An analysis of the earthy substance from New South Wales called Sydneia or Terra Australis / [Charles Hatchett].

AN

ANALYSIS

OF

THE EARTHY SUBSTANCE

FROM

NEW SOUTH WALES,

CALLED

SYDNEIA OR TERRA AUSTRALIS.

BY

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FROM THE

PHILOSOPHICAL TRANSACTIONS.

AN

ANALYSIS, &c.

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§. 1.

THE late ingenious JOSIAH WEDGWOOD, Esq. F.R.S. published, in the Philosophical Transactions for the year 1790, an account of some analytical experiments on a mineral substance from Sydney Cove, in New South Wales.*

This substance, Mr. WEDGWOOD describes to be composed of a fine white sand, a soft white earth, some colourless micaceous particles, and also some which were black, resembling black mica, or black lead.

Nitric acid did not appear to act on any part of this earthy substance; and even a portion on which sulphuric acid had been boiled to dryness, afforded afterwards, when edulcorated with water, only a few flocculi, which Mr. WEDGWOOD conceived to be aluminous earth.

The muriatic acid, during digestion, seemed to act as little as the two preceding acids; but, upon water being poured in, to wash out the remaining portion, the liquor instantly became white as milk, with a fine white curdy substance intermixed; the concentrated acid having, in the opinion of the author,

* Philosophical Transactions, Vol. LXXX. Part II. page 306.

extracted something which the simple dilution with water precipitated.

The remaining part was repeatedly digested with muriatic acid, and treated with water, as before, till the milky appearance was no longer produced.

The properties of this white precipitate, Mr. WEDGWOOD states to be as follows.

1st. It is only soluble in boiling concentrated muriatic acid.

2dly. It is precipitated by water, in the form of a white earth; which may again be dissolved by boiling muriatic acid.

3dly. When nitric acid is mixed with the muriatic solution of this earth, there is no appearance of a precipitate; not even when water is added, provided that the nitric acid exceeds, or nearly approaches, the quantity of muriatic acid.

4thly. The earth is precipitated by the alkalies.

5thly. The muriatic solution does not crystallize by evaporation; but becomes a butyraceous mass, which soon liquefies on exposure to the air.

6thly. The butyraceous mass is not corrosive to the taste; and is even less pungent than the combination of calcareous earth with the same acid.

7thly. Heat approaching to ignition disengages the acid from the butyraceous mass, in white fumes, and a white substance remains.

8thly. The white precipitated earth is fusible *per se*, in from 142° to 156° of Mr. WEDGWOOD'S thermometer, and it is thus distinguished from all the other primitive earths.

And, 9thly. This precipitate cannot be reduced to a metallic state, when exposed to heat with inflammable substances.

From these properties, Mr. WEDGWOOD says, that although

he cannot absolutely determine whether this substance belongs to the class of earths, or that of metallic substances, yet he is inclined to refer it to the former.

Professor BLUMENBACH, of Göttingen, in his Manual of Natural History, published in 1791, also mentions that he had examined a portion of this earthy substance, by means of muriatic acid, after the manner of Mr. WEDGWOOD, and that he had obtained a slight precipitate by the addition of water.*

In consequence of these experiments, the mineralogists throughout Europe admitted the white precipitated substance to be a primitive earth; and we accordingly find, in all the systematical works on mineralogy published since the above-mentioned period, that it is arranged as a distinct genus, under the names of *Sydneia*, *Australa*, *Terra Australis*, and *Austral Sand*.

The extreme scarcity of this substance prevented the chemists in general from examining more minutely into the nature of this new primitive earth, till Mr. KLAPROTH, in the second volume of his Additions to the Chemical Knowledge of Mineral Bodies, gave to the public a memoir entitled, A Chemical Examination of the *Austral Sand*.†

In this memoir, Mr. KLAPROTH says, that he had received from Mr. HAIDINGER, of Vienna, two samples of this substance; one of which had a considerable quantity of black shining particles intermixed with it, which, although regarded by many as graphite or plumbago, he was inclined to believe to be *Eisenglimmer* or micaceous iron ore.

The other contained much less of these black or dark grey

* *Handbuch der Naturgeschichte*, p. 567 and 568.

† *Beiträge zur Chemischen Kenntniss der Mineralkörper.—Zweiter Band*, p. 66.

particles, and, as he considered it to be more pure than the former, he subjected it to the following experiments.

