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XXIII. *Experiments and Observations on the* Terra Ponderosa, &c. *By* William Withering, *M. D.*; *communicated by* Richard Kirwan, *Esq. F. R. S.*

Read April 22, 1784.

S E C T I O N I.

Terra ponderosa aërata.

THIS substance was got out of a lead-mine at Alston-Moor, in Cumberland. I first saw it in the valuable collection of my worthy and ingenious friend MATTHEW BOULTON, Esq. at Soho; who, when he picked it up, conjectured from its weight that it contained something metallic. About two years ago I saw it in his possession; and partly from its appearance, being different from that of any calcareous spar I had seen, and partly from its great weight, I suspected it to be the spatum ponderosum.

A few experiments made at the moment confirmed my suspicions, at least so far as to shew that it contained a large proportion of the terra ponderosa united to fixed air; but I did not then flatter myself that it would prove so pure as I afterwards found it to be.

Professor

Profeſſor BERGMAN, in his Sciagraphia Regni Mineralis, publiſhed laſt year at Leipſic, conjectures (§ 58.), with his uſual ſagacity, "Terra ponderoſa *nitrata* forte alicubi nativa "occurrit, a nemine tamen adhuc inventa, quod etiam valet "de *aërata*."

I was much delighted by the detection of a ſubſtance which promiſes to be of very conſiderable utility in chemical inquiries, and more ſo when I found it to be a native of this country; for it is not improbable, that it may be met with in many other mines, beſides that at Alſton-Moor.

Mr. BOULTON, with his uſual benevolence, preſented me with a piece of it, part of which accompanies this paper, for the inſpection of the Members of the Royal Society.

More obvious Properties.

Its general appearance is not much unlike that of a lump of alum; but, upon cloſer inſpection, it ſeems to be compoſed of ſlender ſpiculæ in cloſe contact, but more or leſs diverging. It may be cut with a knife. Its ſpecific gravity is from 4,300 to 4,338.

It effervesces with acids, and melts under the blow-pipe, though not very readily. Placed in a covered crucible, in a hot parlour fire, it loſt its tranſparency.

After expoſure to a moderate heat in a melting furnace, it adhered to the crucible, and exhibited ſigns of fuſion; but was not diminiſhed in weight, did not feel cauſtic when applied to the tongue, nor had it loſt its property of effervescing with acids.

Hence

Hence it is probable, that its loſs of tranſparency was rather occaſioned by numerous ſmall cracks, than by any eſcape of the water of cryſtallization, or of its aërial acid.

EXPERIMENTS.

A. 500 grains, diſſolved in muriatic acid, in ſuch a manner that nothing but elaſtic fluid could eſcape, loſt in ſolution 104 grains, and there remained an inſoluble reſiduum of nearly 3 grains.

2. In another experiment 100 grains loſt in ſolution 21 grains, and there remained 0,6 of a grain of inſoluble matter.

B. 100 grains diſſolving in dilute muriatic acid, gave out 25 ounce meaſures of air. This air was received in quickſilver, and when the ſpar was wholly diſſolved, the ſolution was boiled, in order to drive out what air might be lodged in it.

2. This air was heavier than atmoſpheric air; it was readily abſorbed by agitation in water, it precipitated lime from lime-water, and it extinguiſhed flame. The water which had abſorbed it changed the blue colour of litmus ſlowly * to a red; ſo that this elaſtic fluid was undoubtedly fixed air.

C. The ſolution (B) by the addition of mild foſſil fixed alkaly, afforded a precipitate which, after proper waſhing and drying, weighed 100 grains.

2. This precipitate, upon being again diſſolved in marine acid, yielded only 20 ounce meaſures of fixed air.

* Other acids turn the blue of litmus inſtantly to a red, whilſt water, impregnated with fixed air, does not change the litmus immediately; but, after ſome ſeconds, the red colour begins to appear, and then gradually grows more diſtinct.

D. To a saturated solution in marine acid mild fixed vegetable alkaly was added; the earth was precipitated, and a quantity of fixed air escaped.

2. The same thing happened when mild fossil alkaly was added.

3. When caustic vegetable alkaly was used, the precipitation took place, but without any appearance of effervescence.

4. 50 parts dissolved in marine acid lost, during the solution, nearly 10,5. This solution, upon the addition of caustic vegetable alkaly, let fall a precipitate which, when washed and dried, weighed 45,5.

