



## On the identity of metacetic and butyric-acetic acids—Propionic acid

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The prevailing form consists of the faces  $b^1$  placed on the edges of the base of the prism, of the base and of the modification  $g^1$  parallel to the small diagonal of this base.

The inclinations of the faces are as follow :—

$b^1$ on the face $m$ of the prism. . . .	147°·30'
$b^1$ on the base of $p$ . . . . .	122°·30'
$b^1$ on $b^2$ adjacent. . . . .	123°·07'
$m$ on $g^1$ . . . . .	124°·22'

The low specific gravity of the small crystals from Dyreford, their crystalline form, and the analyses which M. Damour has published in the ninth volume of the *Annales des Mines*, show that they agree perfectly with the species long since separated from harmotome by MM. Gmelin and Nepel, and since by M. Köhler, under the name of harmotome with a base of lime, or harmotome of Marburg.

The crystals of this mineral, which are met with in the ancient volcanic rocks of Annerode near Giessen, of Stempel near Marburg, and Habichtswald near Cassel, possess, besides the 'faces stated to belong to the Iceland variety, a modification also placed on the edges of the base of the primary form, and the crystallographical sign is  $b^{\frac{2}{3}}$ .

This modification, which is not known in common harmotome, the primary and prevailing forms of which are almost identical with those of lime harmotome, makes with the base of the prism an angle of 138° 54', and with the face  $b^1$  an angle of 163° 35'.

The great external resemblance of the Marburg mineral and the small crystals of Capo di Bove near Rome, and Aci-Reale in Sicily, long since described by M. Lévy under the name of *phillipsite*, induced M. Köhler to suppose that these two substances constituted only one species; but the recent analyses of phillipsite, published by M. Marignac in the 14th volume of the *Annales de Chimie et de Physique*, demonstrate that this arrangement cannot take place.

The Iceland and Marburg minerals form therefore a distinct species, inasmuch as they possess a peculiar form and composition; M. Descloizeaux proposes the name of *Christianite* for this mineral.—*Comptes Rendus*, Novembre 15, 1847.

ON THE IDENTITY OF METACETONIC AND BUTYRO-ACETIC  
ACIDS—PROPIONIC ACID. BY MM. DUMAS, MALAGUTI AND  
F. LEBLANC.

M. Gottlieb obtained some years since a new acid by oxidizing sugar by means of potash, which he called *metacetic acid*, on the supposition of the possibility which the formulæ indicated, and which experiment has confirmed, of obtaining it by subjecting metacetone to the action of oxidizing bodies. M. Redtenbacher has since found that glycerine, under the influence of ferments, also yields metacetic acid; and he has since succeeded in separating considerable quantities of it from the product obtained by oxidizing oleic acid with nitric acid.

The authors now cited have found this same acid as one of the results of the destruction of hydrocyanic æther, by means of potash. M. Nœllner had also observed in the matters to which the fermentation of tartrate of lime gave rise, a peculiar acid, resembling acetic acid, which on this account he named *pseudo-acetic acid*. M. Nicklès has submitted this acid to rigid experiments, which show that it possesses the same composition as metacetic acid; and some inferences induce him to suppose that it has a certain tendency to separate into butyric and acetic acid; hence the name of *butyro-acetic acid*, by which he proposes to distinguish it. M. Nicklès insists in his memoir on some facts which he regards as sufficient to constitute an essential difference between his acid and metacetic acid; he mentions several properties which he thinks sufficient to separate them; but these properties are evidently owing to the still imperfect history of metacetic acid. On comparing metacetic acid extracted from metacetate of potash, with that prepared by means of hydrocyanic æther and butyro-acetic acid derived from fermented tartrate of lime, the authors ascertained that they were identical, having the same composition expressed by  $C^6 H^6 O^4$ ; they have the same odour and appearance; they both crystallize at common temperatures in laminae analogous to those which are yielded by acetic acid. They combine with water in all proportions, the compound floating in the form of an oily stratum on a solution of phosphoric acid or of chloride of calcium; they both boil at about  $284^{\circ} F.$ ; their salts act in the same manner; when distilled with arsenious acid they yield products which have the odour of alcar sine; the salts of silver which the two acids form, are identical both in appearance and in composition.