1. It was digested at three different times with concentrated muriatic acid, in a boiling heat, and the acid was afterwards filtrated through paper. The solution was then mixed by degrees with pure water, which did not however produce any precipitate, even when warmed.

Carbonate of potash caused some flocculi to fall, which, edulcorated and dried, weighed 3.25 grains.

This precipitate was dissolved in diluted sulphuric acid, and left a small portion of siliceous earth; after which the solution, by evaporation, afforded crystals of alum.

2. The residuum of the muriatic solution was mixed with three times the weight of potash, and exposed to a red heat. Muriatic acid was then poured on the mass, and the insoluble gelatinous residuum was edulcorated on a filter; and, after a red heat, weighed 19.50 grains, which proved to be siliceous earth.

3. The muriatic solution, with prussiate of potash, afforded a blue precipitate; the ferruginous part of which was about one quarter of a grain.

4. The solution was then saturated with carbonate of potash, and some alumine was precipitated; which, after a red heat, weighed 8.50 grains, and with sulphuric acid formed alum.

Siliceous earth, alumine, and iron, appeared therefore to be the only ingredients of this substance; but as Mr. KLAPROTH had no more than thirty grains to examine, he could not extend his experiments.

From those above related, he is of opinion that the existence

of this primitive earth may be much doubted, and that this doubt can only be removed in the course of time, by other analyses.

Mr. KLAPROTH concludes his memoir by saying, that the substance examined by him was undoubtedly the genuine austral sand, as Mr. HAIDINGER had received it from Sir JOSEPH BANKS, when he was in London.

Mr. NICHOLSON, however, in the 9th Number of his Journal of Natural Philosophy, *&c.* (p. 410.) published on the 1st of December, 1797, questions much, whether the substance examined by Mr. KLAPROTH was the same as that examined by Mr. WEDGWOOD; and, after having contrasted their experiments, says, "hence it seems fair to conclude that the two "minerals were not the same, however this may have hap-"pened; and that the existence of the new fusible earth of "WEDGWOOD stands on the same evidence as before, namely, "his experiments, which have not yet been repeated, that I "know of."

Some of Mr. NICHOLSON'S objections to the experiments of Mr. KLAPROTH, being founded principally on some difference in the external characters of the substance examined by him, and the one examined by Mr. WEDGWOOD, are such as very naturally occur; but the following pages will, I believe, prove that Mr. KLAPROTH'S experiments were made on that which might be justly regarded as the *Sydneia* or austral sand.

In 1796, the Right Hon. Sir JOSEPH BANKS, P. R. S. favoured me with a specimen of the *Sydneia*, which had been lately brought to England; a portion of this I soon after examined, in a cursory manner, by muriatic acid, but did not obtain any precipitate when water was added to the filtrated solution.

Upon mentioning this circumstance, and expressing a desire to examine this substance with more accuracy, Sir JOSEPH BANKS, with his usual readiness to promote every scientific inquiry, not only permitted me to take specimens from different parts of the box which contained the earth already mentioned, but (that every doubt might be obviated) gave me about 300 grains which remained of the identical substance examined by Mr. WEDGWOOD.

Upon these the following experiments were made; and, to distinguish them, I shall call the first, No. 1, and that examined by Mr. WEDGWOOD, No. 2.

§. 2.

Analysis of the Sydneia, *No.* 1.

The *Sydneia*, No. 1, is in masses and lumps, of a pale greyish white, intermixed with a few particles of white mica, and also occasionally with some which are of a dark grey, resembling graphite or plumbago.

It easily crumbles between the fingers, to a powder nearly impalpable, which has rather an unctuous feel.

Small fragments of vegetable matter are also commonly found intermixed with it; and the general aspect is that of an earthy substance which has been deposited by water.

EXPERIMENT 1.

400 Grains were put into a glass matrass, and one quart of distilled water being added, the whole was boiled to one fourth.

The liquor was then filtrated, and a portion being examined by the re-agents commonly used, afforded no trace of matter

in solution. The remainder was then evaporated, without leaving any residuum.

EXPERIMENT 2.

About 200 grains of the earth, rubbed to a fine powder, were put into a glass retort, into which I poured three ounces of concentrated pure muriatic acid. The retort was placed in sand, and the acid was distilled, till the matter in the retort remained dry. Two ounces of muriatic acid were again poured on it, and distilled as before, till only one fourth remained. The whole was then put into a matrass, which was placed in an inclined position, so that when the earth had subsided, the liquor might be decanted, without disturbing the sediment.