5. Phlogisticated alkaly precipitated the whole of the earth from part of the solution D; for mild fixed alkaly afterwards added to the filtered liquor occasioned no further precipitation.

E. Part of the precipitates D. 1. 2. after exposure to a strong heat in a crucible, was thrown into water. Next morning the water was completely covered with an ice-like crust, and had the acrid taste of lime-water in a very high degree.

2. The smallest portion of vitriolic acid added to this water occasioned an immediate and copious precipitation; and when this acrid water was diluted with 200 times its bulk of pure water, the precipitation upon the addition of vitriolic acid was yet sufficiently obvious.

3. A single drop of this acrid water, added to solutions of tartar of vitriol, GLAUBER's salt, vitriolic ammoniac, alum, Epsom salt, selenite, occasioned an immediate precipitation in all of them.

F. The precipitate thrown down by the caustic vegetable alkaly (D. 3.) was put into water, in expectation that it would make lime-water; but neither upon standing, nor after boiling, did this water exhibit any precipitation when concentrated vitriolic

vitriolic acid was dropped in it; nor had it any acrimonious or other peculiar tafte.

G. Concentrated vitriolic acid was added to one portion of the precipitate D. 3.; concentrated nitrous acid to a fecond portion; and marine acid to a third portion. No effervefcence could be obferved, nor was there any appearance of folution. After ftanding one hour water was added; and the acids, thus diluted, were fuffered to remain upon the portions of the precipitate for another hour. They were then decanted, and faturated with mild foffil fixed alkaly, but without any appearance of precipitation.

H. The part precipitated by the phlogifticated alkaly, when mixed with nitre and borax, and fluxed by a blow-pipe upon charcoal, formed a black glafs; upon flint-glafs, a white; and upon a tobacco-pipe an opaque yellowifh white one.

2. Another portion melted with foap and borax in a crucible, formed a black glafs, but without any metallic appearance.

I. The infoluble refiduum (A.) was boiled in water, the water decanted, and mild fixed alkaly added, but without any fubfequent precipitation.

2. This infoluble powder was not attacked by the nitrous or marine acids; but being put into vitriolic acid, and boiled a confiderable time until the acid became highly concentrated, it diffolved entirely, and feparated again upon the addition of water. It will appear in the fequel, that the fame thing happens to marmor metallicum, when diffolved by boiling in the acid of vitriol.

CONCLUSIONS.

Hence it appears, that 100 parts of this ſpar contain

Terra ponderoſa pura	-	78,6
Marmor metallicum	-	,6
Fixed air - -	-	20,8
		100

OBSERVATIONS.

1ſt, The quantity of mild fixed alkaly neceſſary to ſaturate an acid, previouſly united to the terra ponderoſa, contains more fixed air than is neceſſary to ſaturate that quantity of terra ponderoſa D. 1. 2.

2dly, The terra ponderoſa, when precipitated from an acid by means of a mild fixed alkaly (D. 1. 2.), readily burns to lime; and this lime-water proves a very nice teſt of the preſence of vitriolic acid. E. 2. 3.

3dly, It is very remarkable, that the terra ponderoſa ſpar, in its native ſtate, will not burn to lime. In the lower degrees of heat it ſuffers no change, as was before obſerved, beſides the loſs of its tranſparency. When urged with a ſtronger fire, it melts and unites to the crucible, but does not become cauſtic. I buried it in charcoal-duſt in a covered crucible, and then expoſed it to a pretty ſtrong heat; but it did not part with its air.

May we not conjecture, then, that as cauſtic lime cannot unite to fixed air without the intervention of moiſture, and as this ſpar ſeems to contain no water in its compoſition, that it is is the want of water which prevents the fixed air assuming its elastic aërial state? This supposition becomes still more probable, if we observe that when the solution of the spar in an acid is precipitated by a mild alkaly, C. 1. 2. some water enters into the composition of the precipitate, for it weighs the same as before it was dissolved, and yet contains only 20 ounce measures of fixed air, whilst the native spar contained 25 ounce measures; so that there is an addition of weight equal to that of 5 ounce measures of fixable air, or 3¾ grains to be accounted for, which can only arise from the water; and this precipitate, thus united to water, readily loses its aërial acid in the fire, E. 1.

