Aquifgran, Brigenfis therma in Valefijs Helvetiorum, aqua fancta in Picenis, and an infinite number euery where. Baccius receives our Baths of Bathe among Sulphurous Baths, from the relation of Edward Carne when hee was Embaffadour to Iulius tertius, and Paulus quartus. I will not deny fome touch of Sulphur in them, feeing wee finde among Bitumeous coales, fome which are called metall coales, with certaine yellow vaines which are Sulphur. But the proportion of Sulphur to Bitumen, is very little; and therefore I doe not hold them Sulphurious a pradominio. This is enough for Sulphur.

Concerning Arlenick, it is a venomous minerall, and G therefore

42

therefore I neede speake nothing of the Bathes which proceede from it, but that wee take heed of them; It is likely that those venomous waters and vapours which kill fuddenly, doe proceede from Arfenicke, as at Cicrum in Thracia fons Neptunius in Terracina, at Peraut by Mompelier, the Lake Auernus. The caue of Charon by Naples. Vnder Arfenicke wee may comprehend Auripigmentum, Rifagalum, Sandaracha, Rufma, &c. I heare of but one Mine of Rufma in Ciprus, from whence the Turkes have it to take off hayre, and it doth it beft of any thing knowne, as Bellonius and Platerus reports, and I have made triall of it oftentimes : The former forts of Arlenicke are found in Misia Hellefonti in Ponto, by the River Hippanis, which is made bitter by it. In the leffer Afia, betweene Magnefia and Euphefus in Carmania, &c. It is accounted to be extreame hot and putrefying.

Cadmia is either naturall or factitious: The naturall is often dangerous in Germany, as Agricola faith, especially that which is liquid, which is a ftrong corrofiue : the other is of the nature of Copper, moderately hot and clenfing, and especially good to cleere the eyes, as Calaminaris and Tutia. It is found in Gopper Mynes, and of it felfe in Cyprus, as Gallen faith by the Citie Solos.' Alfo in Agro fenensi, vicentino, Bergomensi, neere Como, where they make Braffe with it. Wnder Mendip hils there is much of it. The Bathes of Saint Cassian doe participate with it, and Cicero his Bathes neere Baia. Alfo the Bath at Zurich in Heluetia, and Grotta in Viterbio.

Thus much for Spirits.

GAP.

ofnicane m class. Antimo

A Sixt fort furfion, butare fore being mit Thefe are Bifm oy, Bell-metal Speiff Calaem is a kinde of m Entil fadyes, w metallin fuffic though they fan of their fit as the Spirite.

Binnatura

from Tur an so allo. It was fore we can f England, and and in very h that particip, timony, but to pens obfirufi bindeth, and ging qualities to purge vio whereupon o are not hot, there is a Min in Thingi m

43

CAP. 9.

Of meane metals, or halfe metals. Bismutum or Tinglasse. Antimony. Bell-metall.

A Sixt fort I make to be meane metals, or halfe metals, which are minerall fubftances, having metalin fufion, but are not malleable as metals are: and therefore being mixt with metals, doe make them brittle. Thefe are *Bifmutum*, or *plumbum cincreum*, Anthimony, Bell-metall, which *Gaber* cals *Magnefia*, in dutch, *Speiff*. Calaem alfo may be reckoned among thofe, which is a kinde of white metalin Cadmia, brought out of the Eaft Indyes, which bath both metallin ingreffion, and metallin fufion, but not perfectly malleable. Thefe although they are more volatill then metall, yet by reafon of their fufion into a King, are not fo eafily fublimd as the Spirits.

Bifmutum is that wee call Tinglasse, differing both from Tin and Leade. Candidius nigro, fed plumbo nigrius albo. It was not knowne to the Ancients, and therefore we can fay little of the qualities of it. It is found in England, and in Mifnia, and at Sneberg in Germany, and in very few places elfe. I reade not of any waters that participate with it : neither can I fay much of Antimony, but that Diofeorides faith it cooles, bindes, opens obstructions, &c. And Gallen, that it dryeth and bindeth, and is good for the eyes, &c. But of the purging qualitie they write nothing, although wee finde it to purge violently, both vpwards and downewards : whereupon wee may gather that all purging medicines are not hot, as I have touched before. Camden faith there is a Mine of it in Cumberland: It is found in Italy, in Thinni montibus, in Senensi agro in the Countie of S. Flora, G2

Bathes which of them; Itis apours which itic, 25 at Ciracina, at Pe-The same of may compretracha, Rufma, Ciprus, from rc, and it doth and Platerus animes: The ilia Helehan h is made bitgotia and Euto be extreame

erately hot and revers, as Calaer Mynes, and the Citic Solos. enfr, neere Coer Mendip hils int Cafitan doe neere Baia. Al-Grotta in Vitre-

GAR:

The naturallis

faith, especial.

comoline : the

44

S. Flora, and in Germany in many places. But I reade of no waters that participate with it, vnleffe wee fhould iudge all purgatiue waters to be infected with it as neere Ormus, Purchas writes of fuch aSpring which purgeth. Partes pag. 72. Sauonarola in Balneis Romandiola, mentions a Spring at Meldula, which purgeth. Alfo Balneum Tertutij in agro Piftorienfi, Fallopio; alfo the fowre water of Mendich and Ponterbon doc purge choler, as Rulandus faith. At Nonefuch we have also a purgative Spring, which may participate with Antimony or Niter, or both: But purgatiue waters are rare, vnleffe it be ratione ponderis, by the weight and quantity, and fo any water may purge, and our Bath waters doe purge in that manner, and by the addition of Salt, which giues ftimulation vnto it. This our Bath guides doe ordinarily preferibe to fuch as will be perfwaded by them, not knowing how it agreeth with their griefes, nor how it may doe hurt in many respects, as oftentimes it doth.

Bell-metall is thought to be a mixture of Tinne and Copper Oares, as Kentman iudgeth, and is found in our Tinne and Copper Mynes in Cornewall. Ireade of no waters infected with it, nor of any vse it hath in Phyficke.

CAP. IO.

Of metals. Gold. Siluer. Iron. Copper. Tinne. Leade.

The feuenth and laft fort are metals, minerall fubftances, fufible and malleable. Thefe are commonly diftinguilhed into perfect and imperfect; perfect, becaufe they have leffe impuritie or heterogeneitie in them, as gold & Siluer. The reft are called impertect, becaufe they are

Fallop.de mesallis cap. 10. Libau, de nat. metall.part 3. sap. 5. are full of impl Hard, as those melt, as yron a mirathefirft Gold of all p molt heauic, fubstances m ice to comp loofcany of h though it lbou an ide and va thinke by boy from thence, all. The like I or Pils, valelle body, which Wilc it goes o concoction of diffilied in ftr metallin fubli it be diffoluer pourbile, as for ledge, that t that may do ir diffolued, p would be, or becaule it lool dot no hurt, a to quench it i gine it lome a tegards dife all other met doth impart : therwis, 200

45

are full of impurities, and they are either hard or foft. Hard, as those which will indure ignition before they melt, as yron and Copper. Soft, which will not, but melt at the first, as Tinne and Lead.

Gold of all metals is the most folid, and therefore the most heavie, as having no impurities or heterogeneall fubftances mixed with it. And therefore it is not fubiect to corruption, as other metals are, neither will it loofe any of his fubftance, either by fire or water, although it should be held in them a long time: so as it is Baccina lib.6. an idle and vaine perswasion that many haue, who thinke by boyling Gold in broth, to get fome ftrength from thence, and lo to make the brothes more cordiall. The like I may fay of putting Gold into Electuaries or Pils, vnleffe it be in cafe of Quickfiluer taken into the body, which the Gold by touch may gather to it, otherwife it goes out of the body as it came in, without any concoction or alteration, or diminution. And if it bee diffolued in ftrong water, it will be reduced againe to his metallin substance, without diminution, much lesse will it be diffolued without corroliue Spirits, to make aurum potabile, as some doe vndertake. Crollius doth acknow- Bafilica chimica ledge, that there is but one Minstruum in the world Pag. 204. that may doe it, and that he knowes not. But if we had it diffolued, we are yet vncertaine what the quality of it would be, or what vie to make of it in Phylicke; onely because it loofeth none of his substance, we know it can doe no hurt, and therefore we vie it for Cautoryes, and to quench it in Beere or Wine, &c. to warme it, or to giue it some aftriction from the fire. Fallopius in these De Thermis regards disclaymes it in all minerall waters, as hee doth cap. 8. all other metals: and will not beleeue that any metall in ingreffu ad doth impart any qualitie vnto water. Claudius holds o- infirmes, therwise, and so doth Baccius, Sauonarola, Montagnana, Pag. 373. Ve-G 3

opper, Tinni

But I reste of to wee thould

ithit:as netre hich porgeth.

tions a Spring

m Teriutifin

Water of Men-

Rulandas fith.

pring, which

or both: But

une ponderie.

I WILL DISY

that mannet,

imulation vn.

y preferibe to

knowing how

nay dochart in

of Tinne and

is found in our

l Ireade of no

hath in Phy.

inerall/abilian. commonly diberfeft, becaufe tie in them, as cft, becaufe they

212

Venuftus Solinander, and almost all that have written of Bathes. For if we fhould exclude Metals, wee muft like. wife exclude Stones, and Bitumina and Sulpher, and almost all minerals, except concrete invces. For none of thefe, after they have attayned to their full confistence, will of them felues diffolue in water, without the helpe of fome concrete iuvce, as a medium to vnite them with the water. But before they haue their full confiftence, whilft they are in Solutis principys, as Earth, Juyce, or Vapour, they may be communicated with water. Gold is fo fparingly bred in the bowels of the earth, as in that refpect it can hardly furnish a perpetuall Spring with any quality from it; yet some Bathes are held to participate with Gold, as Ficuncellenfes, Fabaria, Piperine, de Grotta in Viterbio : Sancti Casiani de Buxo, erc.

Siluer comes next in puritie to Gold, but is inferiour vnto it, as appeares by the diffolution of it, and by the blew tincture which it yeelds, and by the fouling of the fingers, &c. For the qualities of it, there is not much difcouered. But as all other things of pryce are fuperflitioufly accounted cordiall, fo is this, especially in hot and moyft diftempers of the heart: for it is effeemed to bee nimontanus, p.2. cold, and dry, and aftringent, and yet emollient. Wee haue no Bathes which doe manifeftly participate with it : perhaps, by reafon, nature doth not produce it in fuf. ficient quantitie to infect waters. John Bauhinus thinkes there may be Siluer in the Bathes at Boll : becaufe hee faith there was a Pyritis or Marchefit examined by Do. Ater Cadner, and out of fiftie pound weight of it, hee drew two drams of filuer: a very small proportion to ground his opinion vpon:

> Iron is the moft impure of all metals, as we have it wrought, and will hardly melt as metals fhould doe, but with additaments and fluffes. Neither is it fomalleable, and

and duttible as o impurities. Yet refine it in fuch. tough, as it will fin of any elp Mynes, for the malcus, as Belli from divers oth purifying it, is iron is purer the blades beyond Biblis: as T ut in the River St

Eslen que Fueral do

Butthehal ther waters ao my selfe that O perhapsiome Concernit

les reckonsit a cold. Manar are molt of ou be hot, becau cers of the bla of heating, but and therefore l gentia smeis Steele two di platine; the lychinavola attringent qua These two fal

Theod. Taber-CAP 49

46

and ductible as other metals are, by reafon of his many impurities. Yet wefee that at Damafco they worke and refine it in fuch fort, at it will melt at a Lampe, and is fo tough, as it will hardly breake. And this is not by reafon of any efpeciall Myne differing from other iron Mynes, for they haue no Mynes of yron neere to Damafcus, as *Bellonius* reports, but haue it brought thither from diuers other places, onely their artin working and purifying it, is beyond ours. So the Spanifh Steele and iron is purer then ours, and wee doe efteeme of Bilbo blades beyond others which are quenched in the Riuer Bilbilis: as *Turnus* his Sword in *Virgill* was quenched in the Riuer Styx.

Ensem quem Dauno ignipotens Deus ipse parenti Exead. 12: Fecerat, & Stygia candentem extinxerat unda:

47

But the hardning of Steele lyeth not in this point; other waters no doubt may ferue as well. But I perfwade my felfe that our iron might be made much purer, and perhaps fome gold extracted from it which it holds.

