



# On the analysis of plants by incineration

M. Caillat

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dicular wall descends to immense depths, is the same as the summit, we have further evidence that carbonate of lime does exist, or has existed, in such situations—far from coasts.

Again, Sir James C. Ross, in his *Voyage to the Southern Seas* (vol. i. pp. 202, 203, 207, 208), relates that on one occasion the dredge was put over in 270 fathoms and brought up living coral; a day or two afterwards corallines were obtained in 300 fathoms; and speaking of the maintenance of organic life under pressure, he observes, “hitherto we have not been able to determine this point beyond a thousand fathoms, but from that depth several shell-fish have been brought up with the mud.” Sir James appears to believe that their existence at greater depths is not impossible; for he pursues, “as we know they can bear the pressure of one thousand fathoms, why may they not of two?”

I leave it to your judgement whether the foregoing remarks are worthy of publication, and remain,

Your obedient Servant,

WALTER WHITE.

#### GOLD IN CERTAIN MINES OF THE DEPARTMENT OF THE RHONE.

MM. Allain and Bartenbach state that the copper mines of Chessy and of Saint Bel (Rhône) have been the objects of interesting experiments; the result of which is, not only that the copper and zinc which the pyrites contains may be easily extracted, but that it contains also at least 1-10,000 of gold. According to analyses, the numerical results of which are not stated by the authors, the pyrites contains sulphur, iron, zinc (about 8 per cent.), copper (about 5 per cent.), silica, arsenic, and gold, 1-10,000 at least. This discovery of gold has naturally led to the performance of a series of operations, in order to find an economical method of extracting this metal. Although the experiments are not entirely finished, the authors consider that the separation of this small quantity of gold is easy and economical, and that the copper, zinc, and sulphuric acid obtained, will partly cover the expenses of extraction; the method is briefly as follows:—The sulphur and arsenic being expelled by roasting, and the oxides of zinc and copper formed dissolved by sulphuric acid, the residue, which is composed of silica, sesquioxide of iron and gold, is to be washed, and then treated with a cold aqueous solution of chlorine; after some hours' action a solution of chloride of gold is obtained, from which the metal is reduced by the usual processes; the chlorine in this case does not act upon the sesquioxide of iron.—*L'Institut*, Août 8, 1849.

#### ON THE ANALYSIS OF PLANTS BY INCINERATION.

BY M. CAILLAT.

The author, who is professor at the Agricultural Institute of Grignon, is of opinion that incineration, generally hitherto employed

for obtaining the inorganic matters of plants, yields incorrect results; that the sulphates contained in the plants so treated are in great measure decomposed, and that the sulphuric acid or sulphur escapes in large proportion among the gaseous products of combustion.

It occurred to M. Caillat to treat the residues of plants, such as lucern, trefoil and sainfoin, with dilute nitric acid, and he succeeded in separating almost the whole of the mineral substances which they contained; so that the pulpy residue of 10 grammes of the substance employed, after washing and drying, burnt readily, leaving only 18, 20, or 22 milligrammes of ashes. This small residue consisted of silica and a little peroxide of iron, substances both insoluble in the acid employed. This method of treating plants always yielded the author a larger proportion of mineral substances than he obtained from the same quantity of the same plants by incineration; and in certain vegetables he found a much greater quantity of sulphuric acid than has hitherto been stated.

M. Caillat states, that he found by experiment that the loss of sulphuric acid occasioned by incineration is derived from the decomposition of a part of the sulphate of lime. Thus on intimately mixing with starch and water a known quantity of pure and calcined sulphate of lime, and incinerating the mass, the collected ashes did not contain as much sulphuric acid as the sulphate of lime employed.

The author has also stated another direct experiment, which shows that the sulphate of lime converted into sulphuret of calcium by the influence of the organic matter, at a high temperature, is partly converted into carbonate of lime by the action of the oxygen of the air. The oxygen gas, burning at once the sulphur of the sulphuret and a portion of carbon interposed, forms sulphurous acid, which is evolved, carbonic acid, part of which remains combined with the lime, facilitating thereby the displacement of the sulphur.—*L'Institut*, Août 8, 1849.

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#### BLUE ARSENIATE OF COPPER. BY M. REBOULLEAU.

The author had proposed to employ the above-named compound both as an oil and as a water colour; but he has since found that, owing to the action of the oil on the oxide of copper, the colour becomes bluish-green; in fact, that the arseniate acts with oil like verditer and other blue preparations of copper.

If equal parts of common arseniate of copper and neutral arseniate of potash be mixed and heated, the compound melts, and yields on cooling a fused, perfectly transparent mass of a bluish-green colour, a vitreous fracture and very fusible. The resulting compound is a double arseniate of potash and copper obtained in the dry way by M. Berthier's process. Whilst the double arseniate is in perfect fusion, if one-fifth of its quantity of powdered nitrate of potash be projected into it, brisk effervescence ensues, and a large quantity of nitric oxide is disengaged. The crucible then removed from the fire contains a magnificent blue substance, formed of sub-arseniate