4thly, Professor BERGMAN supposes the terra ponderosa to be a metallic earth *; its entire separation from an acid by means of the phlogisticated alkaly (D. 5.) certainly favours such a supposition; but, if it be so, it is evident from experiments H. 1. 2. that other means than those commonly employed must be used to effect its reduction.

5thly, The precipitate made by the caustic vegetable alkaly D. 4. taking some of the alkaly down with it, and thus forming a substance neither soluble in water nor in acids, is a very curious phænomenon.

I afterwards varied the experiment by adding the terra ponderosa lime-water (E.) to caustic vegetable and caustic fossil alkaly. In both cases this insoluble compound was immediately formed; but not so when caustic volatile alkaly was used. This composition of an alkaly and an earth certainly deserves more attention than I am at present able to bestow upon it.

6thly, As it appears from experiments D. 1. 2. 3. 4. that

* See preface to his Sciagraphia Regni Mineralis.

fixed alkalies, both mild and caustic, separated the terra ponderosa from marine acid, I was at a loss to know why Professor BERGMAN, in his admirable table of simple elective attractions, placed the terra ponderosa caustica immediately under the vitriolic, nitrous, and marine acids, and consequently above the caustic alkalies. I was interested in the reality of the facts, because I had so seldom seen reason to doubt the observations of that very excellent chemist, and therefore made the following experiments.

To different portions of terra ponderosa salita and terra ponderosa nitrata I added, drop by drop, caustic vegetable, caustic fossil, and caustic volatile alkalies. In every case the EARTH was thrown down; and I have so often repeated these experiments to satisfy myself and others, that I am persuaded the terra ponderosa caustica ought to be placed below the alkalies, except in the column appropriated to the vitriolic acid; and it may be separated even from that acid, by the vegetable fixed alkaly, if the alkaly be applied *via sicca*, as will appear in the next section.

7thly, The necessity for using pure acids upon many occasions, and the difficulty of obtaining them pure, are sufficiently obvious. The VITRIOLIC ACID, as made in the large way, is generally pure enough for most purposes. It is apt to get coloured by inflammable matter; but this is seldom an inconvenience; and, when it would be so, it is easy to drive it off by boiling the acid in a Florence flask over a common fire. But there is another cause of impurity in this acid, which appears upon diluting it with water; for then it becomes milky, and in a short time a powder subsides *.

The

* About two years ago I examined this powdery matter; both that which was thrown

The acid may be freed from this powder either by distillation in glass vessels, which is a tedious and dangerous process, or by the affusion of water; and, after the powder has subsided, a gentle evaporation will drive off most of the superfluous water.

NITROUS ACID may be freed from vitriolic and marine acids, by solution of silver in the acid of nitre, as is daily practised; but the MARINE ACID has not, to my knowledge, been purified by any other method than the laborious one of re-distilling it from common salt. It is generally mixed with vitriolic acid, and often in large proportion. There is no temptation, and scarcely an opportunity, for it to be contaminated by nitrous acid. From the vitriolic acid then it may be readily purified by the addition of terra ponderosa caustica dissolved in water, or by the terra ponderosa salita. If the latter be used, a small

thrown down by dilution with water, and also some which Dr. PRIESTLEY gave me, being the residuum of vitriolic acid distilled to dryness in a flint-glass retort.

1st, Repeated boiling in water, reduced 6½ grains to 2 grains.

2dly, This solution, by gentle evaporation, afforded 5 grains of crystals, as hard and as tasteless as selenite.

3dly, To these crystals, re-dissolved in water, mild fossil alkaly was added, and a white powder precipitated.

4thly, This powder, after exposure to a pretty sharp heat, was thrown into water; part of it dissolved, and the water got the taste and other properties of lime-water.

5thly, The insoluble part (1.) suffered no change by boiling in nitrous acid; one-half of it mixed with borax, and exposed to the blow-pipe upon charcoal, vitrified; the other half, mixed with borax and charcoal-dust, likewise vitrified.

CONCLUSIONS. It appears, then, that the greater part of this substance was calx vitriolata, or selenite; the remainder a vitrifiable earth.

I had before found, that the terra ponderosa vitriolata, or heavy gypsum, would dissolve in concentrated vitriolic acid; but always separated in a powdery form upon the affusion of water; and now it appears, that calx vitriolata, or selenite, does the same.

portion

portion of the acid must first be tried in a diluted state, from whence we must judge how much of the terra ponderosa salita the whole will require; or else the whole of the acid must be diluted with water. Whether we use the terra ponderosa dissolved in water or in marine acid; in either case the acid of vitriol immediately seizes upon it, and subsides with it in form of an insoluble powder.

