Huygens Institute - Royal Netherlands Academy of Arts and Sciences (KNAW)

So for the relation $\dfrac{-v_c b_c''}{b_c'}$ is found :

$$\dfrac{-v_c b_c''}{b_c'} = n \dfrac{v_{c_-}}{v_c - b_c} \qquad \dots \dots \dots \quad (33^c)$$

Now at the critical point about

$$v_c = 2{,}20\, b_c \quad ; \quad -v_c b_c'' = 0{,}38 \quad ; \quad b_c' = {}^1/_{14} = 0{,}07$$

so that we get:

$$\dfrac{0{,}38}{0{,}07} = \dfrac{2{,}20}{1{,}20}\, n \, ,$$

hence

$$5{,}32 = 1{,}83\, n \, ,$$

so that for n a value is found which is only slightly below 3. If we take the value 0,39 for $- v_c b_c''$ (VAN DER WAALS gives even the value $\dfrac{f-4}{f} = \dfrac{2{,}8}{6{,}8} = 0{,}41$ on p. 1227 loc. cit.), we find accurately $n = 3$. Hence it seems that in the neighbourhood of the critical point the slight number of complex molecules which still remain, are on an average associations of *triple* molecules.

Hence we may write for T_c by approximation :

$$\dfrac{b}{b_q} = 1 - \varphi \left(\dfrac{b_g}{v-b} \right)^2 \qquad \dots \dots \dots \quad (34)$$

I shall have to conclude now; the fuller discussion of this interesting problem, only just alluded to in §§ 35 and 36, I must postpone to a further occasion.

Clarens, April 22nd 1911.

Chemistry.. — *"Action of sunlight on allocinnamic acid."* By Dr. A. W. K. DE JONG at Buitenzorg.

Some time ago (Ber. **35**, 2908 [1902]) RIIBER found that ordinary cinnamic acid, in the solid condition, is converted by the action of sunlight into α-truxillic acid. A number of other compounds possessing a 4-ring have been obtained in a similar manner.

Among the acids obtained by the splitting of the coca alkaloids occurs, besides α-truxillic acid, also a structure-isomer, β-truxillic acid. It seemed to me very probable that this compound might form from *allo*cinnamic acid, which always occurs among the split off acids.

The *allo*cinnamic acid, used in this investigation, was prepared from the split off acids ; it melted at 41°—42°, the melting point of ERLENMEYER's *iso*cinnamic acid. It was readily soluble in both petro-

leum ether and ordinary ether. The substance was dissolved in a little ether and the solution poured into a glass basin when the acid was obtained in beautiful crystals.

After exposure to full sunlight for seventeen mornings an examination was made to see what change had taken place.

It was very plain that the substance was no longer the same, as it consisted of a quite opaque mass whereas the original crystals were beautifully transparent.

It exhibited no definite melting point; at 95° it became somewhat soft to finally melt completely at 165°. Only a portion dissolved in ether. The undissolved mass melted just above 200° (β-truxillic acid melts at 206°). In ammoniacal solution it gave a heavy precipitate with barium chloride and the acid isolated therefrom melted at 206°; when mixed with β-truxillic acid, isolated from the coca-acids, the melting point remained unchanged.

From the ethereal solution a further quantity of β-truxillic acid was obtained and also α-truxillic acid, ordinary cinnamic acid and a trace of oil.

In all, 0.64 gram of β-truxillic acid, 0,1 gram of α-truxillic acid and 0.2 gram of cinnamic acid were obtained. The α-truxillic acid has been formed in all probability, from the ordinary cinnamic acid. Whether β-truxillic acid is formed from two mols. of *allo*cinnamic acid or from one mol. of *allo-* and one mol. of ordinary cinnamic acid (generated from *allo*cinnamic acid) will be further investigated.

Physics. — *"Isotherms of diatomic gases and of their binary mixtures. VIII. Control measurements with the volumenometer"*. By W. J. DE HAAS. Communication N°. 121a from the Physical Laboratory at Leiden. (Communicated by Prof. KAMERLINGH ONNES).

(Communicated in the meeting of April 28, 1911).

§ 1. *Introduction*. With a view to the determination of the compressibility of hydrogen vapour, Prof. KAMERLINGH ONNES invited me to make a special study of the volumenometer (see Comm. N°. 84) with which these measurements were to be made; the results of this particular investigation are given in the present paper, and, at the same time I have described the improvements mentioned in Comm. N°. 117 which were specially introduced for the measurement of the compressibility of hydrogen vapour, and to which