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To cite this article: B.G. Sage (1800) IX. Observations on the transition of animal or absorbing earth to the state of calcareous earth , Philosophical Magazine Series 1, 7:27, 246-247, DOI: [10.1080/14786440008562582](https://doi.org/10.1080/14786440008562582)

To link to this article: <http://dx.doi.org/10.1080/14786440008562582>

Published online: 18 May 2009.

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IX. *Observations on the Transition of animal or absorbing Earth to the State of calcareous Earth* *. By B. G. SAGE, Director of the first School of Mines.

THE ashes produced by burnt bones are white, and composed of more than two-thirds of animal earth, and of a part of that same earth combined with phosphoric acid. They produce by lixiviation a pretty large quantity of natron, from which the fire, according to all appearance, has separated the phosphoric acid.

Bone-ashes ought to be considered as a phosphoric salt with an excess of animal earth. These ashes, deprived of their natron by lixiviation, are insipid, and insoluble in water; but the phosphoric salt becomes soluble if it be disengaged from the excess of animal earth with which it is combined, and which may be effected by means of the vitriolic acid. Fourteen parts of this acid concentrated are requisite for twenty-four of bone-ashes: the more they are calcined to whiteness, the larger will be the quantity of vitrifiable phosphoric acid extracted from them. It is contained in them in the proportion of a third. This salt, composed of animal earth and phosphoric acid, may be decomposed by fixed alkali, which precipitates from it an insoluble calcareous phosphorous salt. This character of insolubility serves to show that there is a difference between the animal earth and the calcareous earth, since the phosphoric acid salt, with a base of animal earth, is soluble in water. When vitrified, it produces a pellucid mass of a light blue tint; while the phosphoric salt with a calcareous base produces by fusion a semi-transparent white glass, crystallised at its surface into a kind of dendrites.

Six ounces of vitrifiable phosphoric acid salt, dried into a soft paste, required four ounces of fixed alkali of tartar to be

* Calcareous earth differs from that of bones in being composed of *acidum pingue* and an excess of animal earth. Calcination reduces it to lime: but this is not the case with the earth of bones, which is a phosphoric salt with excess of animal earth. The name of *phosphat of lime*, given to the earth of bones, is consequently improper.

decomposed.

decomposed. The white precipitate, washed and dried, weighed one ounce six drams.

The leys, when evaporated, produced three ounces five drams of phosphoric tartar. This salt, when exposed to heat in a crucible, liquefies, swells up, and becomes fused. If it be poured on a plate of iron, it has the transparency of glass as long as it is warm, but becomes white and opaque on cooling. This salt when fused is rapid, and soluble in water: it loses by fusion three-eighths of its water of crystallisation.

In the decomposition of the vitrifiable phosphoric acid salt by fixed alkali, more than half of the alkali is decomposed; since there are obtained no more than three ounces five drams of phosphoric tartar, which contain three eighths of water.

The portion of *acidum pingue*, the principle of the fixed alkali *, which modifies itself into mephitic acid gas, is very small. This *acidum pingue* combines with the animal earth, and constitutes calcareous earth, which saturates itself with phosphoric acid, and forms the insoluble salt above mentioned †.

X. *Account of a new, easy, and more convenient Process for resolving Minerals by Alkalies.* By M. LOWITZ ‡.

THE decomposition of mineral bodies is, without doubt, one of the most difficult and most laborious operations of chemistry, and which must still become more difficult and complex in proportion as we are acquainted with a greater number of new and component parts in fossil bodies; for every new discovered earth or species of metal requires after-

* When fixed alkali is employed for the precipitation of any substance, there is always a part of the alkali decomposed, and the acid and earth contained in it form part of the precipitate. Of this, mercury disengaged from the nitrous acid by fixed alkali affords an instance. If this precipitate be distilled, it is sublimated into a mercurial salt *sui generis*. The earth of the alkali remains at the bottom of the retort.

† In the above curious paper the author's own nomenclature has been followed.—EDIT.

‡ From Crell's *Chemical Annals*, 1799, Vol. II. part 10.

wards,