Concerning the temperature of Iron and Steele, G4simpl.lib.9. lew reckons it among earth, and therefore it muft bee cold. Manardus is abfolutely of that opinion, and fo Lib.16.Epifl.s. are moft of our Phyfitians. Only Fallopius holds it to be hot, becaufe Scribonius Largus prefcribes it in vlcers of the bladder, which it doth cure, not in regard simpl.lib.4.f.7. of heating, but drying; for it dryeth and bindeth much, and therefore by Galens rule it muft bee cold. Aftringentia omnia frigida. I have obferued in Iron and Steele two diftinct qualities, The one opening, or deopilatiue; the other aftringent. The opening quality lyeth in a volatill Salt or Niter, which it is full of, the aftringent qualitie in the Crocus, or Terreftriall part. Thefe two fubftances are thus difcerned and feuered. Take

fouling of the stormuch difeare fuperflitiially in hor and teemed to bee mollient. Wee articipate with roduce it in furscience the molecular because hee mined by Doight of it, hee a propartion to

taue Written of

wee mult like.

pher, and al-

For none of

ill confiftence,

ious the beloe

nite them with

all confiltence.

arth, luyce, or

h water. Gold

ath, as in that

Spring with a held to partici-

Piperina, de

fit, and by the

axe, Gr. butisinferiour

s as we have it should doe, ber s it formalleable, and

Take of the fylings of Steele or Iron, and caft it into the flame of a candle, and you fhall fee it to burne like Saltpeter or Rofin. Take thefe fylings, and infufe them three or foure times in VVater or Wine, as wee vfe to make our Chalibert VVines, till the water or wine haue diffolued all this falt, and then dry it and caft it into the flame, and it fhall not burne, but the liquor will haue a ftrong tafte from this Salt. And this is it which opens obftructions. The aftringent qualitie lyeth in the Terreftriall fubftance, as is euident, after either, by infufions, or by calcination, the volutill falt is departed from it, that which remaines, is very aftringent, and ftayeth all manner of fluxes, &cc.

Concerning Bathes participating with Iron, we have too many examples of them for Fallopius to contradift. We may let him inioy his opinion of the Calderiana, Veronenfia & Villenfia Lucenfia, although it bec against the judgement of all other who have written of them, and it is hard for him to be confident in a negatiue. Wee have examples more then enough to prove the qualitie of Iron in our minerall waters. Balneum Regina in agro Pifano, is actually hot, and from iron. So is Balneum Sancti Cassiani in agro Semensi : So in Balneum Ficuncella, de Russellis, Bora in agro. Florent. Brandula in agro Regiensi, Vesicatoria in Tuscia, Isenbrun by Leige, Forgense in Normandy: the Spa water, Tun. bridge water: Briftoll water by S. Vincents Rocke : all which, fome being hot, and fome cold, participate with Iron, as may be proued, not onely by the confent of all writers, which haue made mention of them, but by the Mynes from whence they come, or by their tafte, or by their vertues.

Copper comes neereft to the nature of Iron, but is more pure, and more cafie of fusion, and will be almost all

Solinander, pag. 193: Venuflus, pag. 159. Baccius lib.6. cap.3 Sauonarola: Renodeus pag: 306.

48

all connerted i one into the or trial. And by cim. The like the Confluence Copper Myn which being w this fimilitade is a fimilitade

Copper canno leffe aftringen laich that it pu tinent, prelen argument that ceedingly, and waters which from Copper if they be fool Copper, they Cellenfia fen f Copper and Copperand G is full of Cop Je in Valefijs. fountaine in l held to come Tinneand which our Co owne vie, but

Cornwall, 21

Silly, which

melted out of

Zwitter, with

but with wor

49

caff it into the arme like Sala. of them three whe to make the to maket t

Iron, we have is to contraof the Galderibough it bee a. alle written of dent in a negalough to prove 3, Baineam Refrom iron. So f: So in Balagro. Florent. a (cia, I fembran pawater, Tunts Rocke : all articipate with confent of all nem, but by the beir tafe, or by

of Iron, but is I will be almost all

all conuerted into Vitrioll. They are conuertible the one into the other, as I have fhewed out of Erker, in Vi Libar. de nat. trioll. And by the practife at Commataw and Smolni-metall. c. 10. cium. The like alfo hath beene fhewed in Cornewall, at the Confluence by Mafter Ruffell. Aristotle alfo tels of a Copper Mynein Thalia, an Iland of the Tyrrhen Sea, which being wrought out, turned to an iron Myne : in this fimilitude of nature, we cannot but judge that there is a fimilitude in qualities, and that Iron being cold, Copper cannot be hot. Temperate it may be, becaule leffe aftringent then Iron, and more clenting: Rhafis faith that it purgeth like a Catharticum, and in his Continent, prescribes it to purge water in dropfies. Another argument that all purgatives are not hot ; It drieth exceedingly, and attenuates and digefts. We have divers waters which participate with it, which if they be pure from Copper it felfe, are very fate and wholelome : but if they be foule, and proceede from the excrements of Copper, they are not wholefome to drinke. Balnea Cellensia seu ferina in Martiana Silua, doc confist of Copper and Allum. The Bath of Fabaria in Rhetia, of Copper and Gold. Aqua de Grotta in agro Viterbiensi is full of Copper; lo is Aqua Iasielli, Balmenm Leucenfein Valefijs: Marcus Paulus Venetus, tels of a greenith fountaine in Perfia, which purgeth exceedingly, and is held to come from Copper.

Tinne and Lead are two of our Staple commodities which our Countrie yeelds plentifully, notonely for our owne vfe, but to fupply other Nations. Tinne is bred in Cornwall, and part of Deuonshire, and in the lfles of Silly, which from thence were called *Cassiterides*. It is melted out of little blacke ftones, which the Dutch call *Zwitter*, with great charge, because they cannot melt it, but with wood coales, which is brought them farre off, H and

and they are faine to runne it ouer two or three times, before they can get out all the Tinne, and yet much of it is wafted in the blaft. I doubt not but it might bee done with Sea-Coale, if they knew the Artifice, and with a great product of Tinne. There is both filuer and gold found in it, but without wafting of the Tinne, wee know no meanes to feuer it. It is in qualitie cold and dry, and yet moues fweat abundantly, as I haue proued.

Lead is melted commonly out of an Oare common to Silver and Lead, as Pliny faith, called Galena. And although Agricola faith of the villachar Lead, that it holds no Siluer, and therefore fitteft for affayes; yet Lazarus Ercker contradicts it out of his owne experience. Our Countrie abounds with it every where, efpecially at the. Peake in Darbishire, and at Mendip in Sommersetshire; Wales also and Cornwall, and Deuon, are full of it.and fo is Yorkelhire and Cumberland. The qualities of it are cold and dry. But for thefetwo metals, wee finde no waters which are infected with them. In Lorayne, they haue Bathes called Plambaria, which fome thinke by reafon of the name, to proceede from Lead : but Iohn Baubinus thinkes they should bee called plumiers, as Pictorius writes it from the French word plumer, a deplumando, because they are fo hot, as they vie to scald fowles in them, to take off their feathers.

Thus much for metals, and all other forts of Minerals, with their feuerall Natures and Bathes infected with any of them. As for mixed Bodies, and flores, and recrements, &c. they are to be referred to the fimple bodies from whence they proceede: As Tutia, Pompholix: Minium, Ceruffa, Sublimatum, Pracipitatum, drc.

CAP.

of the gener

nory first, ma

TOwlm

1 in the bo

mult voderfta

mineral water

Somehaue

created perfect

feedeofthem

tables; and fee

more firme an

corruption in

differing part

by generation

It appeares

Cap. 2: give

of the earth,

there had as

alcended fro

duced and no

rals, that they

poled of in fi

febres in their

beene a receit

that mineral

furned it in a when they ha earth one yea

findemore S

vertues.

Frg. 90.

50

three times, yet muchoi

it might bet

Artifice, and

whither and he Time, wee

litic cold and

have proved.

re common to

ena, And al-

thaticholds

i yet Lazaras

perience. Out

pecially at the.

mmerletilnire;

te ful of it and

qualities of it wee finde no

Lotayne, they

me thinke by

tad: but Juke

plumiers, 25

plamer, a de.

ney vie to feald

onsol Mine-

thes infected

and flores, and

the fimple bo-

ia, Pomphalix:

Cit

them, Ch.

CAP. II.

of the generation of metals in the earth. Their feminary fpirit, matter.

TOw I must shew the generation of these minerals I vin the bowels of the earth, which of necessity wee must vnderstand, before wee can shew the reasons how minerall waters receiue either their actuall heat, or their Fallop.de mevertucs.

tallis cap. 1 I-Libauine de nal.

51

Some have imagined that metals and minerals were metal, capitz. created perfect at the first, feeing thereappeares not any feede of them manifeftly, as doth of Animals and Vegetables; and feeing their fubftances are not fo fluxible, but more firme and permanent. But as they are fubicet to corruption in time, by reafon of many impurities, and differing parts in them, fo they had need to be repaired by generation.

It appeares in Genefis, that Plants were not created perfect at first, but onely in their Seminaries: for Mofes, Cap. 2: giues a reason why Plants were not come forth of the earth, scil. because (as Tremellius translates it) there had as yet neither any raine fallen, nor any dew afcended from the earth, whereby they might be produced and nourifhed : The like we may judge of minerals, that they were not at first created perfect, but difpoled of in fuch fort, as they should perpetuate themfelues in their feuerall kindes. Wherefore it hath euer beene a received Axiome, among the best Philosophers, that minerals are generated, and experience hath confirmed it in all kindes. Our Salt-peter men finde that when they have extracted Salt peter out of a floore of earth one yeare, within three or foure yeares after, they Endemore Salt-peter generated there, and doe worke it ouer H2

ouer againe. The like is observed in Allum and Coperoffe.

And for metals, our Tinners in Cornewall haue experience of Pitts which have beene filled vp with earth after they have wroughtout all the Tinne they could finde in them; and within thirty yeares they have opened them againe, and found more Tinne generated. The like hath beene observed in Iron, as Gandentins Merula reports of Ilua, an Iland in the Adriaticke Sea, vn. der the Venetians, where the Iron breedes continually as faft as they can worke it, which is confirmed alfo by Agricola and Baccius: and by Virgill who faith of it, Illua inexhaust is Chalybum generosa metallis. The like we reade of at Saga in Lygijs, where they dig ouer their Iron Mynes euery tenth yeare. John Mathefine giues vs examples, almost of all forts of minerals and metals, which he hath observed to grow and regenerate. The like examples you may finde in Leonardus Thurneife-De metallis pag. Tus. Erastus affirmes that hee did see in S. Ioachims dale, filuer growne vpon a beame of wood, which was placed in the pit to support the workes: and when it was rotten, the workemen comming to fet new timber in the place, found the filuer flicking to the old beame. Alfo he reports that in Germany, there hath beene vnripe and vnconcocted filuer found in Mynes, which the best workemen affirmed, would become perfect filuer in thirty yeares. The like Modestinus Fachius, and Mathefins affirme of vnrige and liquid filuer; which when the workemen finde, they vie to fay Wee are come too foone. But I neede not produce any more proofes for this purpole, as I could out of Agricola and Libauius, and others, feeing our best Philosophers, both ancient and moderne, doe acknowledge that all minerals are generated. The manner of generation of minerals and metals, is the fame

Lib. 3.C.19.

52

In Sarept.conci. 3.11.0%.

In Alchimia magna. 17.0 19.

Sebaft.Foxina 1.3.6.6. Severinas c.8. p.125.].

fime in all, as is ile, and Theoph and in the math Forthemat itbealikeinall mate bodies, that having m producing oth permated per vi alpirimalifedd not relident in Plants, bat in t ment of Para it by his Platon Vacuum in Con that the Speciv most certaine, the leades of in rais doc not affe tion, concochi their owne in to breede a sup how can they : pell excremen any diffinct p Moreover they tilhment, whe tended in all p ment, which f mented esten on of new ma in, into the fa The matter trouented, Ar

fame in all, as is agreed vpon both by Plato and Aristoile, and Theophrastus : the difference is in the efficients and in the matter.

For the manner of generation of minerals, although it be alike in all, yet it differs from the generation of animate bodies, whether animals or vegetables, in this, Cafalpinus de that having no feede, they have no power or inftin & of metal.l. 1.6 2. producing other individuals, but have their species perpetuated per virtutem seu spiritum semini analogum, by a fpiritual fubstance proportionable to feede, which is not refident in euery individuall, as it is in animals and Plants, but in their proper wombes. This is the iudgement of Petrus Senerinus, howfoeuer hee doth obscure Cap. 2: it by his Platonicall grandiloquence. And as there is not Vacuum in Corporibus, fo much leffe in Speciebus. For that the Species are perpetuated by new generations, is most certaine, and proued before : that it is not out of the feedes of individuals, is evident by this, that if minerals doe not allimulate nourilhment by attraction, retention, concoction, expulsion,&c. for the maintenance of their owne individuall bodies, much leffe are they able to breede a superfluitie of nourishment for seede. And how can they attract and concoct nourifhment, and expell excrements, which haue no vaines nor fibres, nor any diftinct parts to performe these Offices withall? Moreouer they are not increased as Plants are, by nourilhment, whereas the parts already generated, are extended in all proportions by the ingreffion of nutriment, which fils and enlarges them: but onely are augmented externally vpon the fuperficies, by fuperadditi- Eraft. diffut, on of new matter concocted by the fame vertue and fpi- part 2. p. 2623 rit, into the fame Species.

