



On the essential oil of betula lenta and on gualtherine

W. Procter

To cite this article: W. Procter (1844) On the essential oil of betula lenta and on gualtherine, Philosophical Magazine Series 3, 25:168, 480-482, DOI: [10.1080/14786444408646085](https://doi.org/10.1080/14786444408646085)

To link to this article: <http://dx.doi.org/10.1080/14786444408646085>



Published online: 30 Apr 2009.



Submit your article to this journal [↗](#)



Article views: 2



View related articles [↗](#)

the skin and lungs a more direct way for its exit from the organism than the kidneys.

Experiments for the determination of the amount of ammonia in the urine of healthy individuals may become of importance in judging of pathological states; for in fevers, and other diseases, the amount of ammonia in the urine increases considerably. It is possible that, by analysing the urine, we may, in the increasing or decreasing amount of ammonia, obtain a measure for the alterations which take place in diseases. But the salts of potash, which are rarely absent, as well as the ammonia which is formed by the action of chloride of platinum upon the organic constituents of urine, render this reagent (the chloride of platinum) very unsafe for determining the increasing or decreasing amount of ammonia in the urine during disease. The magnesia salts would perhaps answer this purpose better; the quantitative examinations made with salts of magnesia are inferior to those made with chloride of platinum, but they are exact enough for the purpose of comparison.

LXXVII. *Intelligence and Miscellaneous Articles.*

ON THE ESSENTIAL OIL OF *BETULA LENTA* AND ON GUALTHERINE. BY W. PROCTER.

THE author has found that the essential oil, which is obtained by the distillation with water of the *Betula lenta* (sweet birch or mountain mahogany), which is so common in North America, and which gives to some of its flowers their agreeable odour, which resembles that of gualtheria oil, is *identical* with the latter; but that the bark evolves this odour only when in contact with water, whilst originally it contains an inodorous body only, viz. gualtherine, which is converted into the essential oil when water is present, by the reaction of another substance also present (analogous to synaptase or emulsine), exactly as the oils of bitter almonds and mustard are formed.

By the action of barytic water, this gualtherine yields a new acid, the gualtheric acid. Unfortunately the author has not made use of elementary analysis.

Oil of Betula lenta.—This oil smells and tastes like gualtheria oil, has a specific gravity of 1.173, becomes reddened by the action of the atmosphere, but loses the colour on distillation; is but little soluble in water, in all proportions in alcohol and æther; produces a purple-red colour with protosalts of iron; forms crystalline compounds immediately with solution of potash, soda, baryta and oxide of lead; these yield the oil unaltered when treated with dilute sulphuric acid; when treated with excess of potash, salicylic acid is formed; it is slowly dissolved by ammonia, and the solution deposits crystals of salicylamide. Crystalline products are obtained by the action of chlorine and bromine, hydrochloric and bromic acids being

evolved. The chlorine compound, crystallized in four-sided prisms, yields by distillation with iodide, cyanide, and sulphuret of potassium, corresponding compounds. The sulphur compound is a yellow disagreeable-smelling oil, which becomes crystalline after a time. Hot nitric acid gives with the oil a crystallizable product, possessing acid properties; its combinations with bases detonate by heat. Concentrated sulphuric acid causes the formation of salicylic acid.

Gualtherine.—If the powdered dry bark be treated with alcohol of 0·805, the exhausted residue gives off no more odour on treatment with water; but when the tincture was evaporated, and a portion of the extract mixed with the exhausted bark, the odour was immediately produced, and by distillation, a product which reddened the protosalts of iron was obtained.

When the alcoholic extract is treated with water, tannic acid, sugar and colouring matter removed by digestion with hydrated oxide of lead, the filtered, almost colourless solution evaporated, the gummy residue treated with alcohol (0·800), and the solution allowed to evaporate spontaneously, a syrupy liquid was obtained, which could not be crystallized. Æther does not remove anything from it. This liquid, which evidently contains the gualtherine combined with a body which prevents its crystallization, is inodorous and of a slightly bitter taste; it may be obtained as a gummy mass when evaporated to dryness. The gualtherine remains undecomposed at 300°, at 400° it becomes perfectly black; it is combustible, leaving a copious carbonaceous residue. On destructive distillation, it yields a yellow oil, which resembles gualtheria oil contaminated with an empyreumatic matter, and leaves a carbonaceous residue.