As there are reasons for preferring the marine acid in several of the nicer and more important enquiries of chemistry, this ready method of purifying it cannot but prove acceptable.

SECTION II.

Terra ponderosa vitriolata. BERGMAN'S Sciagraphia, §§ 58. 89.

Variety, Heavy Gypsum. Ponderous Spar.

Marmor Metallicum. CRONSTEDT Min. § 18. 2. 19. C.

From Kilpatrick-hills near Glasgow. A sort, with smaller crystals, amongst the iron ore about Ketley in Shropshire. In the lead mines at Alston-Moor.

More obvious Properties.

White; nearly transparent, but has not the property of double refraction; composed of laminæ of rhomboidal crystals; decrepitates in the fire. Specific gravity from 4,402 to 4,440.

EXPE-

EXPERIMENTS.

A. 100 grains expofed to a red heat for one hour, in a black lead crucible, loft five grains in weight; but as a fulphureous fmell was perceptible, I fufpected that a decompofition had taken place, and therefore expofed another portion to a fimilar heat for the fame fpace of time in a tobacco-pipe. This had no fmell of fulphur, nor was it diminifhed in weight.

2. It is barely fufible under the blow-pipe; but with borax fluxes readily into a white opake glafs.

B. 100 grains, ground in a mortar, and wafhed over extremely fine by repeated additions of water, were boiled in the fame water, and, after fettling, the water was poured off. The powder, when dried, had not fenfibly loft weight.

2. To feparate portions of the wafhing water, were added mild vegetable and mild foffil alkaly; but without any appearance of precipitation. Nitre of mercury gave a very flight brownifh cloud, barely difcernible; and nitre of filver an extremely flight bluifh appearance.

3. The fame powder, boiled again in frefh water, did not affect the water at all; for it ftood the teft of nitre of filver without any change.

C. Portions of the powder B. were boiled in vitriolic, nitrous, and muriatic acids, of the ufual ftrength, for feveral minutes. The acids were then faturated with vegetable fixed alkaly, but without any appearance of precipitation, nor had the portions of powder loft any weight.

2. But when boiled in vitriolic acid, until that acid became very much concentrated and nearly red-hot, the whole of it diffolved; but, feparated again upon the addition of water, was not

not altered in its weight, was not acted upon by acids of the usual strength, and had, under the blow-pipe, the properties mentioned at A. 2.

3. Some of the solution in the concentrated vitriolic acid was left exposed to the atmosphere, that the acid might slowly attract water. After some days, beautiful crystals appeared in the shapes of stars, fasciæ, and other radiated forms.

4. To another portion of this solution mild fixed vegetable alkaly was added; but the precipitate appeared to be the marmor metallicum unchanged.

D. One ounce of this marmor metallicum in fine powder was fluxed in a crucible with two ounces of salt of tartar, until it ran thin. This substance, boiled with water in a Florence flask, left a residuum of six drams.

E. This residuum was thrown into water, and pure nitrous acid added, until there was no more effervescence. The undissolved part weighed 52 grains.

F. This undissolved part appeared to be the original substance no ways changed; for it did not dissolve in nitrous or marine acids, but did wholly dissolve in the greatly concentrated and boiling vitriolic acid, from which it was again separated by the addition of water. (C. 2.)

G. The solution D. was saturated with distilled vinegar, and then evaporated to dryness, but with less than a boiling heat. The sal diureticus, thus formed, was washed away with alcohol. The remaining salt weighed 5 drams nearly.

2. This salt had the appearance and the taste of vitriolated tartar; it decrepitated in the fire; roasted with charcoal-dust, it formed a hepar sulphuris; and with muria calcarea gave a precipitation of selenite.

H. The salt, formed with the nitrous acid (E), shot readily into beautiful permanent crystals, of a rough bitterish taste.

2. Some of this salt was deflagrated with nitre and charcoal, and the alkaly afterwards washed away.

3. The residuum, being the earth of the marmor metallicum, was very white, burnt to lime, and again formed an insoluble compound with acid of vitriol.

I. 100 grains of terra ponderosa aërata were dissolved in diluted marine acid. Vitriolic acid was dropped into this solution, until no more precipitation ensued. The precipitate, after very careful washing and drying, was exposed to a red heat in a covered tobacco-pipe for half an hour: when cool, it weighed 117 grains.