When it had remained thus for 12 hours, the acid was carefully poured into a glass vessel; but, as I observed that it was not so perfectly transparent as before it had been thus employed, I suffered it to remain 24 hours, but did not perceive any sediment. Half of this liquor was diluted with about twelve parts of distilled water, and, after a few hours, a very small quantity of a white earth subsided.

This however did not appear to me to be a precipitate caused by a change in the chemical affinities, but rather an earthy matter which had been suspended in the concentrated acid, and afterwards deposited, when the liquor was rendered less dense by the addition of water. To ascertain this, I poured the remaining portion of the concentrated liquor on a filter of four folds: it passed perfectly transparent, and, although diluted with twenty-four parts of water, it remained unchanged, and as pellucid as before. I now filtrated the former portion, and added it to that already mentioned.

It was then evaporated to dryness, and left a pale brownish mass, which was dissolved again, by digestion, in the smallest possible quantity of muriatic acid.

Water was added, in a very large proportion, to this solution, without producing any effect; I then, by prussiate of potash, precipitated a quantity of iron, which was separated by a filter.

The clear solution was then saturated with lixivium of carbonate of potash, and a white precipitate was produced, which was collected and edulcorated. This, when digested with diluted sulphuric acid, was dissolved; and the superfluous acid being driven off by heat, boiling water was poured on the residuum, and completely dissolved it.

To this solution some drops of lixivium of potash were added, and, by repeated evaporations, the whole formed crystals of alum.

From the above experiment it appeared, that the muriatic acid had only dissolved some alumine and iron; but, in order to satisfy myself more completely in respect to the component parts of this substance, I made the following analysis.

Analysis. A. 400 grains were put into a glass retort, which was then made red-hot during half an hour. Some water came over, and the earth afterwards weighed 380.80 grains, so that the loss amounted to 19.20 grains. The greater part of this loss was occasioned by the dissipation of the water imbibed by the earth; to which must be added, the loss of weight caused by the combustion of a small portion of vegetable matter.

B. The 380.80 grains were rubbed to a fine powder, and being put into a glass retort, 1470 grains of pure concentrated sulphuric acid were added. The retort was then placed in a small reverberatory, and the fire was gradually increased, till

the acid was distilled over: it was then poured back on the matter in the retort, and distilled as before, till a mass nearly dry remained.

On this, boiling distilled water was repeatedly poured, until it no longer changed the colour of litmus paper, and was devoid of taste. The undissolved portion was then dried, and made red-hot; after which it weighed 281 grains.

C. I now mixed the 281 grains with 300 grains of dry carbonate of potash, and exposed the mixture to a strong red heat, in a silver crucible, during four hours. The mass was loose, and of a greyish white: it was softened with water, and, being put into a retort, sulphuric acid was added to a considerable excess. The whole was then distilled to dryness, and, when a sufficient quantity of boiling water had been added, it was poured on a filter, and the residuum was well washed; it was then made red-hot, and afterwards weighed 274.75 grains.

D. The solutions of B and C were added together, and were much reduced by evaporation. Pure ammoniac was then employed to saturate the acid, and a copious loose precipitate, of a pale yellowish colour was produced; which, collected, edulcorated, and made red-hot, weighed 103.70 grains.

E. The filtrated liquor of D was again evaporated, and carbonate of potash being added, a slight precipitation of earthy matter took place; which, by the test of sulphuric acid, proved to be some alumine which had not been precipitated in the former experiment: this weighed 1.20 grain.

F. The 103.70 grains of D were completely dissolved when digested with nitric acid, excepting a small residuum of siliceous earth, which weighed 0.90 grain.

G. The nitric solution was evaporated to dryness, and a

second portion of the same acid was added, and in like manner evaporated. The residuum was then made red-hot, and digested with diluted nitric acid, which left a considerable portion of red oxide of iron. The solution was again evaporated, and the residuum, being treated as before, again deposited some oxide of iron, much less in quantity than the former.

The whole of the oxide was then heated with wax in a porcelain crucible, was taken up by a magnet, and weighed 26.50 grains.

H. The nitric solution of G was saturated with ammoniac, and a loose white precipitate was formed; which, edulcorated and made red-hot, weighed 76 grains.

I. These 76 grains were dissolved when digested with diluted sulphuric acid; and, when the excess of acid had been expelled by heat, the saline mass was dissolved in boiling water. To this solution I added some lixivium of potash, and, by gradual and repeated evaporations, obtained the whole in regular octoedral crystals of alum.