In concentrated sulphuric acid the gualtherine dissolves, with the production of a red colour and the evolution of the odour of gualtheria oil. By distillation with dilute muriatic and sulphuric acid, oil of gualtheria is likewise formed. But if the gualtherine is dissolved in dilute nitric acid and distilled, instead of the oil, needles soluble in alcohol are found in the receiver, probably formed from the action of the vapours of the acid on those of the oil. Fuming nitric acid produces a yellow solution, from which water separates yellowish crystals. Ammonia has scarcely any action on gualtherine; by boiling with hydrated oxide of lead, a small quantity of a lead compound is obtained, which however contains no gualtherine. If an ammoniacal solution of gualtherine is precipitated with basic acetate of lead, a lead compound is obtained, from which no oil is evolved when treated with sulphuric acid, and which therefore contains no undecomposed gualtherine. Probably in this instance the same acid is formed, as is obtained when gualtherine is treated with the fixed alkalies and earths.

Gualtheric acid is best obtained when gualtherine is boiled with barytic water, the excess of baryta removed by carbonic acid, the solution filtered and carefully decomposed by dilute sulphuric acid. The solution filtered from the sulphate of baryta leaves a gummy mass on evaporation. If this be boiled with carbonate of lead, the solution filtered and decomposed by sulphuretted hydrogen,

Phil. Mag. S. 3. Vol. 25. No. 168. Dec. 1844. 2 I

on subsequent evaporation the acid is obtained as a colourless crystalline substance, readily soluble in alcohol and water, less so in æther, forming uncrystallizable salts with bases, and yielding gualtheria oil when distilled with dilute sulphuric acid.

The substance analogous to emulsine contained in the exhausted bark, the author could not isolate. It is insoluble in alcohol and water. By heating to 100° and treating with dilute solution of potash, the property of forming oil from gualtherine is lost.—*Pharm. Central-Blatt*, No. 30.

OPIANIC ÆTHER.

M. Wöhler states that this compound cannot be obtained by saturating an alcoholic solution of opianic acid with hydrochloric acid gas. On evaporating the solution the acid crystallizes unchanged; it is, however, very readily formed, when sulphurous acid is passed into a hot alcoholic solution of opianic acid; a certain quantity is even produced when the acid instead of being dissolved is merely in suspension in the alcohol; the alcoholic solution after concentration and cooling, yields crystals of the æther; it has the form of small prisms either fasciculated or globular. It is inodorous, its taste slightly bitter, and insoluble in water; when heated under water, it melts at about 212° into a colourless liquid which sinks to the bottom of the vessel; on cooling, it becomes a white, opaque, crystalline mass; it contracts extremely on solidifying, when melted without water; it solidifies into radiated white masses resembling navellite [wavellite?]; if its melting point be exceeded, it does not become solid again for a very long time; it may be sublimed between two plates of glass; when heated in a distilling apparatus, it creeps up the sides of the vessel, and thus apparently distils, without being really volatilized; it sustains a high temperature without decomposing; its vapour has but little odour, and burns with a sooty flame.

When long heated in water it gradually dissolves and is converted into alcohol and opianic acid. Solution of potash converts it into alcohol and opianate of potash. Cold caustic ammonia does not alter it.

By analysis it yielded—

	Experiments.		Equivalents.	Calculation.
	I.	II.		
Carbon	60·23	60·77	24	60·80
Hydrogen ..	5·70	5·84	13	5·47
Oxygen	34·07	33·39	10	33·73
	100·	100·		100·

Its formula is $C^{20}H^8O^7 + C^4H^5O$.—*Ann. de Ch. et de Phys.*, Octobre 1844.

ON METALLIC ACIDS. BY M. FREMY.

The author remarks, that he has already stated that some metallic oxides, which have hitherto escaped the notice of chemists, are capable of forming metallic acids, and that certain compounds of metals and oxygen, which have hitherto been considered as indifferent oxides, are true metallic acids.