

from the conjugation of the carbonyl group with the two double linkings and the phenyl group. In cinnamylideneacetic acid, where the methyl group is replaced by hydroxyl, the absorption band is shifted towards the violet, owing to the fact that the free residual affinity of the carbonyl group is decreased by the juxtaposition of the hydroxyl group. This decrease of free residual affinity is most marked in the case of the readily ionised sodium salt, and least marked with the acid when the ionisation is restrained by the addition of hydrogen chloride. This effect has been observed in the four acids mentioned, and is especially marked in the case of cinnamylidenemalonic acid. The addition of alkali to this acid causes a shift of the absorption band from just inside the visible region to just beyond it, so that the free acid appears to be coloured yellow, and its sodium salt appears to be colourless. The results throw some light on the catalytic action of mineral acids on the esterification process.

**\*202. "Relation between chemical constitution and physiological action in certain substituted aminoalkyl esters." By Frank Lee Pyman.**

Several substituted aminoalkyl esters have been prepared with the object of producing a cocaine substitute; none of these, however, are suitable for the purpose, since such as possess anæsthetic properties are also toxic and irritant. These substances were prepared by benzoylating (in two cases, phthaloylating) the corresponding aminoalcohols, two of which, 1:4-diethanolpiperazine (m. p. 134—135°) and  $\beta$ -hydroxy- $\beta$  3:4-methylenedioxyphenylethyldimethylamine,\* have not previously been described. The chemical, physical, and physiological properties of the following aminoalkyl esters and their salts have been examined: dibenzoyloxymethyldiethylamine, dibenzoyloxytriethylamine,  $\beta$ - $\gamma$ -dibenzoyloxydimethylpropylamine,  $\beta$ - $\gamma$ -dibenzoyloxydiethylpropylamine,  $\beta$ - $\gamma$ -dibenzoyloxy piperidylpropane (m. p. 64—65°), piperidylethyl benzoate, s-di- $\beta$ -benzoyloxy-1:4-diethylpiperazine (m. p. 104—105°), diethylaminoethyl phthalate, piperidylethyl phthalate,  $\beta$ -benzoyloxy- $\beta$ -3:4-methylenedioxyphenylethyldimethylamine.

**203. "The passage of hydrogen through a palladium septum, and the pressure which it produces." By Demetrius Tsakalotos.**

It was shown by Sir William Ramsay (*Phil. Mag.*, 1894, [v], 38, 206) that hydrogen, when it passes through the walls of a palladium tube filled with a gas ( $N_2$ , CO,  $CO_2$ , CN) at atmospheric pressure, raises

\* Where melting points are not given, the free base did not crystallise.

the pressure in the tube by nearly one atmosphere when the external pressure of the hydrogen is one atmosphere. There is always a small deficit in pressure, however, for the rise in pressure produced by the entry of the hydrogen never attains that of the atmosphere. The amount of this deficit depends on the nature of the gas originally in the tube.

The experiments to be recorded were made with the object of ascertaining whether, if the tube were initially filled with an indifferent gas, the final pressure would be the theoretical one. Argon was chosen for this purpose. The method employed differed little from that described by Ramsay. The tube was filled with pure dry argon at atmospheric pressure, and at a temperature of  $280^{\circ}$  (boiling point of bromonaphthylene); it was then exposed on its external surface to an atmosphere of hydrogen, carefully purified and dried. If  $p$  be the external pressure of the hydrogen, and  $p'$  the internal pressure, that is, the pressure due to the hydrogen after the gas had ceased to enter, the results of the experiments are as follow :

	I.	II.	III.	Theory.
$p'/p$ .....	0.9281	0.9189	0.9242	1.000

The mean result is 0.9238.

This result does not appreciably differ from that previously obtained by Ramsay ; the figures varied between 0.8984 and 0.9693.

#### 204. "Constitution of the phthaleins of mellitic and pyromellitic acids." By Oswald Silberrad.

In a previous paper, the author described (*Trans.*, 1906, 89, 1789) condensation products of mellitic and pyromellitic acids with resorcinol to which were assigned carbinol formulæ, as being the most in accord with observed facts. Subsequently, quinonoid formulæ have been suggested (compare Green, *Proc.*, 1907, 23, 12).

In considering the possibility of so formulating these compounds, it should not be lost sight of that the necessity for attributing quadrivalency to the pyrone oxygen atom is hardly in accord with the properties of the compounds in question ; they show none of the basic properties generally attributed to this element when so linked ; on the contrary, they form salts up to the full basicity of the acid groups present. Further, recent work by the author has shown that when present in analogous compounds a quadrivalent oxygen atom impresses a strongly basic influence on the specific properties of the compound.

Thus it has been shown that octamethyltetra-aminodixanthylbenzene-tetracarboxylic acid can behave as a base, forming a tetrahydro-