K. The 274.75 grains of C now alone remained to be examined. They appeared to consist of siliceous earth, mixed with the dark grey shining particles already mentioned; but, as I shall describe, in the following experiments, the process by which these were separated, I shall now only say that they amounted to 7.50 grains.

L. The earth with which the abovementioned particles were mixed weighed 267.25 grains. This earth was white, and arid to the touch: when melted with two parts of soda, it formed a colourless glass; and, with four parts of the same it dissolved in water, and formed a *liquor silicum:* it was therefore pure siliceous earth or silica.

The substance here examined was composed therefore of the following ingredients.

		grains.
Pure siliceous earth or silica -	F.	0.90
	L.	267.25
Alumine - - - -	E.	1.20
	H.	76
Oxide of iron - - -	G.	26.50
Dark grey particles - -	K.	7.50
Water and vegetable matter -	A.	19.20
		398.55

The foregoing analysis was repeated several times, and always with similar results; excepting, that as I had taken the specimens from different parts of a large quantity, I found that the proportions of the ingredients were not constantly the same: that of the siliceous earth, for example, was sometimes greater, and the alumine and iron proportionably less. Some specimens were also nearly or totally destitute of the dark grey shining particles; in short, every circumstance was such as might be expected from a mixed substance, which, from the nature of its formation, cannot have the ingredients in any fixed proportion.*

As this substance agreed in its general characters, for the greater part, with that described by Mr. WEDGWOOD, and as it was indisputably brought from the same place, there appeared every reason to believe that the nature of both was the same;

* The description given by Mr. KLAPROTH convinces me that his experiments were made on a portion of this substance. Moreover, when my late friend Mr. HAIDINGER was in London, I gave him some of this earth for his collection; so that, whether Mr. KLAPROTH made his experiments on that which had been received by Mr. HAIDINGER from Sir JOSEPH BANKS, or from myself, it is not less certain that he operated on that which might be regarded as the genuine *Sydneia*.

but, to obviate as much as possible any doubt or objection, I determined to repeat the experiments, and the analysis, on that portion which remained of the identical substance examined by Mr. WEDGWOOD, and which from that period had been reserved by Sir JOSEPH BANKS, who kindly favoured me with it for this purpose.

§. 3.

Analysis of the Sydneia, *No.* 2.

This substance, as has already been mentioned, consists of a white transparent quartzose sand, a soft opaque white earth, some particles of white mica, and a quantity of dark lead-grey particles, which have a metallic lustre.

The Sydneia, No. 2, appears chiefly to differ from No. 1, by being more arenaceous, and by a larger proportion of the dark grey particles. Many experiments, similar to those made on No. 1, already described, were made on this substance, with pure concentrated muriatic acid; but, as none of these afforded any appearance of a precipitate by the means of water, I do not think it necessary to enter into a circumstantial account of them, and shall proceed therefore to the analysis.

A. 100 grains were exposed to a red heat, in a glass retort, and, after half an hour, were found to have lost in weight 2.20 grains.

B. The 97.80 grains which remained were mixed with 300 grains of dry carbonate of potash, and the mixture was exposed to a strong red heat, in a crucible of silver, during three hours.

When cold, the mass was softened with water, and was put into a glass matrass. I then added three ounces of pure con-

centrated muriatic acid, and digested it for two hours in a strong sand heat. Boiling water was then added, and the whole being poured on a filter, the residuum was edulcorated, dried, and made red-hot; it then weighed 85.50 grains.

C. The filtrated solution was evaporated to one fourth, and pure ammoniac being added, a precipitate was formed, which, after a red heat, weighed 10.70 grains.

D. One ounce of muriatic acid was poured on the 10.70 grains, in a matrass, which was then heated. The whole of the 10.70 grains was dissolved, excepting a small portion of siliceous earth, which weighed 0.30 grain.

E. The muriatic solution was then reduced by evaporation, to about one fourth; to which I added a large quantity of distilled water, which did not however produce any change. I then gradually added a solution of pure crystallized prussiate of potash, and heated the liquor till the whole of the iron was precipitated; after which, ammoniac precipitated a loose white earth, which, edulcorated and made red-hot, weighed 7.20 grains. The iron precipitated by the prussiate may therefore be estimated at 3.20 grains.

F. The 7.20 grains of the white earth were digested with sulphuric acid, and, after the excess of acid had been expelled by heat, boiling water was poured on the saline residuum. The solution was then gradually evaporated, with the addition of a small portion of lixivium of potash, and afforded crystals of alum, without a trace of any other substance.