The matter whereof Mineralls are bred, is much controuerted, Aristorle makes the humidity of water and

H 3

the

53

n and Cope.

all hancespevp with carth it they could by has opene generated. indentin Menicke Sea, vn. s continually smed alfo by Sinh of it, 1/a. The like we lig ouer their SED ME SILLES VS a and metals, course. The 14 Tearneile. S. Leachims id, which was and when it t new timber he old beame, tath beene vntes, which the erfect liber in s,and Mothetich when the tome too forme. s for this purim, and others, int and moare generated. d metals, is the fime
Of naturall Bathes,

the dryneffe of earth to bee the matter of all Mine.

Eraftus, Carerius, Cafalpinus, Martinus; Morefinus, Foxius, Magy rus, Libavina.

54

Libav.de nat. metall c.14. Carerins 178.

septal. in Hipp. be two places for the generation of minerals : the one a de acresaqu. Oc.

ralls : the dryneffe of earth to participate with fire, and the humidity of water with ayre, as Zabarella interprets it; fo that to make a perfect mixt body, the foure Elements doe concurre : and to make the mixture more perfect, thefe must be refolued into vapour or exhalation by the heat of fire, or influence from the Sunne and other Planets, as the efficient caule of their generation : but the caufe of their congelation to bee cold in fuch bodies as heat will refolue. This vapour confifting partly of moyflure, and partly of dryneffe, if all the moyfture belpent, turnes to earth or falt, or concrete invces, which diffolue in moviture : if fome moviture remaine before congelation, then it turnes to ftone : if this dry exhalation be vnctuous, and fat, and combu-3 Meteor. c.ule. ftible, then Bitumen, and Sulphur, and Orpiment are cafalp.1.3.5.1. bred of it : if it be dry and incombustible, then concrete iuyces, &c. But if moy fure doe abound in this vapour, then metals are generated which are fulible and malleable. And for the perfecting of these generations, this exhalation is not fufficient, but to give them their due confistence, there must be the helpe of cold from Rocks in the earth to congeale this exhalation. So that here must be two efficients, heat and cold. And for the better effecting of this, these exhalations doe infinuate themselues into stones, in the forme of dew or frost, that is, in little graines ; but differing from dew and froft in this, that these are generated after that the vapour is conuerted to water ; whereas Minerals are generated before this conucrfion into water. But there is doubt to be made of frost, because that is bred before the conversion of the exhalation into water, as may appeare, Meteor. 1. According to this affertion there must institix, where forme of an exhe to a frond plac coldnelle of Ro minerall water

an

lation. Thisistheg

flotle ; butitis foruples, both o For the matter, camb should ma you can expect theone is cold. therefore as ht t particular mine metals are mad able and exten by cold, as we l mineral quality ter is not the cl imbibed lowe the nature of pu mineralls in th what should b no minerall qu this minerall qu pour of it the e the effect of wa potential facu metallin wates metall, and fo the power and not perfected This concodi

matrix,

r of all Mine.

with fire, and

abarella inter-

ody, the fourt

e mixture more

our or ethilari-

the Sunne and

cir generation :

e cold in fuch

our confiding

effe, if all the

it, or concrete

lome moyilune

esto flone : if

t, and combu-

Orpiment are

ic, then concrete

in this vapolit,

ible and malle.

enerations, this

them their due

ald from Rocks

. So that here

And for the bet-

s doe infinitate

dew or froft,

from devy and

er that the va-

s Minerals are

ater. Ber there

at is bred before

ater, as may ap-

rtion there must

crais : the enca

mittix,

matrix, where they receive their effence by heat in forme of an exhalation, and from thence they are fent to a fecond place to receive their congelation by the coldneffe of Rocks : and from this *matrix* come our minerall waters, and not from the place of congelation.

55

This is the generation of minerals, according to Ariforle ; but it is not fo cleare, but that it leanes many foruples, both concerning the matter, and the efficients. For the matter, it feemes not probable, that water and carth fhould make any thing but mudde and dirt; for you can expect no more from any thing then is in it, the one is cold and dry, the other cold and moyft; and therefore as fit to be the matter of any other thing, as of particular mineralls. And water, whereof principally metals are made to confift, is very vnfit to make a malleable and extentible fubftance, efpecially being congeled by cold, as we may fee in yce. But fome doe adde a minerall quality to thefe materials, and that fimple water is not the chiefe matter of metals, but fuch as hath imbibed fome minerall quality, and fo is altered from the nature of pure water. This affertion doth prefuppole mineralls in the earth before they were bred : otherwife what fhould breed them at the first, when there was no minerall quality to be imparted to water ? Againe, this minerall quality either giues the water or the vapour of it the effence of the minerall, and then it is not the effect of water, but of the minerall quality, or the potentiall faculty to breed it. If the effence, then this metallin water, or vapour, must have the forme of the metall, and fo be fulible and mallcable. If it have only the power and potentiall faculty, then the generation is not perfected, but must expect further concoction. This concoction is faid to be partly by heat, and partly by

Of natural Bathes,

by cold; if by heat, it must be in the passages of the exhalation as it is carried in the bowels of the earth : for, afterwards when the exhalation is fetled in the ftones, the heat is gone. Now if the concoction bee perfected before the exhalation be infinuated into the Stones, as it must be, if it be like dew, then is it perfect metall, and neither is able to penetrate the Stones, nor hath any neede of the cold of them to perfect the generation. If by cold, it is ftrange that cold fhould be made the principall agent in the generation of metals, which generates nothing; neither can heate be the efficient of these generations. Simple qualities can have but simple effects, as heate can but make hot, cold can but coole, &c. But they fay cold doth congeale metals, because heate doth diffolue them; I answer, that the rule is true, if it bee rightly applied: as weefee yee which is congealed by cold, is readily diffolued by heate. But the fusion of mephilosoph. c. 49. tals cannot properly bee called a diffolution by heate, because it is neither reduced to water or vapour, as it was before the congelation by cold, nor is it permanent in that kinde of diffolution, although after fusion it thould bekept in a greater heat then cold could be which congealed it. For the cold in the bowels of the earth cannot be fo great, as it is vpon the superficies of the earth, feeing it was neuer obferued that there was any yce bred there. Wherefore this diffolution which is by fulion, tends not to the destruction of the metal (but dothrather make it more perfect) as it fhould doe according to the former rule rightly applied. And therefore this diffolution by fusion, doth not argue a congelation by cold: which being in the paffiue elements, doth rather attend the matter then the efficient of generations: for it is apt to dull and hebetat all faculties and motions in nature, and fo to hinder generations, rather then to further

Valefius Cacra

56-

further any. It rations, 250 and bamarasecalor

And thus T rals, where his for the collect Mynes, thea doth rightly it Tals to be Sacci more realon,be Gilgill would thefe two bein in the earth. Mercine the and Vitrioll, H these material is enough for generations, # There is a bowels of the matter and ac to produce mi the matter w Workes vpon an actuall bea which actual! the matter. T the graynes of generative Spi and the fupe might choal Stedesgather

tic of many s

WOrke natur

57

lages of the ex-

he carth ; for

in the Atones,

abee perfected

othe Stones, as

test metall, and

nor hah any

eneration. Hby

ade the princi-

hich generates

t of the legene.

mpleeffects, 25

coole, bic. Bot

aule heate doth

s truc, if it bee

is congealed by

the folionolime.

ution by heate,

t vapour, as it

e isie permanent

h after fulion it

could be which

els of the earth

operficies of the

lat there was any

tion, which is by

f the metal (but

could doe accor-

. And therefore aca congelation

ements, doth ra-

or ofgenerations:

ies and motions , rather thento

ferther

further any. It is heate and moy flure that further generations, as Ouid faith, Quippe vbi temperiem sumpfere humorquecalorque, Concipiunt.

And thus much for Aristotles generation of minerals, where his vapours or exhalations doe rather ferue for the collection or congregation of matter in the Mynes, then for the generation of them; as Libauius Singularium doth rightly judge. Agricola makes the matter of mine-lib. 1.9411.1 rals to be Succus Lapidescens Metallificus, Gc. and with more reason, because they are found liquid in the earth : Gilgill would haue it Alhes; Democritus Lyme: but thele two being artificiall matters, are no where found in the earth. The Alchymifts make Sulphur and Mercorie the matter of metals : Libauius, Sulphur De vat. metal. and Vitrioll. But I will not ftand vpon difcourfing of cap. 10. thefe materials, becaufe it makes little to my purpofe. It is enough for my purpose to shew the manner of these generations, which I take to be this.

There is a Seminarie Spirit of all minerals in the bowels of the earth, which meeting with conuenient matter and adjuuant caufes, is not idle, but doth proceed to produce minerals, according to the nature of it, and the matter which it meetes withall : which matter it workes vpon like a ferment, and by his motion procures an actuall heate, as an inftrument to further his worke; which actuall heate is increased by the fermentation of the matter. The like we fee in making of malt, where the graynes of Barley being moyflened with water, the generative Spirit in them, is dilated, and put in action; and the fuperfluitie of water, being remoued, which might choake it, and the Barley laid vp in heapes; the Seedes gather heat, which is increased by the contiguitie of many graines lying one vpon another. In this worke natures intent is to produce moe individuals, according

Of Naturall Bathes

according to the nature of the Seede, and therefore it shootes forth in spyres: but the Artist abuses the intention of nature, and conuerts it to his end, that is, to increase the spirits of his Malt. The like we finde in minerall fubftances, where this spirit or ferment is refident, as in Allum and Copperos mynes, which being broken, exposed and moystened, will gather an actuall heate, and produce much more of those minerals, then else the myne would yeeld: As Agricola and Thurneiser doc affirme, and is proued by common experience. The like is generally observed in Mynes, as Agricola, Erastus, Libanins, &c. doe auouch out of the daily experience of minerall men, who affirme, that in most places, they finde their Mynes fo hot, as they can hardly touch them: although it is likely that where they worke for perfect minerals, the heate which was in fermentation, whilft they were yet breeding, is now much abated: the minerals being now growne to their perfection. And for this heate wee neede not call for the helpe of the Sunne, which a little cloude will take away from vs, much more the body of the earth, and Rocks; nor for fubterraneall fire: this imbred heate is fufficient, as may appeare alfo by the Mynes of Tinglaffe, which being digged, and laid in the moyft ayre, will become very hot. So Antimony and Sublimat being mixed together, will grow fo hot as they are not to be touched: If this be fo in little quantities, it is likely to bee much more in great quantities and huge rockes. Heate of it felfe dif-Carerius p 217. fers not in kinde, but onely in degree, and therefore is inclined no more to one Species, then to another, but as it doth attend and ferue a more worthy and fuperiour faculty, luch as this generatiue spirit is. And this spirit doth conuert any apt matter it meetes withall to his owne Species, by the helpe of heate; and the earth is full

58

fall of fach mat things : and oft adiount caules cies: but is apt 1 generative (pir Elements then the Elements, felues, doe live knowledged b Morifican CESI wife to attribu Andthisisth minerallipecie A. Nes cons hath his prope Species accor hismatter, A that they at a ther malculin fuperment Species, whit minerals, eith ter, or the vig neration of n

> Ofthecan We in miner REEL

IOw Ico ceive bo

nd therefore in

ules the inten-

that is, to in-

finde in mine-

ent is refident,

a being broken,

actual beate,

is, then elfe the

Tourneiser doc

ience, Thelike

icola, Erafina,

aily experience

of places, they

hardly touch

hey worke for

n fermentation,

uch abated the erfection. And

ic helpe of the

away from vs.

Rocks; nor for

mcient, as may

, which being

ill become very nixed together, ched: If this be much more in of it felfe dif.

nd therefore is

another, but as y and superiour

And this fpint

withall to his

nd the carth is ful full of fuch matter which attends vpon the Species of things : and oftentimes for want of fit opportunitie and adiquant causes, lyes idle, without producing any Species: but is apt to be transmuted by any mechanicall and generative (pirit into them. And this matter is not the Elements themselues, but subterraneall Seeds placed in the Elements, which not being able to live to themfelues, doe live vnto others. This feminarie Spirit is ac- Foxius, Marknowledged by most of Aristotles interpreters, (and tinus, Moresi-Morifinus cals it Elphesteria) not knowing how other- Libavius, Velwife to attribute thefe generations to the Elements. Carerius, Era-And this is the caufe why fome places yeeld fome one flus, Severinus. minerall species aboue another. Quippe solo natura subeft. Non omnis fert omnia tellus. The feminary Spirit hath his proper wombs where it relides, and formes his Species according to his Nature, and to the aptneffe of his matter. But as Senerinus affirmes of animall feedes, that they are in themselues Hermaphroditicall, and neither masculine nor feminine, but as they meete with fuperuenient caufes, fo it is in these minerall Seedes and Species, which in one wombe doe beget divers forts of minerals, either according to the aptnelle of the matter, or the vigour of the Spirits. Thus much for the generation of minerals, &c.

CAP. IO.

Of the causes of actual beat, and medicinable virtue in minerall waters. Diuers opinions of others, reietted.

