

when their *Gas* is gone, they are found to contain two Sorts of such-like Earths; the one absorbent, fermenting with Acids; and the other fixt, or Talcky: And that this Substance is really Talcky, is confirmed by the digging up of a pretty deal of Talc in the sinking this Well.

All the Salts of the medical Waters are more generally alkaline than acid, being of a Martial Nature, impregnated with Sulphur, which gives them a muriatic Taste.

We may hence conclude, that this *Westabton* Water is a very good Chalybeat Water; and, by Report, more plentiful and more constant all the Year round, than the Well at *Holt*, which Spring diminishes much at a certain time of the Year; but both seem alike for their Virtues, and physical Use, being both alike Martial.

XXI. *An Examination of the Chiltenham Mineral Water, by Conradus-Hieronimus Senckenberg; which may serve as a Method in general for examining Mineral Waters.*

THE Water is bright and clear to the Sight, of no Smell, yet of a bitter Taste.

To know its constituent Parts, the following Experiments were made; and, first, to try whether there is any *alkaline Salt* in it.

Rhenish Wine was mixt with the Mineral Water. *Rhenish Wine* is a subtilized *Acidum essentielle* in a spirituous and oily Liquor: Wherefore an *alkaline Salt* should have been manifested; but it was unaltered.

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Distilled Vinegar is a stronger vegetable Acid ; but, mixt with the Water, procures no Alteration.

Spiritus Salis, Nitri, and Vitrioli, the three strongest and purest mineral Acids, being mixt with the Mineral Water, there was no Change or Precipitation.

Mercurius sublimatus corrosivus, is a Dissolution of Quicksilver in concentrated Spirit of Salt, which, being dissolved in common distilled Water, manifested not only the volatile, but also the fixed alkaline Salt, in any Liquor, insomuch that it precipitates the *Volatiles* to a *white*, and the *fixed* alkaline Salts to a *red* Powder ; but, mixt with this Water, produced no Precipitation.

Vitriolum Martis is an acid Salt, intimately mixt with Iron-earth : Being dissolved, and put into another Liquor, it will presently betray the alkaline Salts by precipitating them ; but should it find no contrary Salt, then somewhat of the Iron-earth will settle to the Bottom ; as is common in dissolving all sorts of *Copperas* : And so it happened by mixing this Mineral Water with it, when a brown Powder settled, which is the *Terra Martialis*.

All these Experiments shew evidently, that no *alkaline Salt* is in the said Mineral Water.

For, to try whether there is any acid Salt to be found in this Water, the following Mixtures were made :

Aqua Calcis Vivæ, which contains an Earth impregnated with *alkaline Salt*, makes a very quick Discovery of an *Acid*, by Precipitation ; but, mixt with this Water, caused no Variation.

Syrupus Violarum, having a very sensible vegetable Tincture, which, by mixing it with a small Quantity
of

of any *Acid*, turns *red*, and, with an *alkaline Salt*, *green*; but, mixt with this *Water*, keeps its *Colour*.

Oleum Tartari per Deliquium, which is an *alkaline Salt*, dissolved in *Water*: And,

Spiritus Salis Armoniaci, a volatile *alkaline Salt* in *Water*, they being mixt with this *Mineral Water*, the *Mixture* grew milky, and a little after a white *Precipitate* settled. This happens when a fixed or a volatile *alkaline Salt* meets with a neutral *Salt*; then they join together, and somewhat of the *alkaline Earth* falls down.

Milk mixt with a *Mineral Water*, and boiled in equal *Proportion*, will make a *Separation*, by meeting with either an *acid* or *alkaline Salt* in it, or, by finding of the last *Salt*, the *Mixture* will change *red*; but our *Mineral Water* may be boiled with it in several *Proportions*, without any *Change* or *Precipitation*.

According to these *Experiments*, there is no *acid Salt* in this *Water*.

To see whether there is no *Iron* or *Copperas* in it,

If the *Solution* of *Galls* is mixt with any *Liquor*, and grows black, then it is a *Sign* of *Iron* or *Copperas*; but our *Mineral Water*, mixt with it, turned a little brownish, because of the *Salt* in the *Water*.

To know whether there is any *Brimstone* in a *Mineral Water*, it is to be inquired with a polished *Piece* of *Silver*, which, being put in the *Water*, will turn black or yellowish; but this did not happen with this *Water*.

