

Geo. E. Leguin, Associate Member. { Nelson H. Darton,
James H. Stebbins, Jr.,
Wm. Rupp.

John Grey Macfarlan. { P. Casamajor,
James H. Stebbins, Jr.,
A. H. Elliott.

The following gentleman was nominated as a Regular Member :

Percy Neymann. { E. Waller,
A. H. Elliott,
A. P. Hallock, } Proposed by.

The election of candidates for the Committee on Nominations was now in order.

The following gentlemen received the largest number of ballots :

1. Arthur H. Elliott.
2. E. Waller.
3. James H. Stebbins, Jr.
4. A. R. Ledoux.
5. Wm. Habirshaw.
6. P. Casamajor.
7. J. P. Battershall.
8. A. P. Hallock.
9. O. Grothe.

Three names out of the nine were then drawn from Chairman.

The members of the Nominating Committee are therefore,

Wm. Habirshaw, J. P. Battershall, P. Casamajor.

There being no further business, the meeting adjourned.

JAMES H. STEBBINS, JR.,
Recording Secretary.

ON THE ACTION OF PHTHALIC ANHYDRIDE, UPON GALLIC ACID.

BY JAMES H. STEBBINS JR., A.B., F.C. S.

In 1871 Baeyer observed, while heating a mixture of phthalic acid, and pyrogallic acid, the formation of a coloring matter,* which he termed "galleine."

At first Baeyer, believed that the formation of this dyestuff, was due to an oxydation of pyrogallic acid, and that the phthalic acid was not essential for its formation, as it seemed that the same dyestuff

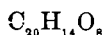
*Ber. d. d. chem. Gesell. IV., p. 455, 555, 663.

was formed by heating pyrogallic acid, with other organic acids, or with benzaldehyde.

Further investigation, however, soon showed, that the phthalic acid, as well as the other acids, on being heated with pyrogallic acid, enter the molecule of the resulting compound, and that not only does pyrogallic acid act in this way, but also phenoles on the one hand, and many organic acids on the other, combine under elimination of water, when the mixture, is either heated alone with glycerine, or with sulphuric acid.

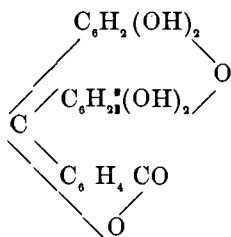
The constitution of the compounds (which he called phthaleines) was in later years explained by Baeyer, and his scholars.*

Baeyer in his last paper on this subject (2) assumes that the formula of galleine may be represented by



which on being heated to 180°C loses water, and passes over into a compound closely resembling fluoresceine, which he called galline. ($C_{20}H_{12}O_7$)

In order not to make this subject too tedious, I will omit the many deductions, as to the correct formula of galleine, and will use Baeyer's formula hereafter, viz.:

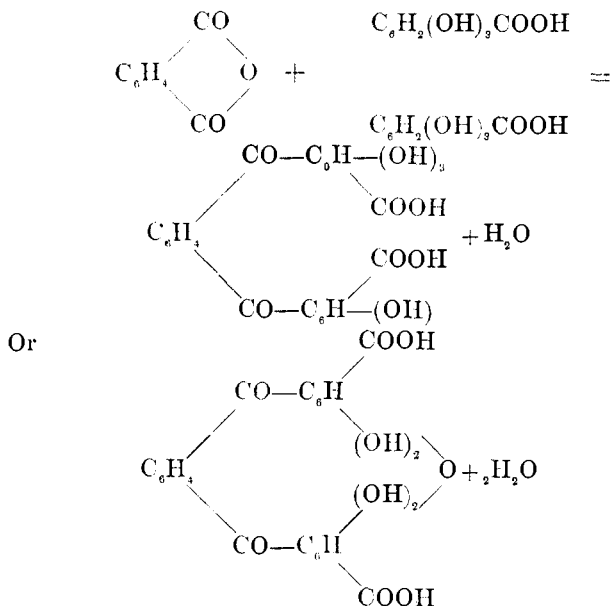


While reading over some of Baeyer's interesting work on this subject, it occurred to me, that possibly phthalic-anhydride, and gallic acid, might be combined, to form a compound of similar nature to galleine.

According to Baeyer's theory, phthalic-anhydride and gallic acid should unite, under elimination of water, to form a substance, which might possibly be represented by the following formulæ :

* Ann. Chem. and Pharm. 183,1; 202 p. 36.