NOw I come to thew how our minerall waters receiue both their actuall heat, and their virtues. I ioyne I 2

Of naturall Bathes,

60

ioyne them together, becaufe they depend vpon one and the fame caufe, vnleffe they bee inyces which will readily diffolue in water, without the helpe of heat : 0ther minerals will not, or very hardly.

This actuall heat of waters have troubled all those that have written of them, and many opinions have beene held of the caules of them.

Some attribute it to wind, or ayre, or exhalations included in the bowels of the earth, which either by their owne nature, or by their violent motion, and agitation, and attrition vpon rocks and narrow. pallages, doe gather heat, and impart it to our waters. Of their owne nature these exhalations cannot bee fo hot, as to make our water hot, especially seeing in their paffage among cold rocks, it would bee much allaied, having no supply of heat to maintaine it. Moreouer, where water hath paffage to get forth to the fuperficies of the earth, there thefe exhalations and windswill eafily paffe, and fo their heat gone withall, and fo our waters left to their naturall coldneffe : whereas wee fee they doe continue in the fame degree and tenor, many generations together. If by their agitation and violent motion they get this heat, because no violent thing is perpetuall or conftant: this cannot be the caufe of the perpetuall and conftant heat of water. Befides, this would rather caufe earthquakes and ftormes, and noyfes in the earth, then heat our fprings. Moreouer, wee dayly observe that water is neuer heated by winds, or agitation ; as in the Cataracts of the Rhein by Splug; the agitation and fall of water vpon rocks is most violent, and makes a hydrous noyfe ; yet it heats not the water, though it be very deepe in the earth. Nei-Valefins contro. ther can any attrition heat either ayre, or water, or any foft, and liquid thing, but rather make it more cold. Others

lib.4.cap.3. Solinanddis.C.4.

Others attr Sunne, whole earth, doe bet and beames, n opecially wh withall, and effentially in whole beame is excluded, h clude the beat mud wall, or ground; boy To deepe into Lacretine fait

> 211 Pera Prafe 18/171

Andifthe in the middeli rancall water In the winter Sanne, then the waters Ib of the ablence alke, Neithe the Sonnes pr rather dimini adde cold to the heat/doth leffe; otherwi themixpurco

Others attribute this actuall heat of Baths vnto the Sunne, whofe beames peircing through the pores of the earth, doe heat our waters. The Sunne by his light and beames, no doubt, doth warme these inferiour parts, especially where they have free passage, and reflection withall, and it is to be indged, that the heat not being essentially in the Sunne, is an effect of the light by whose beames it is imparted to vs. So as where light is excluded, heat is also excluded. And if we can exclude the heat of the Sunne by the interposition of a mud wall, or by making a Cellar fix foot vnder the ground; how is it likely that these beames can peirce fo deepe into the earth, as to heat the water there ? as *Lucretius* faith.

> Qui queat hic subter tam crasso corpore terram Percoquere humorem, & calido sociare vapori? Prasertim cum vix posit per septa domorum Insinuare suum radijs ardentibus astum.

And if the Sunne be not able to heat a ftanding Poole in the middeft of Summer, how fhould it heat a fubterraneall water, which is alwayes in motion, efpecially in the winter time ? Againe, if this heat come from the Sunne, then in the Summer, when the Sun is hotteft, the waters fhould be fo alfo, and in winter cold, becaufe of the ablence of the Sunne; but we finde them alwayes alike. Neither can any Antiperiftafis be equivalent to the Sunnes prefence to continue their heat. It fhould rather diminish it by the opposite quality of cold : for, adde cold to any heat, and the cold by working vpon the heat, doth bring it to a temper, and makes the heat leffe; otherwife how should a temperament arise from valef. cont.c.s. the mixture of the Elements, if there were not a reacti- Magnusl.3.c.3

S2UIU231

I 3

on,

61

end vpon one es which will re of heat : 0.

ibled all choic opinions have

or exhalations which either cat motion, and nation. to our waters. cannot bee lo ally seeing in bee much almen. Moreorth to the fuons and winds thall, and fo : Whereas wee and tenor, maation and viooviolent thing the caule of the Belides, this ks, and novloreouer, wee by winds, or in by Splug; is most no. t it heats not earth. Neiwater, or any it more cold, Others

Of naturall Bathes,

62

on, and a refiftence, which reduceth the mixture to his temperament. Wherefore this Antiperiftafis is an idle inuention to maintaine this purpofe.

Others attribute this actuall heat to quick Lyme, which we fee doth readily heat any water caft vpon it, and alfo kindle any combustible fubstance put into it; this is *Democritus* his opinion. To this I answer, that Lyme is an artificiall thing, not naturall, and is neuer found in the bowels of the earth. Besides, if it were found, one infusion of water extinguisheth the heat of it, and then it lyeth like a dead earth, and will yeeld no more heat. So as this cannot procure a perpetuall heat to Baths's neither can the Lymestones without calcination, yeeld any heat to water, nor will breake and crackle vpon the affusion of water, as Lyme doth. VV herefore this opinion is altogether improbable.

Others attribute this actuall heat to a fubterraneall fire kindled in the bowels of the earth vpon Sulphur and Bitumen. Now we are come to hell, which Pitha-Metamorph.15. gor as cals Materiam Vatum, falfique pericula mundi; The dreame of Poets, and a forged feare. The largeft defeription of it is in Virgill : from whence both Diuines and Philosophers deriue much matter : and Baccina doth beleeue that there is such a thing in the center of the earth. But if we observe Virgill well, we shall finde that he propounds it but as a dreame : for in the end of that booke he faith

Entad.6.

Sunt gemina somni porta; quarum altera fertur Cornea, qua veris facilis datur exitus umbris: Altera candenti perfecta nitens Elephanto, Sed falsa ad Cælum mittunt insomnia manes.

ane muxture of the Elements, if there were not a r

Dreames

Dreames Of Horn The other But lets C

Now faith sibills throug gate (Partaga all that I have Ludonica Pin place.

I hope non proue not of i earthyor that il it, to further a to be the caul Vulcanoes Sr achuallheate o mon receiued

First for the the earth, wh hollow, but i of the earth, a any concasin Superficies; a water from th will not agree expell the oth will burne in ly falle, as ex mong the Bit Moreouer,

proceede fro the fire to co

Dreames haue two gates, the one is faid to be Of Horne, through which all true conceits do flee: The other framed all of Iuory rare, But lets out none, but fuch as forged are.

Now faith he, when Anchyfes had led Aineas and Sibilla through Hell, hee lets them forth at the Iuory gate (Portaque emittit Eburna:) As if he should fay; all that I haue related of hell, is but a fiction; and thus Ludonicus Vines interprets it, in his comment vpon this place.

I hope none will thinke that I deny a Hell, but I approue not of the affignement of it to the center of the earth, or that that fire fhould ferue, as *Baccins* would haue it, to further all generations in the earth: and as others, to be the caufe of Fountaines, Windes, Earth-quakes, Vulcances Stormes, Saltneffe of the Sea, &c. nor of the actuall heate of our Bathes, although it be the most common received opinion.

First for the place, it is not likely that the center of the earth, whither all heauie things doe tend, should be hollow, but rather more compact then any other part of the earth, as likewife *Valefius* thinkes: but if there bee any concauities, they are betweene the Center and the Superficies; and these concauities being receptacles of water from the Sea, cannot also receive fire. These two Baccius lib.1. will not agree together in one place, but the one will cap. 19. expell the other : for whereas fome hold that Bitumen will burne in water, and is nouriscue by it, it is absolutely false, as experience shows; and I have touched it among the Bitumina.

Moreouer, if the heate which warmes our Bathes did proceede from hence, there must be huge veffels aboue the fire to containe water, whereby the fire might heate

it,

63

hixture to his bafis is an idle

quick Lyme,

call vport it,

e put into it;

anlwer, that and is neutr es, if it were the heat of will yeeld no erpenal hear nthout calcibreake and Lyme doth. probable. [abterranea]] pon Salobur which Pithetenla muzai: The largelt tce both Di. ter : and Barng in the cen-

altera fertar un mobră : banto, ia mames.

well, we shall

e: for in the

Dreattes

Of natural Bathes,

64

it, and not be quenched by it. Alfo the vapours arifing from hence, must bee hotter then water can endure, or be capable of: for as they alcend towards the Superficies of the earth, they must needes bee cooled as they passed by rockes, or elfe they could not be congealed into water againe: and after this congelation, the water hath lost most of his heate, as we finde in our ordinary distillations of Rose water, &c. where we see our water to descend into the receiver, almost cold; so that they cannot derive our hot Bathes from hence.

Secondly, for the fire it felfe, although water and ayre may be received into the bowels of the earth, yet there is great difficulty for fire. For the other two neede no nourishment to support them, as fire doth. If there bee not competencie of ayre to nourilh the fire, howfocuer there be fewell enough, it is fuddenly quenched, and fuch huge fire as this must be, will require more ayre, then can there be yeelded: a great part thereof paffing away through the fecret creekes of rocks, and little or none entring through the Sea. And therefore daily experience fhewes, that our minerall men are faine to finke new Shafts (as they call them) to admit ayre to their works, otherwife their lights would goe out. Although one would thinke that where many men may have roome enough to worke, there would be space enough for ayre to maintaine a few lights. The like we fee in Cuppingglaffes, where the light goes out as foone as they are applied. Alfo there are no fires perpetuall, as hot Bathes are, but are either extinct, or keepe not the fame tenor. Wherefore fire cannot bee the caufe of this conftant heate of Bathes. Alfo where fire is, there will be fmoake, for as it breedes exhalations, fo it fends them forth. But in most of our hot Bathes wee finde none of these dry exhalations. Moreouer fire is more hardly pend in then ayre;

ayre, yet wele fire thould allo maintaine it. S Heckin Ifelan in Engris, Æo their eruption caule, but one cies of the can and meanes er cafual meanes there is neither kindleit: feein Winde, or o nings, can doe beames of the clude Lightni Thirdly, f

cesinthebow

fire, Bitumen a

there can be

Sulpher is

that if water di although it be contract from actuall heate, all hot waters ters bot (as is The Bathes fi, De Gruta in war in agro La cyc. are all h by fmell or ta all fulphorom Bathes of Zu

apours ariting

an endure, or

the Superfi-

cooled as they

congealed in-

ion, the water

n our ordinary

feeour water

is to that they

nater and ayre

eth, yet there

INO DEEDE NO . If there bee

at, howlocuer ached and fuch

ore ayre, then

f patting away

little or some

e daily experi-

ine to linkenew

o their works,

Although one

ay have roome

nough for ayre

e in Copping.

as they are ap-

, as hot Bathes

he fame tenor.

of this conflant

will be imoake,

them forth. Bor

se of these dry

ly pendinthen

stil;

ayre, yet we lee that ayre doth breake forth : wherefore fire should also make his way, having fewell enough to maintaine it. So they fay it doth in our Vulcanoes at Hecla in Ifeland, Ætna in Sicily: Vesuuio in Campania: in Enaria, Æolia, Lipara, &c. But it is yet vnproued that these eruptions of fire, doe proceede from any deepe caufe, but onely are kindled vpon or neereche fuperficies of the earth, where there is ayre enough to feede it, and meanes enough to kindle it by lightnings, or other cafuall meanes. Whereas in the bowels of the earth, there is neither ayre to nourish it, nor any meanes to kindleit: feeing neither the beames of the Sunne, nor Winde, or other exhalations, nor Lyme, nor Lightnings, can doe it. For the fame reafons that exclude the beames of the Sunne and exhalations, will likewife exclude Lightnings.

Thirdly, for the fewell, there are onely two lubitances in the bowels of the earth, which are apt fewels for fire, Bitumen and Sulpher.

Sulpher is in fuch request with all men, as they think Donatius de nthere can be no hot Bath withoutit : nay many hold, quis lucemabus that if water doe but passe through a myne of Brimstone, although it be not kindled, but actually cold, yet it will contract from thence, not onely a potentiall, but an actuall heate. But we doe manifeltly finde, that neither all hot waters are fulphurous, nor all fulphurous waters hot (as is faid before in Sulpher.)

The Bathes of Caldanella and Auinian, in agro Senenfi, De Grottain viterbio, De equis in pifano, Dini Iohannis in agro Lucensi, Balneum Geber suilleri in Halfatia, ere. are all hot, and yet give no ligne of fulphur, either by fmell or tafte, or qualitie, or effect. Contrariwife that all fulphurous waters are not hot, may appeare by the Bathes of Zurich in Heluctia, of Buda in Pannonia, at K Cure

Of Naturall Bathes

Cure in Rhetia, Celenfes in Germany. In Campania, betweene Naples and Buteolum, are many cold fulphurous Springs. At Brandula in agro Carpenfi, erc. All which Bathes fnew much Sulphur to be in them, and yet are cold. And no meruaile, for if we infule any fimple, be it neuer fo hot potentially, yet it will not make the liquor actually hot. Wherefore this Sulphur must burne before it can giue any actuall heate to our Bathes; and then it must needes be subject to the former difficulties, and alfo must bee continually repaired by new generations of matter, which actuall fire cannot further, but rather hinder. The fire generates nothing, but confumes all things.

