

PROCEEDINGS
OF
THE ROYAL SOCIETY.

January 10, 1856.

ADMIRAL BEECHEY, V.P., in the Chair.

In consequence of there not being a sufficient number of Fellows present, the Ballot for the question of the readmission of Mr. Sievier was postponed to the next Meeting.

The following communications were read :—

- I. "On Insolinic Acid." By AUGUSTUS W. HOFMANN, Ph.D.,
F.R.S. &c. Received December 20, 1855.

(Abstract.)

In attempting to purify cuminic acid by boiling with chromic acid, I observed that this acid experienced, on the part of this reagent, a progressive alteration. By twenty-four hours' ebullition, cuminic acid is completely converted into an acid insoluble in alcohol

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and ether, for which I propose the provisional name of *insolinic acid*; purified by the ordinary processes, this body furnished on analysis the following relations :—



but the analysis of the salts demonstrates that this formula must be doubled, insolinic acid being a bibasic acid.

I have examined the following salts :—

Insolinic acid	$\text{C}_{18} \text{H}_8$	O_8
Silver salt	$\text{C}_{18} (\text{H}_6 \text{Ag}_2)$	O_8
Copper salt.	$\text{C}_{18} (\text{H}_6 \text{Cu}_2)$	O_8
Barium salt	$\text{C}_{18} (\text{H}_6 \text{Ba}_2)$	O_8
Calcium salt (at 100°C.)	$\text{C}_{18} (\text{H}_6 \text{Ca}_2)$	O_8
„ (at 133°C.)	$\text{C}_{18} (\text{H}_6 \text{Ca}_2)$	O_8
Potassium salt (neutral)	$\text{C}_{18} (\text{H}_6 \text{K}_2)$	O_8
„ (acid).	$\text{C}_{18} (\text{H}_7 \text{K})$	O_8
Potassium-sodium salt	$\text{C}_{18} (\text{H}_6 \text{K Na})$	O_8

When considered by itself, insolinic acid has but slight claims on the attention of chemists; but when viewed in connexion with other groups of bodies, it acquires increased interest. Some years since, Gerhardt pointed out that to the homologous series of monobasic fatty acids $\text{C}_{n_2} \text{H}_{n_2} \text{O}_4$, the lowest terms of which are formic and acetic acids, there runs parallel a homologous series of bibasic acids, $\text{C}_{n_2} \text{H}_{n_2-2} \text{O}_8$, the simplest member of which is oxalic acid. These two series of acids are connected by the closest ties, and very conclusive experiments have demonstrated that the members of the former may be easily converted into those of the latter; such is the case of the transformation of butyric into succinic acid, effected by M. Dessaignes under the influence of oxidizing agents.

The following table exhibits these two series of acids arranged according to their carbon :—

Formic acid	$\text{C}_2 \text{H}_2 \text{O}_4$
Acetic acid.	$\text{C}_4 \text{H}_4 \text{O}_4$
Propionic acid	$\text{C}_6 \text{H}_6 \text{O}_4$
Butyric acid	$\text{C}_8 \text{H}_8 \text{O}_4$
Valeric acid	$\text{C}_{10} \text{H}_{10} \text{O}_4$
Caproic acid	$\text{C}_{12} \text{H}_{12} \text{O}_4$

Enanthylic acid	$C_{14}H_{14}O_4$
Caprylic acid	$C_{16}H_{16}O_4$
Pelargonic acid	$C_{18}H_{18}O_4$
Rutic acid	$C_{20}H_{20}O_4$
Oxalic acid	$C_4H_2O_8$
— ?	$C_6H_4O_8$
Succinic acid	$C_8H_6O_8$
Pyrotartaric acid	$C_{10}H_8O_8$
Adipic acid	$C_{12}H_{10}O_8$
Pimelic acid	$C_{14}H_{12}O_8$
Suberic acid	$C_{16}H_{14}O_8$
— ?	$C_{18}H_{16}O_8$
Sebacic acid	$C_{20}H_{18}O_8$

The existence and the mode of formation of insolinic acid prove that to the series of monobasic aromatic acids, $C_{n_2}H_{n_2-8}O_4$, the lowest known term of which is benzoic acid, there corresponds likewise a series of bibasic acids, $C_{n_2}H_{n_2-8-2}O_8 = C_{n_2}H_{n_2-10}O_8$. Of this series few members are at present known, but the group of aromatic acids is itself very imperfect and limited. The two series comprise at present the following terms:—

Benzoic acid	$C_{14}H_6O_4$
Toluylic acid	$C_{16}H_8O_4$
— ?	$C_{18}H_{10}O_4$
Cuminic acid	$C_{20}H_{12}O_4$
— ?	$C_{14}H_4O_8$
Terephthalic acid	} $C_{16}H_6O_8$
Phthalic acid	
Insolinc acid	$C_{18}H_8O_8$
— ?	$C_{20}H_{10}O_8$

If we take the carbon as the standard of comparison, it is evident that the bibasic insolinc acid corresponds to the monobasic acid, which stands between toluylic and cuminic acid. In addition to this unknown acid, toluylic acid only is represented in the series of bibasic acids. There are, in fact, two bodies which may be regarded as representatives of toluylic acid, namely, phthalic and terephthalic acids. Benzoic and cuminic acid are not yet represented.