M. de la Provostaye determined that the crystals of the metacetate and butyro-acetate of barytes were similar in form, and that all the angles which could be compared were identical.

From the collection of facts now stated, the authors think they are entitled to conclude that metacetic acid, pseudo-acetic acid, and butyro-acetic acid constitute the same and one only acid.

This acid, they further remark, is the first which exhibits the fatty character, setting out from formic or acetic acid, towards the fatty acids properly so called; it is the first which separates from solution in the form of an oily stratum; it is the first which gives, with the alkalies, salts that are unctuous to the touch, similar to alkaline soaps. These characters have induced the authors to give to this substance the name of *propionic acid*, a name which indicates its place in the series of fatty acids; it is the first of them.

When one of the authors indicated, six years since, the existence of a group of acids having the general formula  $C^n H^n O^4$ , he could cite only eight acids which were susceptible of being referred with certainty to this general formula; they were the formic, acetic, valerianic, cenanthylic, lauric, myristic, ethalic and margaric. To reduce the butyric, caproic and capric acids to this general formula, it was requisite to admit a slight inaccuracy in the explanation of the generally correct analyses of M. Chevreul. Recent researches on these three acids have perfectly confirmed this supposition.

As however there must exist between margaric and formic acid fifteen intermediate acids, six remained to be discovered. These gaps were almost entirely filled up by the metacetic, caprylic, pelargonic, coccinic and benic acids, recently discovered by a more attentive study of fatty bodies. There may now be reckoned, including anamirtic acid, eighteen acids forming a continuous series, in which only a single term is wanting.

It is proper to add that the unpublished researches of M. Brodie prove that the general formula  $C^a H^a O^4$ , far from stopping at margaric acid, includes a new acid, the composition of which is  $C^{54} H^{54} O^4$ , and even acids which reach still higher formulæ. We are therefore certain that there are, confining ourselves to the first among them, eight fatty acids to discover between margaric acid and that the formula of which has just been given, and that these acids will be less fusible, more solid, and consequently more proper for certain uses, as for example of giving light, even than margaric acid itself, provided abundant sources of them should be discovered. It is therefore a subject of the greatest interest to collect and to analyse with care fatty matters of vegetable origin. Everything induces the belief that by them the gaps will be occupied. We are however so little advanced in knowledge respecting the fatty matters which exist in insects, that it would not be surprising if an attentive study of their materials should furnish some of the terms which sooner or later may enrich the series by completing it.

Everything induces the hope that the twenty-six acids which we are entitled to nominate are not the only ones, and nothing authorises us to foretell to what point the simple formula  $C^a H^a O^4$  will extend or where its application may stop.—*Comptes Rendus*, Novembre 29, 1847.

#### ON THE COMPOSITION AND PROPERTIES OF NICOTINA.

M. Barral finds that nicotina consists of—

40 eqs. of carbon . . . . .	= 240	74.07
28 eqs. of hydrogen . . . .	= 28	8.64
4 eqs. of azote . . . . .	= 56	17.29
	<hr/> 324	<hr/> 100.00

Nicotina combines with water in all proportions, and is also hygrometric. In an atmosphere saturated with the vapour of water, 100 parts are capable of absorbing 177 parts of water in three weeks, and this it loses completely in an atmosphere dried by potash.

When nicotina is thus hydrated it becomes entirely a crystalline mass, when exposed to a refrigerating mixture of salt and ice. It is unquestionably owing to the presence of water in nicotina, that MM. Posselt and Reimann have stated that this alkali may be solidified: this does not occur with anhydrous nicotina.

Chlorine acts energetically on nicotina. When a few drops of it are let fall into a bottle of chlorine, the combination may be so vivid as to emit light; hydrochloric acid is disengaged, and a liquor of a