The like we may judge of Bitumen, that vnlefle it be kindled, it can yeeld no heate to our Bathes : as Solinander reports of a Bituminous Myne in Westfalia in agro Tremonensi, where going downe into the groue, hee found much water, having the mell, tafte, and colour of Bitumen, and yet cold. Agricola imputes the chiefe caule of the heating of Bathes, vnto the fewell of Bitumen, Baccius on the other fide to Sulphur. But in mine opinion, they need not contend about it. For as I have fhewed before in the examples of minerall waters, there are many hot Springs, from other minerals, where neither Sulphur nor Bitumen haue beene observed to be. Iohn de Dondis, and Iulius Alexandrinus, were much vnlatisfied in these opinions, and did rather acknowledge their ignorance, then that they would fubfcribe vnto them. I neede not dispute whether this fire be in Alueis, or in Canalibus, or in Vicinis partibus, erc. be. caule I thinke it is in neither of them.

CAP.

The Asibor beat, and med 國外

> Avis DM Trita

Itratel Ofany le

Whichm

if Idocerre i doeit in dilqu I have in nion concern have their fer rits, and facul consident m the generation ture of the eff worke of get

Batt be corri without a fup

ting it lefte, w bring it to hi

WHereb the canfes of e to propound a more true and mentioned by Ateps to follow

Lib. I. Culs.

CAP. 13.

67

The Authors opinion concerning the cause of actuall heat, and medicinable virtue in minerall waters.

We doubtfull and weakely grounded, concerning the caufes of the actuall heat of Baths : let me prefume to propound another, which I perfwade my felfe to bee more true and certaine. But becaufe it hath not beene mentioned by any Author that I know, I haue no mans fteps to follow in it.

Avia Doctorum peragro loca, nullius ante Trita folo.

I trauell where no path is to be feene Of any learned foot that here hath beene.

Which makes me fearfull in the delivery of it. But if I doe erre in it, I hope I shall not be blamed; feeing I doe it in disquisition of the truth.

I have in the former Chapter fet downe mine opinion concerning the generation of minerals; that they have their feminaries in the earth replenished with spirits, and faculties attending them: which meeting with convenient matter and adjuvant causes, doe proceede to the generation of several species, according to the nature of the efficient and aptnesses, according to the nature of the efficient and aptnesses, according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the nature of the efficient and aptnesses according to the matter. In this worke of generation, as there is generation anise, for there must be corruptio alterism. And this cannot bee done without a superiour power, which by moyfure, dilating it felfe, worketh vpon the matter, like a ferment to bring it to his owne purpose. This motion betweene K 2 the

erents nothing, intervalefie it be ass: as Solinan-Nelthila in agro the groue, hee afte, and colour putes the chiefe e fewelh of Bira-

bur. But in mine

t. For as I have

all waters, there

erals, where peie observed to be,

w, were much rather acknow-

roald fubscribe

er this fire be in

ertibus, or. be.

In Campania, nany cold fil. Carpenfi, fro

to be in them,

il we infule any yet it will not

we this Sulphur

all heate to our

A to the former

ly repaired by

all fire cannot

Cali

Of natural Bathes,

which have be

Cornewalldo

and suga befor

ficient meane

that if the ad

neede be no

their equal T

Nowforth

heate, as that

with moysfure

the other doth

teft Bathes th

place where t part the qualit

heate, by realic

in their liqui

bodies. For a

them that wil

be the coacre

is procured b

lyeth vpon a

corpus continu

and changing

by fuffering

lidation, any

or Tincture o

munic (as is fa

actual fire ki

minerals, wh

pate the Spin

with them af

tennate them

to water. Fo

melted in the all fire were [

68

the agent spirit, and the patient matter, produceth an actuall heat (ex motufit calor) which ferues as an inftrument to further this worke. For as cold duls, and benumbes all faculties, fo heat doth quicken them. This I shewed in the example of Malt. It is likewife true in euery particular grayne of Corne, fowen in the ground, although by reafon they lyc fingle, their actuall heat is not discernable by touch ; yet wee finde that externall heat and moyfture doe further their spiring, as adjuvant causes : where the chiefe agent is the generative spirit in the feed. So I take it to bee in minerals, with those distinctions before mentioned. And in this all generations agree, that an actuall heat, together with moyfture, is requisite : otherwise there can neither be the corruption of the one, nor the generation of the other. This actuall heat is leffe fenfible in fmall feeds and tender bodyes, then it is in the great and plentifull generations, and in hard and compact matter : for hard bodies are not fo cafily reduced to a new forme, as tender bodies are; but require both more spirit, and longer time to be wrought vpon. And therefore whereas vegetable generations are brought to perfection in a few moneths, these minerall generations doe require many yeares, as hath beene observed by minerall men. Moreouer, these generations are not terminated with one production, but as the feed gathereth ftrength by enlarging it felfe; fo it continually proceeds to fubdue more matter wnder his gouernment: fo as, where once any generation is begun, it continues many ages, and feldome giues ouer. As we fee in the Iron mynes of Ilma, the Tinne mynes in Cornwall, the Lead mynes at Mendip, and the Peake, &c. which doenot only ftretch further in extent of ground, then have beene obferued heretofore ; but alfo are renewed in the fame groues which

which have beeneformerly wrought, as our Tinners in Cornewall doe acknowledge; and the examples of *Ilma cap.*11. and *Saga* before mentioned doe confirme. This is a fufficient meanes for the perpetuitie of our hot Springs: that if the actuall heate proceede from hence, there neede be no doubt of the continuance of them, nor of their equall Tenor or degree of heate.

Now for the nature of this heate, it is not a deftructive heate, as that of fire is, but a generative heate ioyned with moyfture. It needes no ayre for cuentilation, as the other doth. It is in degree hot enough for the hottelt Bathes that are, if it bee not too remote from the place where the water iffucth forth. It is a meanes to impart the qualities of minerals to our waters, as well as heate, by reason the minerals are then in folutis principijs, in their liquid formes, and not confolidated into hard bodies. For when they are confolidated, there are few of them that will yeeld any quality to water, vnleffe they be the concrete inyces, or any actuall heate, because that is procured by the contiguity of bodies, when one part lyeth vpon another, and not when they are growne In corpus continuum. As we lee in Malt, where by turning and changing the contiguitie, the heate is increased, but by fuffering it to vnite, is quenched : But before confolidation, any of them may yeeld either Spirit, or Iuyce, or Tincture to the waters, which by realon of their tenuitie (as is faid before) are apt to imbybe them. Now if actuall fire kindled in the earth, fhould meete with thefe minerals, whilft they are in generation, it would diffi- Thurseifer Alpate the Spirits, and deftroy the Minerals. If it meete chimia magna with them after confolidation, it will neuer be able to at- "ib-4.cap.8. tenuate them fo, as to make them yeeld their qualities to water. For wee neuer finde any Metals or Minerals melted in the earth, which must be, if the heate of actuall fire were fuch as is imagined : neither doe wee euer finde K 3

oduceh an is an infiru. ils, and betem. This alle true in the ground, ctuall best is hat external as adiuvant atuse spirit. with those is all genera. with moyther be the if the other. tos and ten. tifall genera-: for hard me, astenrit, and lonore whereas tion in a few equire many men. More. d with one igth by ens to fubdue here once a. ages, and felynes of Lima, id mynes at only french ene oblerned fame grones which

Of naturall Bathes,

70

finde any floores of metall fublimed in the earth. This naturall heat is daily found by our Minerall men in the Mines, fo as oftentimes they are not able to touch them, as Agricola teftifieth ; although by opening their groues and admiffion of ayre, it fhould be wel qualified. Whereas on the other fide, it was never obferued, that any actuall kindled fire was ever feene by workmen in the earth, which were likely to be, if these fires were so frequent.

Wherefore feeing we fee that Minerall waters do participate with all forts of Minerals, as well metals, as other, as hath beene shewed in the particular examples of all of them : feeing alfo that few of them, vnleffe Minerall iuyces, are able to impart their quality to water, as they are confolidated, but only as they are in folutis principijs, and whilft they are in generation, as is agreed vpon by all Authors : feeing alfo this naturall heat of fermentation must necessarily be present for the perfecting of their generations, and is fufficient, in regard of the degree of heat to make our Baths as hot as they are : feeing alfo that the other aduentitious fire, would rather deftroy these Minerals, then further them : feeing allo we cannot imagine it either likely, or poffible, without manifold difficulties, and absurdities : I doe conclude that both the actuall heat of Baths, and the Minerall qualities which they have, are derived vnto them by meanes of this fermenting heat.

Examples might be brought from all kinde of generations, and from fome artificiall works, of this fermenting heat proceeding from the feeds of naturall Martin, de pri- things. Thefe feeds containing the fpecies, and kinds ma-generatione. of naturall bodies, are not from the Elements, but are placed in the Elements, where they propagate their

fpecies, and individuals, according to their nature;

busic were fuch as is imagined : neither doe wee cuer

and have their the Stage of th when their fpe once, fome to inthefpring hur; 25 Virgi of his excelle finde.

Vegetables planting, as th molt consenie moyfure and and attempt i oftentimes the ture, and com being let in al Want conlice when we lee a ceined moyft Malt, or Wo make vie oft may farre vp would not be our Winew want thole lo andbenumbe tation. And though it app becaule it is t fure: yet we bubling and which as the pagation of the 10 they have

71

and haue their ductimes and feafons of appearing vpon the Stage of the World. Animals haue their fet times when their fpermatick fpirits are in turgefcence, fome once, fome twice a yeare, and fome oftner : efpecially in the fpring : vere magis, quia vere calor redit offibus; as Virgill fpeakes of Mares : only man in regard of his excellency aboue other creatures, is not fo confinde.

Vegetables haue likewife their feafons of fetting and planting, as they may have the earth and the feafon most convenient : yet at any time, if their feeds get moyfure and heat to dilate them, they will ferment and attempt the production of moe individuals : but oftentimes the Artift doth abuse this intention of nature, and conuerts it to his ends : and oftentimes nature being set in action to proceede à potentia in actum, doth want conuenient meanes to maintaine her worke: as when we fee a Ryck of Hay or Corne which hath receiued moyflure, burnt to alhes. So in the making of Malt, or Woad, or Bread, or Beere, or Wine, &c. wee make vie of this generatiue spirit for our ends : that we may ftirre vp, and quicken it. Otherwife our Bread would not be fo fauory, our Beere would be but Wort, our Wine would bee but Muft, or Plumpottage, and want those spirits which we defire 3 and which lie dead and benumbed in the feeds, vntillthey come to fermentation. And in all these there is an actuall heat, althoughit appeare not in liquid things, fo well as in dry: because it is there quenched, by the abundance of moyflure: yet we may observe active Spirits in it, by the bubling and hiffing, and working of it. So in minerals, which as they have this generative Spirit, for the propagation of their Species, as hath beene fhewed before, fo they have this meanes of fermentation, to bring them from

arth. This men in the ouch them, thing their elepalified fetted, that workmen in fires were [o

rs do partiis, as other, mples of all fle Mineral iter, as they alis princi. s agreed vpheat of fereperfecting gard of the is they are: vould rather feeing allo ble, without oe conclude he Minerall to them by

de of geneks, of this s of naturall s, and kinds nts, but are pagate their their nature; and

Of natural Bathes,

72

from a potentiall qualitie, to an actuall existence: And as their matter is more plentifull, and in confistence more hard and compact; so these Spirits must bee more vigorous and powerfull to subdue it : and confequently the heate of their fermentation must bee in a higher degree, then it is in other generations. And this is in briefe (though rudely delivered) mine opinion concerning the actuall heate of our Bathes, and of the minerall qualities which we finde in them: which I referre to the cenfures of those that be learned.

There are two other motions which refemble this fermentation. The one is Motus Dilatationis, the other Antipatheticus. Motus Dilatationis is euident in Lyme, in Allum, in Coperos, and other concrete iuyces, where by the effufion of water, the Salt in the Lyme, or the concrete iuyces being fuddenly diffolued, there is by this motion, an actuall heate procured for a time, able to kindle any combustible matter put to it.

The like we obferue in those Stone Coales, called metall Coales, which are mixed with a Marchessit containing some minerall inyce, which receiving moysture, doth dilate it felfe, and growes so hot, as oftentimes great heapes of those Coales are kindled thereby, and burnt before their time; as hath beene seene at Puddle VVharfe in London, and at Newcastle. But this is much different from our fermentation.