G. I now proceeded to examine the 85.50 grains of B. These appeared to consist of siliceous earth, or fine particles of quartz, mingled with a considerable quantity of the dark grey shining particles.

Mr. WEDGWOOD was of opinion that these were a peculiar species of plumbago or graphite. Professor BLUMENBACH, on the contrary, regards them as molybdæna: and Mr. KLAPROTH believes them to be *eisenglimmer* or micaceous iron ore.

When rubbed between the fingers, they leave a dark grey stain, and the feel is unctuous, like that of plumbago, or molybdæna: the traces which they make on paper also resemble those of the abovementioned substances, but the lustre of the particles approaches nearer to that of molybdæna.

In order therefore to determine whether or not they consisted totally or partially of molybdæna, I put the 85.50 grains into a small glass retort, and added two ounces of concentrated nitric acid. The retort was then placed in a sand heat, and the distillation was continued, till the matter remained dry. The acid was then poured back into the retort, and distilled as before; but I did not observe that the grey particles had suffered any change, nor were nitrous fumes produced, as when molybdæna is thus treated.

To be more certain, however, I digested pure ammoniac on the residuum; and, having decanted it into a matrass, I evaporated it to dryness, without perceiving any vestige of oxide of molybdæna, or indeed of any other substance.

It was evident therefore that molybdæna was not present; and, as the general external characters and properties corresponded with those of plumbago, I was inclined to believe that these were particles of that substance, and not micaceous iron, as Mr. KLAPROTH imagined. To determine this, the following experiment was made.

H. 200 grains of pure nitre in powder were mixed with the 85.50 grains, and the mixture was gradually projected into a

crucible, made strongly red-hot. A feeble detonation took place at each projection; and, after a quarter of an hour had elapsed, the crucible was removed.

When cold, the mass was porous and white, without any appearance of the dark grey particles. Boiling water was poured on it, and the whole being put into a matrass, one ounce of muriatic acid was added, and digested with it in a sand heat. By evaporation it became gelatinous: it was then emptied on a filter, and, being well washed, dried, and made red-hot, weighed 75.25 grains.

The appearance of this was that of a white earth, arid to the touch. When melted with two parts of soda, a colourless glass was formed; and, with four parts of the same, it was soluble in water, and produced *liquor silicum;* it was therefore pure siliceous earth.

I. The filtrated liquor was saturated with ammoniac, and, upon being heated, a few brownish flocculi were precipitated, which, when collected and dried, weighed 0.40 grain. This precipitate was dissolved in muriatic acid, and was again precipitated by prussiate of potash, in the state of Prussian blue.

The liquor from which the flocculi of iron had been separated was then examined, by adding carbonate of potash, and lastly, by being evaporated to dryness; but it no longer afforded any earthy or metallic substance: so that, by the process of detonation with nitre, the 85.50 grains afforded 75.25 grains of pure siliceous earth, with 0.40 grain of iron; and, as the dark grey substance was destroyed, excepting the 0.40 grain of iron abovementioned, and as 9.85 grains of the original weight of 85.50 grains were dissipated, there can be no doubt but that this substance, amounting to 10.25 grains, was carburet of iron or

plumbago; especially as some experiments which I purposely made, on that from Keswick in Cumberland, were attended with similar results.

It is also evident, that these particles could not be *eisenglimmer* or micaceous iron, as nitre has little or no effect on that substance, when projected into a heated crucible.

In a subsequent experiment on the same, the crucible was removed immediately after the last projection, and I then observed that an effervescence, with a disengagement of carbonic acid, took place, upon the addition of the muriatic acid, as is usual when pure plumbago is decomposed by nitre, and that less of the gelatinous matter was formed by evaporation.

The cause of this difference was evidently the duration of the red heat; for, in the first instance, the alkali developed by the decomposition of the nitre had time to unite with the siliceous earth, so as, when dissolved, to form *liquor silicum*; but, in the second experiment, a portion of alkali remained combined with the carbonic acid, produced by the carbon of the decomposed plumbago.

The produce of 100 grains by this analysis was,

		grains.
Silica - - -	D.	0.30
	H.	75.25
Alumine - - -	F.	7.20
Oxide of iron - -	E.	3.20
Graphite or plumbago -	I.	10.25
Water - - -	A.	2.20
		98.40

Mr. WEDGWOOD says, that sulphuric acid cannot dissolve the precipitated earth, and has but little effect on the mixed

substance, even when distilled to dryness; but, from the preceding experiments, I had reason to believe that the aluminous earth and iron would be separated by reiterated distillation; I therefore repeated the analysis in the following manner.