2. 50 grains of terra ponderosa aërata in a lump were put into diluted vitriolic acid; but the action of the acid upon it was hardly sensible, even when made hot.

Marine acid was then added, and after some time an effervescence appeared. The terra ponderosa vitriolata, thus formed, after proper washing and drying, was exposed to a red heat for an hour: it then weighed 58,4 grains.

CONCLUSIONS.

1st, It appears that the marmor metallicum is composed of vitriolic acid and terra ponderosa, D. E. F. G. H.

2dly, That this compound, though probably soluble in water, has so little solubility as almost to escape detection by the nicest chemical tests, B. 1. 2. 3.

3dly, That it is not soluble in acids of the usual strength; but that it perfectly and entirely dissolves in highly concentrated

trated vitriolic acid, from which it again separates entire and unchanged upon the affusion of water, C. 1. 2.

4thly, That it cannot be decomposed (*via humida*) by mild fixed alkaly, C. 4.

5thly, That it may be decomposed (*via sicca*) by the vegetable fixed alkaly, D. E. G. H.

6thly, That it may be decomposed by inflammable matter, uniting to its acid, and forming sulphur; but that it cannot be decomposed by heat alone, A. 1.

7thly, From experiments I. 1. 2. it appears, that 100 parts of this substance contain

Vitriolic acid pure -	32,8
Terra ponderosa pure	67,2
	100

For the 100 parts of terra ponderosa aërata made use of in the experiment I. 1. would lose during the solution 20,8 of fixed air (§ 1st, A.); then, deducting 0,6 for the marmor metallicum contained in the terra ponderosa aërata (§ 1st. A. 1. 2.), there remains 78,6 of pure terra ponderosa. This, when saturated with vitriolic acid, and made perfectly dry, weighed 117; consequently it had taken 38,4 of vitriolic acid.

OBSERVATIONS.

The apparent insolubility of terra ponderosa aërata in the diluted vitriolic acid (I. 2.) can be accounted for by remarking, that the moment the surface of the lump was acted upon by the acid, an insoluble coat of marmor metallicum was formed upon it, which effectually precluded any further operation of the acid.

Professor

Profeſſor BERGMAN, in order to obtain the earth from the terra ponderoſa vitriolata, directs the latter to be roaſted with fixed alkaly, and the duſt of charcoal; but I have always done it by charcoal duſt alone, though probably this method may require a greater degree of heat.

It has been remarked, that terra ponderoſa and calx of lead reſemble each other in many reſpects; and I muſt add, that the vitriol of lead diſſolves in the highly concentrated vitriolic acid much in the ſame manner that the marmor metallicum does, and like this too ſeparates upon the affuſion of water; but I never obſerved it diſpoſed to cryſtallize.

The marmor metallicum may probably be uſeful in ſome caſes where a powerful flux is wanted; for I once mixed ſome of it with the black flux, and expoſing it to a pretty ſharp heat, it entirely ran through the crucible. May not, therefore, ſome of the more common varieties of it be uſed advantageouſly as a flux to ſome of the more refractory metallic ores?

SECTION III.

Terra ponderoſa Vitriolata.

Variety, Calk or Cauk.

Marmor Metallicum, CRONSTEDT Min. § 18. B?

Plentiful in the Mines in Derbyſhire.

More obvious Properties.

Of a white or reddiſh colour; cryſtallized in rhomboidal laminæ, but theſe very much intermixed and confuſed. Loſes little or nothing of its weight by being made red-hot. Specific gravity 4,330.

EXPERIMENTS.

A. Ground in a mortar, and waſhed over, the waſhing water, when decanted, gave no precipitation with mild vegetable alkaly; but with nitre of ſilver and nitre of mercury the ſlighteſt cloud imaginable.

B. 100 grains boiled in marine acid weighed, after proper waſhing and drying, 99,5.

C. The acid ſolution B let fall a Pruſſian blue upon the addition of a ſingle drop of phlogiſticated fixed alkaly; and, when ſaturated with mild foſſil alkaly, afforded an ochry-coloured precipitate.

D. This precipitate, collected and waſhed, weighed half a grain. It was roaſted with tallow, and then was wholly attracted by a magnet.