2 Ber. d. d. chem. Gesell. IV. p. 663.



But, the reaction did not work according to my expectations, as will be seen from the following:

10 grs. phthalic-anhydride, and 20 grs. gallic acid, were thoroughly mixed and heated at first, (on the sand bath) to 195°C. At this temperature no reaction took place. So the heat was gradually raised to 220°C., at which temperature the mixture melted, under evolution of a gas, which on examination was found to be CO₂. The melt then darkened in color, and finally turned red brown.

The whole time of heating was about two hours.

The melt was then allowed to cool, dissolved in boiling alcohol, and the solution so obtained poured into cold water.

A copious fine brown precipitate is thus formed. This was collected on a filter, washed with water, dried, and finally recrystallized from alcohol.

A combustion of the above dried at 120°C. gave the following figures:

	FOUND.
Carbon.....	61.50 per cent.
Hydrogen.....	3.50 per cent.
	THEORY.
Carbon.....	62.82 per cent.
Hydrogen.....	3.63 per cent.

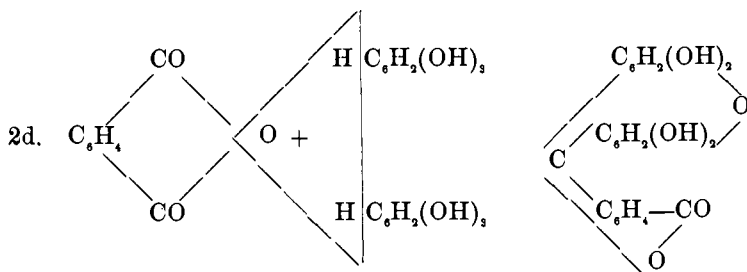
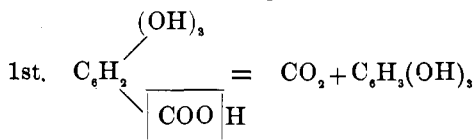
These figures, beyond a doubt, lead to the formula of galleine, and in fact the body analysed closely resembles the latter in every respect.

It dissolves in alcohol, with a fine cherry-red color. Is sparingly soluble in hot water, and dyes mordanted cotton, of the same shades as galleine. It is likewise soluble in caustic soda solution, with a fine blue color, and finally, it forms with sulphuric acid, a condensation product, closely resembling coeruleine.

The formation of galleine from phthalic-anhydride, and gallic acid may, I think, be explained as follows.

1st. The gallic acid, on being heated to 220°C. splits up into carbonic acid, and pyrogallic acid.

2nd. The pyrogallic acid on being formed then unites with the phthalic acid to produce galleine. Thus:



Finally, to make sure, that the compound under examination was really galleine, I treated a small amount of it with acetic anhydride, and thus obtained the well known tetra acetyl galleine, as may be seen from the following figures:

FOUND.	
I.	II.
Carbon.....64.09 per cent.....	64.09 per cent.
Hydrogen..... 4.71 per cent	4.27 per cent.
THEORY.	
$C_{20} H_8 (OCOCH_3)_4$	
Carbon.....	63.15 per cent.
Hydrogen.....	3.75 per cent.

The yield of galleine by this process is quite large, and it promises, I think, to be a good improvement in the manufacture of galleine, on account of the greater cheapness of the raw materials.

N.B. After this paper had been read before the American Chemical Society, Dr. Prochazka arose and stated that he had obtained the same results as myself, about a year previous, and I therefore cannot claim any originality in these experiments, but publish them merely for the benefit of the public, as Dr. Prochazka's experiments have remained hid under a bushel.

JAMES H. STEBBINS, JR.

NOTE ON ASBESTOS FILTERS.

By P. CASAMAJOR.

An extensive dealer in wares used by chemists, lately informed me that he had many inquiries concerning asbestos for filtering liquids in chemical analysis. Some chemists complain that they cannot get clear solutions through asbestos, while others, who obtain clear solutions, find that their liquids filter altogether too slowly.

Allow me to recall that the method of making asbestos filters, by pouring a thin paste of this material over a perforated platinum disc, was first proposed by me in 1875,* but I neglected to give directions concerning the preparation of asbestos, to make it fit for filtering liquids in chemical analysis. It now appears, however, that such directions would be found useful, and I propose to repair the omission and give the necessary details.

The kind of asbestos to use is a matter of some importance. I have tried three kinds, which are sold by dealers in New York, as the *Canadian*, the *Italian*, and the *Australian*. This last is less flexible than the other two, and consequently the fibres do not felt together and pack as closely on the perforated plate. Hence, liquids filter more rapidly, and the Australian is, on this account, preferable to the other two kinds. I am informed that the Canadian asbestos is the most soluble in acids, but I have not verified the assertion.

Whatever may be the kind of asbestos used, the following is a

* See *American Chemist*, V., p. 44. *Chemical News*, XXXII., p. 46.