Second Analysis of the Sydneia, *No.* 2.

A. 100 grains of the earth were put into a glass retort, upon which 400 grains of pure concentrated sulphuric acid were poured. The retort was placed in a small reverberatory, and the fire was continued till a dry mass remained. 400 grains of the acid were again poured in, and distilled as before. Upon the dry mass, boiling water was poured, and the whole was then emptied on a filter, and edulcorated. The residuum, after a red heat, weighed 87.75 grains, and consisted of siliceous earth, mixed with some mica, and with particles of plumbago.

B. The filtrated solution, by ammoniac, afforded a precipitate, which weighed 9.50 grains; and, being examined, as in the former experiment, yielded 6.50 grains of alumine, and 3 grains of oxide of iron.

The plumbago was separated from the siliceous matter, in the manner already described, and amounted to about 10 grains.

By this analysis I obtained,

	grains.
Silica and mica - -	77.75
Alumine - - -	6.50
Oxide of iron - - -	3
Plumbago - - -	10
	97.25

It appears therefore that the Sydneian earth, when treated with sulphuric acid, is capable of being for the greater part

decomposed; and Mr. WEDGWOOD probably did not succeed, because his process was in some respect different, or that the distillation was not sufficiently repeated.

I have not thought it necessary to be more circumstantial in the account of this second analysis, as the operations were similar to those of the former.

§. 4.

These experiments prove, that the earthy substance called *Sydneia* or *terra australis*, consists of siliceous earth, alumine, oxide of iron, and black lead or graphite.

The presence of the latter appears to be accidental, and it probably was mixed with the other substances at the time when they were transported, and deposited, by means of water; for this appears evidently to have been the case, from the general characters of this mixed earthy substance.

The quartz and mica, which are so visible, indicate a granitic origin; and the soft white earth has probably been formed by a decomposition of feldt spar, such as is to be seen in many places, and particularly at St. Stephen's, in Cornwall. The granitic sand which covers the borders of the *Mer de Glace*, at Chamouni, in Savoy, also much resembles the *terra australis*, excepting that the feldt spar is not in a state of decomposition: in short, the general aspect, and the analysis, concur to prove, that the *Sydneia* has been formed by the disintegration and decomposition of granite, or *gneiss*.

Mr. WEDGWOOD'S experiments are so circumstantial, that had I only examined the earth last brought to England, I should have supposed, with Mr. NICHOLSON, that I had operated on a different substance; but, as I had an opportunity to examine,

by analysis, a portion of the same earth on which Mr. WEDGWOOD made his experiments, and as I received it from Sir JOSEPH BANKS, the same gentleman who had furnished Mr. WEDGWOOD with it, no suspicion can be entertained about its identity.

Some of the experiments which I have related, and which prove that some of the finer earthy particles remained suspended in the concentrated muriatic acid, and were precipitated when the acid was diluted with water, appear in some measure to account for the mistake which has been made, in supposing that a primitive earth, before unknown, was present; but this alone will not account for many of the other properties mentioned by Mr. WEDGWOOD, such as,

1st. The repeated and exclusive solubility in the muriatic acid, and subsequent precipitation by water.

2dly. The butyraceous mass which was formed by evaporation.

And, 3dly. The degree of fusibility of the precipitated earth.

These indeed I can by no means explain, but by supposing that the acids used by Mr. WEDGWOOD were impure. This supposition appears to be corroborated by a passage in Mr. WEDGWOOD's paper, where he says, "here the Prussian lixi-" vium, in whatever quantity it was added, occasioned no pre-" cipitation at all, (only the usual bluishness arising from the " iron always found in *the common acids.*")* Now if (as it seems from this expression) Mr. WEDGWOOD employed the common acids of the shops, without having previously examined and purified them, all certainty of analysis must fall, as the impurity of such acids is well known to every practical

* Philosophical Transactions, Vol. LXXX. Part II. p. 313.

chemist; but, whether this was the cause, or not, of the effects described by Mr. WEDGWOOD, I do not hesitate to assert, that the mineral which has been examined does not contain any primitive earth, or substance possessing the properties ascribed to it, and consequently, that the Sydneian genus, in future, must be omitted in the mineral system.