E. A quantity of the cauk, finely powdered, was mixed with charcoal-duſt, and roaſted in a crucible at a white heat, for five hours, freſh charcoal-duſt being occaſionally added. It gave out a ſtrong ſmell of ſulphur.

F. To this roaſted cauk nitrous acid was added, which diſſolved the greater part of it; producing, during the ſolution, ſome efferveſcence, and a ſtrong ſmell of hepar ſulphuris.

G. Some of this ſolution, after proper evaporation, afforded beautiful cryſtals, not deliqueſcent, exactly reſembling thoſe obtained from the marmor metallicum, (§ II. H.).

H. To other portions of the ſolution F, were added fixed vegetable and foſſil alkalies, and likewiſe volatile alkaly, each of which precipitated the earth from the acid.

I. This

I. This earth, after exposure to a white heat for one hour, became caustic, and made lime-water, similar in properties to to that mentioned at § Ist. E.

K. Some of the part not acted upon by the nitrous acid F, dissolved entirely by boiling in highly concentrated vitriolic acid, and wholly separated again by the affusion of water. More water was added, and the whole was boiled again; but the filtered liquor gave no signs of precipitation upon the most liberal addition of mild fixed vegetable alkaly.

CONCLUSIONS.

It appears, therefore, that 100 parts of Derbyshire cauk contain

Marmor metallicum	-	99,5
Calciform iron	- -	,5
		100

And it is probable, that the redder pieces contain a little more iron.

SECTION IV.

Terra ponderosa vitriolata.

Variety, radiated Cauk.

Gypsum crystallisatum capillare. CRONSTEDT Min. § 19. B.

From Pennely by the Bog, near Minsterley, in Shropshire, fifteen miles from Salop, on the road to Montgomery.

More

More obvious Properties.

Somewhat gloſſy like ſatin; yellowiſh-white, opake; compoſed of ſlender ſpiculæ ſet cloſe together, and pointing from a center.

In ſome pieces there are concentric circles of a ſemi-tranſparent horn like appearance. It is not very brittle; may be ſhaved with a knife; loſes little or nothing of its weight by being made red-hot. Its ſpecific gravity 4,000; but after ſoaking one night in the water 4,200, or more.

EXPERIMENTS.

When treated in the ſame manner that the Derbyſhire cauk was, in the preceding ſection, 100 parts of it appeared to contain

Marmor metallicum	-	97,7
Calciform iron	- -	2,3
		100

Suſpecting that the preſence of ſo ſmall a proportion of iron could hardly occaſion the whole of the apparent differences betwixt the Shropſhire and Derbyſhire cauks and the marmor metallicum; and thinking it not improbable, that they might contain lead; I mixed ſome of them with charcoal-duſt and borax, but could not by means of the blow-pipe produce any metallic appearance, although vitriol of lead, treated in the ſame manner, was readily reduced.

I then mixed four parts of cauk with one part of vitriol of lead; the lead could ſtill be reduced, though not ſo readily as before.

GENERAL

GENERAL OBSERVATIONS.

The terra ponderoſa ſeems to claim a place betwixt the earths and the metallic calces. Like the former, it cannot be made to aſſume a metallic form; but, like the latter, it may be precipitated from an acid, by means of phlogiſticated alkaly. In many of its properties it much reſembles the calx of lead; and in others, the common calcareous earth, but ſtill ſeems ſufficiently different from that to conſtitute a new genus, as will appear from a little attention to the following circumſtances.

Terra ponderoſa,	Terra calcarea,
When diſſolved in water, precipitates upon the addition of the ſmalleſt portion of vitriolic acid.	Diſſolved in water, does not precipitate upon the addition of vitriolic acid.
Its gypſum, therefore, is inſoluble.	Its gypſum, therefore, is ſoluble.
With the nitrous and marine acid, forms cryſtals which do not deliqueſce.	With nitrous and marine acids forms ſalts ſo deliqueſcent that they cannot be kept in a cryſtallized form.
Decompoſes vitriolic ſalts *via humida*.	Does not decompoſe vitriolic ſalts.

It has been called terra ponderoſa, or heavy earth, upon account of the great ſpecific gravity of its gypſum; its ſpar is likewiſe heavy enough to countenance ſuch an appellation; but the earth itſelf does not appear to be a heavy ſubſtance, and I imagine the great weight of its compounds with the vitriolic and aërial acids is owing to the abſence of water.

Birmingham, Nov. 1783.