Another Motors refembling this fermentation, is that which is attributed to Antipathic, when difagreeing fubftances being put together, doe fight, and make a manifeft actuall heate; as Antimony and Sublimat, oyle of Vitrioll, and oyle of Tartar, Allum Liquor and Vrine, Lees, Chalke, &c. But the reafon of this difagreement is in their Salts, whereof one is aftringent, the other relaxing; the one of cafie diffolution in water, the other other of hard a antipathie: for t wo contrarie ice, but that in bean impedim mine aright w ihall finde it t when not be fuch actions, fometimes to 1 thisinexplicab voluncaries, a fible fubftance fermentation, feription. And on, which I b of the former

By mbas me ny water conta

The natur handled, of the actual Now it is fit w dilcourt what may the better make of them difcourry, bu poort ground of their purp with a bare d

73

other of hard diffolution, &c. and not by reafon of any antipathie: for it is not likely that nature would produce two contrarie substances mixed like atomes in one fubiect, but that in their very generations, the one would be an impediment to the other. Moreouer if wee examine aright what this Sympathie and Antipathie is, we shall finde it to be nothing but a refuge of ignorance, when not being able to conceiue the true reafons of fuch actions, and pattions in naturall things, wee flye fometimes to indefinite generalities, and fometimes to this inexplicable Sympathic and Antipathic: attributing voluntaries, and fenfitiue actions and paffions to infenfible fubstances. This mot us allo is much different from fermentation, as may cafily appeare by the former defcription. And thus much for this point of fermentation, which I hope will give better fatisfaction then any of the former opinions.

CAP. 14. Managed

By what meanes it may be discouered what minerals a. ny water containeth.

Ethey are perfort mixed with cherry

corporally where

The nature of minerals and their generations being handled, and from thence the reafons drawne, both of the actuall heate of Bathes, and of their qualities : Now it is fit we should seeke out fome meanes, how to discouer what minerals are in any Bath, that thereby we may the better know their qualities, and what vie to make of them for our benefit. Many haue attempted this discouery, but by such weake meanes, and vpon such poore grounds, as it is no meruaile if they haue failed of their purpole : for they haue contented themselues with a bare distillation or cuaporation of the water, and L observing

fience: And confiftence fi bee more ahigher deassin briefe assin briefe nerall qualnerall quale to the cen-

clemble this to the other ential lyne, rete inyces, se Lyme, or sed, there is for atime, apic.

s, called mes chefit containg moyfhare, s oftentimes bereby, and ne at Puddle e this is much

ation, is that difagreeing and make a ablimat, oyle quar and Vthis difagreengent, the oin water, the other

with

Of Naturall Bathes

74

observing the fediment, have thereby judged of the minerals, valefie perhaps they finde fome manifest taste, or smell, or colour in the water, or some vactuous matrer fwimming aboue it. Some defire no other argument of Sulphur and Bitumen, but the actual beate: as though no other minerals could yeeld an actual heate, but those two. But this point requires better confideration; and I have beene to large in deferibing the natures and generations of minerals, because without it, wee cannot difcerne what universals we have in our waters, nor indge of the qualities and vse of them.

Our Minerals therefore, are either confused or mixed with the water. If they bee confused they are eafily difeerned : for they make the water thick and pudly, and will either fwim aboue, as Bitumen will doe, or finck to the bottome, as earth, Sulphur, and fome terrestriall iuyces; for no confused water will remaine long vnseparated. If they are perfectly mixed with the water, then their mixture is either corporall, where the very body of the Minerall is imbibed in the water, or spirituall, where either fome exhalation, or spirit, or tincture is imparted to the water.

Corporally there are no mineralls mixed with water, but iuyces, either liquid, as *fuccus lapidefcens metallificm*, &c. before they are perfectly congeled into their naturall confiftence, or concrete, as Salt, Niter, Vitriol, and Allum. And these concrete iuyces doe not only diffolue themselues in water, but oftentimes bring with them fome tincture or spirit from other Minerals. For as water is apt to receive iuyces, and tinctures, and spirits from animals, and vegetables ; so are concrete iuyces, being diffolued, apt to extract tinctures and Spirits from minerals, and to communicate them with water. And there are no Mynes, but have fome of these thele concrete of them, for th are few miners corporated wi and Tinne, an water being k it will receive it be attenuate foure myce; 2 powder, as me of Leade, or F Copper. The france from m in Scietics print and the rather spt toimby by tenuated by h which though great them of cold, doe fett Thefe fpi our Baths, but after enapor fublimation: creale the we or finell of the forewe have theeffects. W Mynes which the mud wh may deceive which the wa I'wear and ftr them. The

75

these concrete inyces in them, to diffolue the materials of them, for their better vnion and mixture: and there are few minerals or metals, but have fome of them incorporated with them: as we fee in Iron, and Copper, and Tinne, and Leade, &c. And this is the reason that water being long kept in Veffels, of any of these metals, it will receiue a tafte and fmell from them, especially if it be attenuated, either by heate, or by addition of fome foure iuyce; and yet more, if the metals be fyled into powder, aswe fee in making Chalibeat wine, or Sugar of Leade, or Puttie from Tinne, or Verdegreafe from Copper. There may be also a mixture of Spirituall fubfrance from minerals, whilft they are in generation, and in Solutis principijs : the water paffing through them, and the rather if it be actually hot, for then it is more apt to imbybe it, and will containe more in it, being attenuated by heate, then being cold; as we fee in Vrines, which though they beefull of humours, yet make no great flew of them fo long as they are warme, but being cold, doe fettle then to the bottome.

These spirituall substances are hardly difeerned in our Baths, but by the effects ; for they leave no refidence after euaporation; and are commonly as volutill in fublimation as the water it felfe : neither doe they encrease the weight of the water, nor much alter the tafte or fmell of them, vnleffe they be very plentifull. Wherefore we have no certaine way to difcouer them, but by the effects. We may coniecture for what of them by the Mynes which are found neare vnto the Baths, and by the mud which is brought with the water. But that may deceive, as comming from the pallages through which the water is conueyed, or, perhaps, from the fweat and ftrigments of mens bodyes which bathe in them. The corporall substances are found, either by fublima-L 2

ed ofthemi. vanifed talls, duous mat. duous mat. transchough see, but those tration; and I res and genete annor difte annor dif-

infed or mixicy are calily and padly, will doe, or ind fome terrefinine long with the wal, where the he water, or or spirit, or

ed with wadefense metalded into their liner, Vitriol, not only diftoring with eher Mineand tischures, i to are conset tinchures punicate them these forme of these

Of naturall Bathes,

76

Sublimation or by precipitation. By Sublimation, when being brought to the flate of congelation, and flickes of Wood put into it, within a few dayes, the concrete inyces will fhoote vpon the wood; in Needles, if it bee Niter; in Squares, if it be Salt; and in Clods and Lumps, if it be Allum or Coperofe; and the other minerall fubftance which the waters have received, will either incorporate a tincture with them, or if it be more terrestriall, will fettle and feparate from it, and by drying it at a gentle fire, will thew from what house it comes, either by colour, tafte, fmell, or vertue : There is an other way by precipitation, whereby those minerall substances are ftricken downe from their concrete iuyces which held them, by addition offome oppofite fubftance. And this is of two forts : either Salts, as Tartar, Soape, Alhes, Kelps, Vrine, &c. Or fowre iuyces, as Vinegar, Lymons, Oyle of Vitrioll, Sulphur, &c. In which I have observed that the Salts are proper to blew colours, and the other to red: for example, take a piece of Scarlet cloath, and wet it in Oyle of Tartar (the ftrongeft of that kinde) and it prefently becomes blew: dip it againe in Oyle of Vitriol, and it becomes red againe.

Thefe are the chiefe grounds of difcouering minerall waters, according to which any man may make tryall of what waters he pleafeth. I have beene defirous heretofore to have attempted fome difcouerie of our Bathes, according to thefe principals: but being thought (by fome) either not convenient, or not vfefull, I was willing to fave my labour, which perhaps might have feemed not to be worth thankes: and in thefe refpects am willing now alfo to make but a bare mention of them.

AP. O A D in curs the second car which the state of a P.

of the of ly. In this foft in gener. Bathe.

Henatu

I led, and preffions, an meanesthey of them. N mult bee di whereof they but common as hot, celd, altringent, (lifying, &c. greed vpon h doe dry exce fome of thos Cooling w the liner, fto fo for falt di of the Mela Heating w mach, bowe ons, Palfyes Forthele al vicers, e Mollifyin 21001

Altringer

CAP. 9.

sation, when , and flickts

the concrete

dles, if it bee

and Lamps,

minerall fub-

eitherincor-

re terrettriall,

ngitatagen. 15, either by

other way

dollances are

s which held

ce, And this

sape, Alles,

inegar, Ly.

which I have

colours, and

e of Scarlet

litrongeli of

ew: dipita.

ting minerall

y make tryall

efirous here-

four Bathes,

thought (by

I was wil.

ght have let-

e refoeds am

as of them,

GAR.

dagaine.

Of the vse of Minerall waters, inwardly, outwardly. In this Chapter is shewed the inward vse of them, first in generall; then particularly of the bot waters of Bathe.

The nature and generations of Minerals being handled, and how our Minerall waters receive their impreffions, and actuall heat from thence; and by what meanes they are to be tried, what Minerals are in each of them. Now we are to fhew the vfes of them; which must bee drawne from the qualities of the Minerals whereof they confift: which are feldome one or two, but commonly moe. These qualities are either the first, as hot,cold,moyst,& dry; or the second, as penetrating, aftringent, opening, resoluing, attracting, clensing, mollifying, &c. For the first qualities, it is certaine and agreed vpon by all Authors; That all Minerall waters doe dry exceedingly, as proceeding from earth : but fome of those doe coole withall, and some doe heat.

Cooling waters are good for hot diftemperatures of the liuer, ftomach, kidneyes, bladder, wombe, &c. Alfo for falt diftillations, fharp humors, light obstructions of the Mefaraicks, &c.

Heating waters are good for cold affects of the flomach, bowels, wombe, feminary veffels, cold diftillations, Palfyes, &c.

For the fecond qualities, clenfing waters are good in all vlcers, especially of the guts.

Mollifying waters, for all hard and fchirrous tu-

Aftringent waters, 'for all fluxes, &c. and fo of the reft.

L 3

Now

Of naturall Bathes,

Now these waters are vied either inwardly or outwardly.

Inwardly, either by mouth, or by injection.

6 de tuenda sanit.cap.9.

78

By mouth, either in potion, or in broaths, iuleps, &c. Galen neuer vied them in wardly, because hee iudged their qualities to be difcouered by experience, rather then by reason. And seeing we finde many of them to be venomous, and deadly, as proceeding from Arsenick, Sandaracha, Cadmia, &c. we had need bee very wary in the inward vie of them.

Neptunes Well in Tarracina was found to be fo deadly, as it was therefore ftopped vp. By Monpellier at Perant is a Well which kils all the fowles that drinke of it ; the lake Auernus kils the fowles that fly ouer it; fo doth the vapour arifing from Charons den betweene Naples and Puteolum. So there are diuers waters in Sauoy and Rhetia, which breede fwellings in the throat. Others proceeding from Gipfum doe ftrangle, &c. But where' we finde waters to proceede from wholfome Minerals. and fuch as are convenient, and proper for our intents, there we may be bold to vie them as well inwardly as outwardly : yet loas we doe not imagine them to bee fuch abfolute remedies, as that they are of themfelues able to cure difcafes without either rules for the vfe of them, or without other helps adioyned to them. For as it is not enough for a man to get a good Damalco or Bilbo blade to defend himfelfe withall, vnleffe he learne the right vse of it, from a Fencer; fo it is not enough to get a medicine and remedy for any difeale, vnleffe it be rightly vied, and this right vie must come from the Phyfitian, who knowes how to apply it, and how to prepare the body for it, what to adde and ioyne with it, how to gouerne and order the vie of it, how to preuent fuch inconueniences as may happen by it,&c.

Wherefore,

Wherefor

ot of any othe

a griefe, we m

wife enogh to

alword is ab

hiseneny, b

ofit. Anda

abfolute rale

may be able it

more is the Pl

cular vies of h

himfelfe with

rection of the

rules toguide

truc and certa

particular pe

heral rales a

varied accord

ly finde, that

feines, out of

ate oftentin

nough to inti

Minerall wa

Bitomen, Ir

hase fet dow

the particula

purpolely de

My inter

Bathsof Bat

I indge, prin

Sulphur, 11

outwardly.

Inwardly waters as pr

79

Wherefore, where we speake of any Minerall water, or of any other medicine that is proper for fuch & fuch a griefe, we must be fo vnderstood, that the medicine is wife enogh to cure the difeafe of it felfe, no more then a fword is able of it felfe to defend a man, or to offend his enemy, but according to the right and skilfull vie of it. And as it is not poffible for a Fencer to fet down absolute rules in writing for his Art, whereby a man may be able in reading of them to defend himfelfe ; no more is the Phyfitian poffibly able to direct the particular vses of his remedy, whereby a patient may cure himfelfe without demonstration and the paticular direction of the Phyfitian. It is true, that we have generall rules to guide vs in the cure of difeafes, which are very true and certaine ; yet when we come to apply them to particular perfons, and feuerall conftitutions, thefe general rules are not fufficient to make a cure, but is iuffly varied according to circumftances. Hereupon we daily finde, that those patients which thinke to cure themsciues, out of a little reading offome rules or remedies, are oftentimes dangeroufly deceiued. And this is enough to intimate generally concerning the vies of our Minerall waters.