To find out the *acidum salinum* in a *Mineral Water*, you must mix with it *Solutio Argenti*, which turns instantly *white*, and a light *Precipitate* falls, being the *Luna Cornea*.

A Solution of *Saccharum Saturni*, mixt with the Water, yields the *Magisterium Saturni*.

All the above-mentioned Experiments certify, that our Mineral Water contains no *alkaline* nor *acid Salt*, no *Iron*, *Copperas*, or *Brimstone*: Therefore from the same Experiments it is evident, that the *Chiltenham* Water consists of a *Sal medium fixum vel neutrum*, and a dissolvable *Terra alcalina vel cretacea*, which may be separated.

By a *Sal medium*, is to be understood, a Salt being neither of an *alkaline* nor an *acid* Nature; and that will not precipitate any Solution made with such Salts, nor, mixt with the Syrup of Violets, will change its Colour.

These neutral Salts have always their Origin from an *alkaline* and an *acid Salt*; and, according to the *alkaline Salt* they meet with, so they are qualified. So we have the *Tartarus vitriolatus*, consisting of the *Sal alcali fixum*, and *Acidum vitriolicum*.

The *Arcanum duplicatum* of the *Sal alcali*, Salt-petre, and *Acidum vitriolicum*.

The *Sal Mirabile* GLAUBERI, consisting of common Salt, and its *Terra fluxilis*, and an *Acidum vitriolicum*; but with this Difference, that the *Sal Mirabile* will soon melt in a Crucible with a gentle Fire; but *Tartarus vitriolatus*, *Arcanum duplicatum*, &c. will not melt, even with the strongest Heat, because of the Difference of the Earth in the alkaline Salt, which in the common alkaline Salt is very fixt, but in the common Salt very volatile and fusible.

Such a *Sal medium* as the *Sal mirabile*, we find in this Mineral Water, yet mixt with some common Salt.

As for the Bitterness of this Water, there is no other Reason for it than the *Terra Cretacea*, which is proved by

by the *Epsom* Salt, where the *Terra alcalina Salis communis*, joined with the *Acidum vitriolicum*; and after the same manner in the *Sal mirabile*, the alkaline Earth causes the bitter Taste. The same may also be found, by mixing Quick-lime with Spirit of Vitriol, and it will produce a very bitter Taste; but the Mixture of Quick-lime with Spirit of Nitre causes a Bitterness which exceeds Gall.

One Pound Troy of this Water yields 29 Grains of the said *Sal medium*, and 3 Grains of the Earth.

Remarks by C. M.

The Right Honourable the Lord *Cadogan* had communicated a short Account of these Waters to the *Royal Society* on April 17. 1735. being a Letter his *Lordship* had received from Mr. *Tho. Dundas*, Surgeon to his Lordship's Regiment, dated at *Gloucester*, March 25. 1735. wherein he gives an Account of some few Experiments he had made on these Waters, which mostly agree with the preceding ones; as that there were no Marks of a Chalybeat Nature in them; nor any Signs of *Nitre* or *Sulphur*: But that six Quarts of this Water being distilled very carefully, the Sediment at the Bottom of the Vessel was nothing more than *Alum* and *Sal Gem*, to which it owes its *purgative Quality*. Some of the Salt of this Water, being put into a Solution of Silver, quickly made a Precipitation of the Silver. Mr. *Dundas* says, that some alkaline Liquors, as *Oil of Tartar*, Spirit of *Sal Ammoniac*, &c. being dropt into some of the Water, immediately produced a violent Effervescence; which plainly shews a great *Acidity*; which he ascribes to the *Alum* in this Water. M. *Senckenberg* found no such Effervescence on mixing these two alkaline Liquors with the Water; but only says it grew milky, and a little white Precipitate subsided. I can account for this material Difference no otherwise, than by supposing, that the *Acid*, which caused the Effervescence in Mr. *Dundas*'s Experiment, was a volatile Gas, which was not quite spent in being carried no farther than *Gloucester*, but which was quite evaporated and flown away before the Water came into M. *Senckenberg*'s Hands in *London*: And as to the *Alum*, M. *Senckenberg* did not attend to it.

“ Mr. *Dundas* thinks these Waters may be of Use in a lax Constitution; when the Humours are of an *alcalescent* Nature; but, when *acescent*, must do Hurt.”