Inwardly we finde great and profitable vie of fuch waters as proceed from Niter, Allum, Vitriol, Sulphur, Bitumen, Iron, Copper, &c. Examples whereof I haue fet downe before in the feuerall Minerals, referring the particular vies of each to fuch Authors as haue purpofely deferibed them.

My intent is chiefely to apply my felfe to thole Baths of Bath in Summerfetshire; which confisting, as I iudge, principally of Bitumen, with Niter, and some Sulphur, I hold to be of great vse both inwardly and outwardly. And I am forry that I dare not commend the

dly or out-

on. shaleps,&rc. base indged ence, native y of them to from Arleed bee very

elo deadly, er as Person ke of it : the ; lo doth tene Naples is in Sanov Nom. Others But where ne Minerals, OUE VINENTS, inwardly as hem to bee f them lehoes ir the vie of them. For Damalco or fiche learne not enough le, valeffe it me from the and how to ioyne with now to previtac Wherefore,

Of natural Bathes,

&c. And this

Phylitian fees

that when the

Bath, becanfe

Inwardlya

Inleps, &c. a

will not min

text in Binn

Diureticks, 1

ments, as vitt

well we mine

aliments mon

th babiaron

ill qualitie wh

thus much to

Byiniectio

warme and o

ges of wring, l

the fundamen

of the Sphin

&c. And th

othermedici

fit, and we d

vterin effects

for the inwa

80

the inward vie of them as they deferue, in regard I can hardly be perfwaded that we have the water pure, as the fprings yeeld them, but doe feare, left where wee take them, they may bee mixt with the water of the Bath. If this doubt were cleared, I should not doubt to commend them inwardly, to heat, dry, mollifie, discusse, glutinate, dissolue, open obstructions, cleanse the kidneyes, and bladder, eafe cholicks, comfort the matrix, mitigate fits of the mother, helpe barrenneffe proceeding from cold humors, &c. as Tabernemontanus affirmes of other Bitumious Baths. Alfo in regard of the Niter, they cut and diffolue groffe humors, and cleanfe by vrine. In regard of the Sulphur, they dry and refolue, and mollifie, and attract, and are efpecially good for vterine effects proceeding from cold and windy humors. Our Bath Guides do ufually commend the drinking of this water with falt to purge the body, perfwading the people, that the Bath water hath a purging quality in it, when as the fame proportion of fpring water, with the like quantity of falt will doe the like. Our Baths haue true virtues enough to commend them, fo as we need not fecke to get credit or grace vnto them by falle luggeftions. The Bitumen and Niter which is in them, although it ferues well for an alterative remedy, yet it is not fufficient for an euacuatiue : and therefore we must attribute this purgatiue quality, either to the great quantity of water which they drink (and fo it works) ratione ponderis) or vnto the ftimulation of falt which is diffolued in it, or vnto both together. I fhould like much better to diffolue in it fome appropriate firrup or other, purgatiue, for this purpole, as Manna, Tartar, Elaterium, firrups of Roles, of Cicory, with Rhewbarb, Augustunus: or to moue vrine, Syr. de 5. rad, Bizantinus de Limonibus, Sambucinus de Althea, Orc.

regard I can

ter pure, 25

where wee

ater of the

not doubt

ry, mollific,

Ions, clearly

comfort the

barrennelle

Bement Law

n regard of

nmors, and

ar, they dry

tre elpecially.

ld and win.

ommendthe

he body, per-

th a purging

it loting wa-

helike. Our

nd them, So

e vato them

iner which is

erative reme-

ity, either to nk (and fo it ilation of fait together. I

me appropri-

ole,25 Manna, Cicory, with

Syr. de S.

us de Althes, Gr. 81

&c. And this courfe is vfuall in Italy, according as the Phyfitian fees most convenient, but with this caution, that when they take it in potion, they must not vfe the Bath, because of contrary motions.

Inwardly alfo Bath waters are vsed, for Brothes, Beere, Iuleps, &c. although fome doe miflike it, because they will not mixe medicaments with aliments : wrefting a text in *Hippoer*. to that purpose. But if we may mixe Diureticks, Deoppilatiues, Purgatiues, &c. with aliments, as vsually we doe. I fee no reason but we may as well vse minerall waters, where we defire to make our aliments more alterative by a medicinall qualitie: alwaies prouided that there be no malignitie in them, nor any ill qualitie which may offend any principall part. And thus much for the vse of them by mouth.

By iniection they are vsed also into the Wombe, to warme and dry, and cleanse those parts; into the passages of vrine, to drie and heale excoriations there into the fundament for the like causes, as also for resolutions of the Sphincter, and bearing downe of the fundament, &c. And thus they are vsed either alone, or mixed with other medicines, according as the Physician thinks most fit, and we daily finde very good success thereby in vterin effects, depending vpon cold causes. Thus much for the inward vse of our Bath waters.

empletion M las esteress trul CAP:

learned worke, of the perpendite of the world."

Which I will English one of Mafler Dadhar Richards

Of Naturall Bathes

CAP. 16.

Of the outward vse of the hot waters of Bathe; first sthe generall vse of them to the whole body, in bathing : secondly, the particular vse of them, by pumping, bucketing, or applying the mud.

Ovtwardly our Bath waters are principally vied, becaule they are most properly for fuch effects, as are in the habit of the body, and out of the veines: As Palfies, Contractions, Rheumes, cold tumours, affects of the skin, aches, &c. And in these cases we vie not onely the water, but also the mudde, and in some places the vapour.

The water is vied both for his actuall and potentiall heate, as alfo for the fecond qualities of mollifying, difcuffing, clenfing, refoluing, &c. which the minerals giue vnto it. The vie hereof is either generall to the whole body, as in bathing, or particular, to fome one part, as in bucketting or pumping, which anciently was called *Stillicidium*. The Italians call it *Duccia*. The generall vie in Bathing, is most ancient: for our Bathes were first difcouered thereby to be wholefome and foueraigne in many difeafes:

Nechams verles concerning the vie of these Bathes, are foure hundred yeares old:

Bathonia T bermas vix prafero Virgilianas Confecto profunt Balnea nostra seni: Presunt attritis, collisis inualidisque Et quorum morbis frizida causa subest.

Which I will English out of Master Doctor Hackwels learned worke, of the perpetuitie of the world.

Our

Our Bayne For their eff For feeble I For bruis C For those I

Wehat That King B of Elias, dida of them vpon Citic and diff certaine reco the vie of the they are as po them a more and the Saxo and by the S ficke people, a Theopinion fimple for an And Nechan haue mention them in Cass diftinguilbe have beene at Bath and the from the Spt off, from the could not en wile an app Beth, for vnc the name of proceeding p Yet as the) 4

Our Baynes at Bathe with Virgils to compare; For their effects, I dare almost be bold, For feeble folke, and crazie good they are, For bruis'd, confum'd, farre spent, and very old, For those likewife whose sickness of cold.

hacketing,

ally vied be-

fielts, as are

ines: As Pal-

s, affects of

victotone-

me places the

nd potential]

slifying, dif-

the minerals

nerall to the

to fome one

incently was

wis. Thege.

r our Bathes

iome and fo-

hele Bathes,

h

dd

tor Hacknel

Out

We have antient traditions (fama est obscurior annis) That King Bladud who is faid to have lined in the time of Elias, did first discouer these Bathes, and made tryall of them ypon his owne fonne, and thereupon built this Citic, and diftinguilhed the Bathes, &c. But we have no certaine record hereof. It is enough that wee can fhew the vse of them for 4000. yeares, and that at this day they are as powerfull as euer they were: Camden giues them a more ancient date from Ptolomy and Antonin, and the Saxons : and faith they were called Aqua Solia, and by the Saxons Akmanchester, that is, the towne of ficke people, and dedicated to Minerua, as Solinus faith. The opinion that the Bathes were made by Art, is too fimple for any wife man to beleeue, or for me to confute: And Nechamin his verfes which follow after those I haue mentioned, doth hold it a figment : you may fee them in Camden. We have them for their vie in bathing, diftinguished into foure seuerall Bathes, whereof three have beene anciently: namely the Kings Bath, the hot Bath, and the Croffe Bath. The Queenes Bath was taken from the Springs of the Kings Bath, that being farther off, from the hot Springs, it might ferue for fuch as could not endure the heate of the other. We have likewife an appendix to the hot Bath, called the Leapers Bath, for vncleane perfons. We finde little difference in the nature of these Bathes, but in the degree of heate, proceeding no doubt, from one and the fame Myne. Yet as the Myne may be hotter in one part then in an other, M2

Of natural Bathes,

84

other, or the paffages more direct from it, fo the heate of them may vary. Some little difference alfo we finde among them, that one is more cleanfing then another, by reason (as I take it) of n ore Niter. For in the croffe Bath wee finde that our fingers ends will fbrinke and Ibriuell, as if we had walked in Soape water, more then in the other Bathes. The Kings Bath, as it is the hotteft of all the Bathes, foit is the fittest for very cold difeases, and cold and plegmaticke conflitutions: And we have daily experience of the good effects it worketh vpon Palfies, Aches, Sciaticaes, cold tumours, &c. both by cuacuation, by Sweate, and by warming the parts affe-Aed, attenuating, difcuffing, and refoluing the humors: Alfo in Epilepfies and Vterin affects in the Scorbut, and in that kinde of dropfic which wee call Anafarca. The hot Bath is little inferiour vnto it, as next in degree of heate, and vsefull in the fame cafes. The Queenes Bath, and Croffe Bath are more temperate in their heate, and . therefore fittelt for tender bodies, which are apt to bee inflamed by the other, and where there is more neede of mollifying and gentle warming, then of violent heate and much euacuation by fwcate. And in these Bathes they may induce longer without diffipation of Spirits, then in the other: the Queenes Bath is the botter of the two, but temperate enough for most bodies. The Croffe Bath is the coldeft of all, as having but few Springs to feede it: yet we observe it to supple, and mollifie morethen the reft, both because they are able to ftay longer In it, and becaufe (as I faid before) it feemes to participate more with Niter, then the reft, which doth cleanfe better, and giues more penetration to the other Minerals. Wherefore in contractions, Epilepfies, Vterin affects, Conuulfions, Cramps, &c. This Bath is very viefull, as also in cutaneall discases, as Morphewes, Itch.

Itch, &c. Th our Bathes, a They ate w bucketting, O Pumping 3 we vie the only the Do as good as th the part, and fion. Our bi finding that i kenfromthe rected Pump OF DEALE THIS from thence, worthy Met phrey Brown these Pump. whereby he l ferues athan red to be do Croffe Bath valeffe for yo of the hot B one may fit i or foot, ork the body in the hanehot kid Bath might h and cold Bra For these Pu Archbilhop On my perfu of them. It

to the brate

lo we finde

in another,

the croffe

brinke and

more then

s the hourft

old difeates,

nd we have

rketh vpon

c. both by

parts affe-

the humors:

corbut, and

farca. The

in degree of

Jeenes Bath,

heate, and

e spe to bee more neede

violent heate

hele Bathes

of Spirits,

botter of the

The Croffe

Springs to Mifie more

ftay longer

to partici-

dothclemle

other Mine-

, Vterin af-

ath is very

Morphews,

Jach,

85

Itch, &c. Thus much for the nature and difference of our Bathes, and the generall vse of them in bathing.

They are vied also to particular parts by pumping or bucketting, or applying the mud.

Pumping or bucketting are not vied in that falhion, as we vie them, in any other Baths that I can learne, but only the Duccia or Stillicidium : But I hold our fashion as good as that. The water comes more plentifully vpon the part, and may be directed as the patient hath occafion. Our bucketting hath beene longeft in vie : but finding that it did not heat fome fufficiently, being taken from the furface of the Bath. We have of late erected Pumpes, which draw the water from the lprings or neare vnto them, fo as wee haue it much hotter from thence, then wee can have it by bucketting. A worthy Merchantand Citizen of London, M. Humphrey Browne, was perfwaded by me to beftow two of theie Pumps vpon the Kings and Queenes Bath, whereby he hath done much good to many, and deferues athankfull remembrance. The like alfo I procured to be done at the other Baths, although that of the Croffe Bath is not fo vfefull, by reason it wants heat, vnleffe for yong children. Allo we have a Pumpe out of the hot Bath, which wee call the dry Pumpe, where one may fit in a chayre in his clothes, and haue his head, or foot, or knee pumped without heating the reft of the body in the Bath ; and deuiled chiefely for fuch as haue hot kidneys, or fome other infirmities which the Bath might hurt. This we finde very vlefull in rheumes and cold Braines, and in aches or tumors in the feet. For these Pumps we are beholding vnto the late Lord. Archbilhop of Yorke, and to M. Hugh May, who vpon my perlwalions were contented to bee at the charge of them. It were to be wilhed that fome well dispoled to

M 3

Of naturall Bathes,

86

to the publique good, would creft the like at the Kings Bath, where, perhaps, it might be more vfefull for many, in regard of the greater heat which those springs haue.

The lute of Baths, is in much vie in fome places, where it may be had pure, both to mollifie, and to refolue, and to ftrengthen weake parts. But we make little vie of it in our Baths, becaufe we cannot haue it pure, but mixed with ftrigments. In diuers other places either the fprings arife agood diftance from the bathing places, or elfe there be other eruptions from whence it may bee taken. But our fprings arifing in the Baths themfelues, it cannot well be faued pure. Belides, we have not those meanes of the heat of the Sunne, to keepe it warme to the parts where it is applyed : fo as growing cold, it rather does hurt then good. Wherefore it were better for vs, to vse artificall lutes, as the Ancients did, of clay, Sulphur, Bitumen, Niter, Salt, &c. or vnguents of the fame nature, as that which they call Ceroma. But the best way is to referre the election of these remedies, to the prefent Phyfitian, who will fit them according to the nature of the griefe,

CAP. 17.

In what particular infirmities of body, bathing in the bot waters of Bath is profitable.

To come more particularly to the vse of bathing, we must vnderstand, that there are many Minerall waters fit for bathing, which are not fit to drinke : as those which participate with Lead, Quickfiluer, Gypfum, Cadmia, Arsenick, &c. Also those that containe liquid Bitumen, are thought to relaxe too much : but those

those that pro andpreferibe lian : Sulphi by takin in W Amach,and allowes it, a dominant B to be made o are not in th fins, eEgint phurand Bit flood of ho tick braines profitable vi ting, and by And Oribah ture of these and therefor bee very hot Iron waters and Allumi Bitumions an bids in hot h in cold effect we make el talle or Imel rum, Valeria Or; which suppling and contrenient phur, in wh his tharp (pin Rane none of to make it w

87

those that proceede from dry Bitumen, are permitted. and prefcribed in potion, by Panlas Agineta, and Trallian : Sulphur alfo is questioned, whether it bee fit to be taken inwardly by potion, because it relaxeth the Romach, and therefore detins forbids it : yet Trallian & Tretrab.ferm. allowes it, and fo doe others, if the Sulphur be not pre- 3. Cap. 167. Trailian Ljoca dominant. But for outward bathing there is no queftion to be made of these Minerals, nor of any other which are not in them clues venomous. And whereas Oribafius, Aginesa, Actuarius, &c. are fuspicious of Sul- Orib.I. 10.6.3: 7 Agin. 1.1.0.5.2: phur and Bitumen for the head ; they must bee vnder- Actuar, 1.3.6,10 ftood of hot diffempers there, and not of cold rheuma. tick braines; where by daily experience wee finde the profitable vie of them, both by euacuation in bucketting, and by warming and comforting the cold part. And Oribafius doth ingenuoufly confesse, that the na. Cap. 53 ture of these Baths was not then perfectly discouered : Hippor. de acre, and therefore they were all held to bee, not only dry, aquis, & losis. but very hot : although we finde them not all fo : for. Iron waters doe coole, and fo doe those of Campher, and Alluminous, and Nitrous waters alfo. But for our Bitumious and Sulphurous waters, which Galen for- de fanit. tuenda bids in hot braines, there is no reason to suspect them lib.6. (ap. 9. in cold effects of the braine and nerues, in which cafes we make efpeciall choyce all things, which either in tafte or imell doc refemble Bitumen : as Rue, Caftorum, Valeriana, herba paralyfeos, trifolium, afphalitis, ere; which both by his warming quality, and by his fuppling and mollifying fubftance, is most proper and convenient for those parts. The like I may fay of Sulphur, in which nothing can bee excepted against, but his tharp spirit, which is made by burning : and wee haue none of that in our waters, nor, I hope, any fire to make it withall. The other parts of Sulphur are hot and

t the Kings full for maofe (prings acts, where

refolies and the vie of it. , but mixs cither the places, or nay beetathemleines, se not thole Warmie to cold, it ra. were better did, of clay, ents of the a. But the emedies, to ccording to

bing in the

of bathing, ny Minerall drinke : as iluer, Gypnat containe much : but thole

Of natural Bathes,

88

and dry, and very vn &uous. As for Niter, it clenfeth, purgeth both by ftoole and vrine, and helpeth the incorporation of the other Minerals with the water, and qua lifies the heat of them, and gives them better penetration into our bodies. In regard of these Minerals, together wi h the actuall heat, we finde that the bathing in our Baths doth warme the whole habit of the body, attenuate humors, open the pores, procure lweat, moue vrine, cleanfe the matrix, prouoke womens euacuations, dry vp vnnaturall humors, ftrengthen parts weakned, comfort the nerues, and all neruous parts, cleanfe the skin, and fuck out all falt humors from thence, open obfructions if they be not too much impacted, cafe paines of the ioynts, and nerues, and muscles, mollifie and discusse hard tumors, &c. Whereby this bathing is profitable for all palfies, apoplexies, caros, epylepfies, stupiditie, defluctions, gouts, sciaticaes, contractions, cramps, aches, tumors, itches, scabs, leprofies, collicks, windines, whites in women, ftopping of their courfes, barrennelle, abortions, fcorbuts, analurcas, and generally all cold and phlegmatick difeafes, which are needleffe to reckon vp. In all which cures our Bathes' haue a great hand, being skillfully directed by the Phylitian. with preparation of the body before, and addition of fuch other helps as are needfull. And whereas without the helpe of fuch Baths these diseases could not be cured without tormenting the body, either by fire, or launcing, or caufficks, or long dyets, or bitter and vngratefull medicines, &c. In this courfe of bathing all is pleafant and comfortable, and more effectuall then the other courfes, and therefore it is commonly the last refuge in these cases, when all other meanes faile. I will not vndertake to reckon vp all the benefits which our Baths doc promife ; but if wee had a register kept of the manifold manifold care Bathes princi, they are, But logue of rare would be offer ion of their but generally

The mann Hien and oro touched, con and after bat of continuing wering the B

Now for what the indgement at ent to know toons in the confination eafes, and f nor be com all bodies al the appearin ta capte ci courfe, and or cooler, f aduifed wh vpon any p vfe of in. A

from hence

manifold cares which haue beene done by the vse of our Bathes principally, it would appeare of what great vse they are. But as there is a defect in not keeping a Catalogue of rare Gures, fo many perfons of the better fort would be offended if a Physitian should make any mention of their cures or griefes: wherefore I must speake but generally:

89

CAP. 18.

The manner of bathing, chiefly referred to the inspe-Etion and ordering of a Physician. Tet some particulars touched, concerning the gouernement of the Patient in and after bathing: the time of day, of staying in the Bathe, of continuing the vseofit. The time of the yeare. Of couering the Baths.

TOw for the manner of Bathing, I will not fet downe what the Phylitian is to doc, but leaue that to his iudgement and difcretion: but what is fit for the Patient to know: for there are many cautions and observations in the vsc of bathing, drawne from the particular conftitutions of bodies; from the complication of difeafes, and from many other circumstances which cannot be comprehended in generall rules, nor applied to all bodies alike: But many times vpon the fucceffe, and the appearing of accidents, the Phylitian must ex renata capere confilium, and perhaps alter his intended courfe, and perhaps change the Bath either to a hotter or cooler, &c. In which respect, those Patients are ill aduifed which will aduenture without their Phyfitian vpon any particular Bath, or to direct themselues in the vie of it. And this is a great caule that many goe away from hence without benefit, and then they are apt to com-N

itcletich th the in-Water, and etter peneintrais, tothe bashing the body, weat, mont Electrations, Weakned, cleanse the thopen ob-Leale pines tollific and bathing is epylephies, ontractions, ies, collicks, kit courles, and generalare needlelle ches have a e Phylitian, addition of reas without not be aired re, or launand vngtate. gall is pleathen the othe laft refile. I will which our r kept of the manifold

Of Naturall Bathes

complaine of our Bathes, and blafpheme this great blef. fing of God beftowed vpon vs.

90

It is fit for the Patient when he goeth into the Bath, to defend those parts which are apt to be offended by the Bath: as to have his Head well couered from the ayre and winde, and from the vapours arising from the Bath: also his kidneyes (if they be subject to the Stone) anoynted with some cooling vnguents; as *Rofatum comitilfa infrigidans Galeni fantolinum, fre.* Also to begin gently with the Bath, till his body be inured to it, and to be quiet from swimming, or much motion, which may offend the Head by fending vp vapours thither: at his comming forth, to have his body well dryed, and to reft in his Bed an houre, and sweate, &c.

A morning houre is fitteft for Bathing, after the funne hath bin vp an houre or two; and if it be thought fit to vic it againe in the afternoone, it is beft foure or fiue houres after a light dinner. For the time of flaying in the Bath, it must bee according to the qualitie of the Bath, and the tolleration of the Patient. In a hot Bath, an houre or leffe may be fufficient: in a temperate Bath, two houres. For the time of continuing the Bath, there can be no certaine time fet downe, but it must be according as the Patient findes amendment, fometimes twenty dayes, fometimes thirty, and in difficult cafes much longer. And therefore they reckon without their Hoft, which alligne themselves, a certaine time, as perhaps their occasions of businesse will best afford. For the time of the yeare, our Italian and Spanish Authors preferre the Spring and Fall; and fo they may well doe in their hot Countries; but with vs confidering our clymat is colder, and our Bathes are for cold difeafes; J hold the warmelt moneths in the yeare to be beft; as May, June, July, and August; and I have perfwaded many hereunto who have Springs, and ly variable, at dingittempe pelicof the Bathitlelfe, times, yet th doe them m Water EDGE Claudious W. ties Endes g they doc no that most of by they retain it were to be Bath, beng! made close would be vie cold ayre in hinder our b many who h doe fall back perfectly fin to many we Citic, if it ma hither in the or more late Enle of Ma ble difpolitio coucring of lome other for the Quee many, and names for cu

great blef.

the Bath,

Fended by

from the

guom the

the Stone)

a atam cin

to to begin

1 toit, and

n, which

thither: at

trych, and

theluane

ught fit to

ure or fine

Aayingin

tic of the

os Bath, an

e Bath, two

there can

according

ies twenty

much lon-

heir Hoft,

is perhaps

or the time

its preferre

loe in their

I CHIDA IS

hold the

May, Ime,

any hereup-

00

to who have found the benefit of it; for both in our Springs, and after September, our weather is commonly variable, and apt to offend weake perions; who finding it temperate at noone, doe not suspect the cooleneffeof the mornings and evenings. Likewife in the Bath it felfe, although the Springs arife as hot as at other times, yet the winde and ayre beating vpon them, doth doe them much harme, and allo make the furface of the water much cooler then the bottome: and therefore Claudinus witheth all Bathes to be couered, and Fallopius findes great fault with the Lords of Venice, that they doe not couer their Bath at Apono. Wee fee alfo that most of the Bathes in Europe, are coucred, whereby they retaine the fame temperature at all times. And it were to be wilhed that our Queenes Bath, and Croffe Bath, being small Bathes, were couered, and their Slips made clole and warme. By this meanes our Bathes would be viefull all the yeare, when neither winde and cold ayre in winter, nor the Sunne in fummer, fhould hinder our bathing. Moreouer for want of this benefit, many who haue indifferently wel recoured in the Fall, doe fall backe againe in the winter before the Cure bee perfectly finished : and as this would be a great benefit . to many weake perfons, fo it would be no harme to this Citic, if it may be a meanes of procuring more refpect hither in the Winter time, or more early in the Spring, or more late at the Fall. The Right Honourable, the Earle of Marleborow, hath of his owne accord and noble disposition to doe any Bathes good, vndertaken the couering of the Croffe Bath ypon his fole charge. If fome other out of the like affection would doe the like for the Queenes Bath, they thould doe much good to many, and gaine a thankefull remembrance to their names for cuer.

N2

I

Of Naturall Bathes, Jc.

92

I defire not nouelties, or to bring in innouations, but I propound these things vpon good grounds and examples of the best Bathes in Europe, and so I defire to haue them confidered of referring both this point, and whatsource else I haue said in this discourse, to the censure of those who are able to judge.

I doe purposely omit many things about the vertues and vses of our Bathes, which belong properly to the Physitian, and cannot well be intimated to the Patient De composed. without dangerous missaing. For as Galen faith, our flocos ub.8.6.7. Art of Physicke goes vpon two legges, Reason and Experience, and if either of these be defective, our Physicke

must needs be lame. Reason without Experience, makes a meere contemplatiue and theoricall Physitian: Experience without Reason, makes a meere Empericke, no better then a Nurse or an attendant vpon sicke persons, who is not able out of all the experience he hath, to gather rules for the cure of others. Wherefore they must be both ioyned together: and therefore I referre Phyfitians workes, vato Physitians themselues.

FIN IS.

Errata,

PAges. line 19. for 4000, reade 4000c. page 83. lipe 13: for 4000. reade 400.











