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Chemistry. — *"On ocimene"*. By Prof. P. VAN ROMBURGH. (Communicated by Prof. C. A. LOBRY DE BRUYN).

(Communicated in the meeting of February 27, 1904).

At the December meeting 1900, I had the honour to submit to the Academy a communication on the essential oil from an Ocimum Basilicum L. which contains besides a large quantity of eugenol, a hydrocarbon of the formula $C_{10}H_{16}$ to which I gave the name of *Ocimene*. The peculiar behaviour of that hydrocarbon reminded me of the olefinic terpenes, discovered by SEMMLER, of which myrcene, isolated by POWER and KLEBER, was the best known. Ocimene, however, did not appear to be identical with myrcene.

CHAPMAN[1]) has shown some time ago that the essential oil of hops contains 40—50 % of an olefinic terpene which he considers to be identical with myrcene. In his paper, CHAPMAN disagrees with my observation that myrcene is not so changeable as stated by POWER and KLEBER. According to these investigators this substance becomes polymerised after standing for a week, whereas I could preserve it for months, of course in a properly sealed bottle. CHAPMAN refers to a paper of HARRIES[2]) to show the unstability of myrcene. There we read, however, only that the polymerisation "sehr leicht zu bewirken ist durch längeres Stehen oder durch mehrstündiges Erhitzen auf 300°", whilst SEMMLER[3]), in accordance with my observations, says that he found it to be "überhaupt nicht so leicht veränderlich".

The olefine terpene from hops has the power of absorbing oxygen, like ocimene. In one of CHAPMAN's experiments 16 cc. of oxygen were absorbed in three days by 1 cc. of the terpene. I had already found previously that myrcene does not absorb in the same time any notable quantity (only fractions of a cc.) and, recently, on repeating my experiments I found my previous observation confirmed. If, however, myrcene was left in contact with oxygen for a long time (in tubes 1.5 cm. in diameter) the volume of the gas began to decrease gradually, but with increasing velocity, so that after 16 days 30 cc. had been absorbed. Of a sample of ocimene which had been kept in a properly sealed bottle for three years and had twice made the journey to and from Java, 1 cc. absorbed 17.8 cc. of oxygen in 11 hours; in the case of this terpene I again noticed that after

[1]) Journ. of the Chem. Soc. Trans 1903. 83 p. 505.

[2]) Berl. Ber. 35 (1902). S. 3259.

[3]) Berl. Ber. 34 (1901). S. 3126.

oxidation had set in, the absorption proceeded more rapidly so that on the second day, for instance, oxygen was being absorbed at the rate of 2 cc. *per hour*.

Still, I should not feel justified in saying that hops-terpene and myrcene are not identical, merely on account of the difference in oxygen absorption, because further experiments have taught me that under certain undefined conditions even this hydrocarbon may sometimes be left in contact with oxygen for a day without absorbing a notable quantity [1]). But as soon as the absorption has commenced it proceeds at a fairly rapid rate.

By the action of oxygen a colorless viscous substance is obtained.

I hope to refer to these experiments more fully later on.

In the same paper CHAPMAN expresses some doubts as to the "chemical individuality" of ocimene. Although I have already pointed out in my previous communication that the boiling point at 20 mm., the behaviour on distilling at the ordinary atmospheric pressure and the index of refraction of ocimene and myrcene differ considerably, I will now adduce additional facts which undoubtedly prove that ocimene and myrcene are *different* compounds.

Mr. C. J. ENKLAAR, who has taken up the study of ocimene in the Utrecht laboratory, repeated in the first place the determination of the index of refraction of this hydrocarbon and for a product carefully fractioned over metallic sodium he found $n_D = 1.4872$ and $n_D = 1.4867$, which values satisfactorily agree with 1.4861 previously found by myself by means of another apparatus. For myrcene, POWER and KLEBER have found $n_D = 1.4674$ whilst I had, previously, found 1.4685.

SEMMLER (loc. cit.) has shown that myrcene is reduced by sodium and alcohol to dihydro-myrcene. On applying this reaction to ocimene, Mr. ENKLAAR obtained a dihydro-ocimene, which not only differs from dihydro-myrcene [2]) as regards boiling point, specific gravity and index of refraction, but also by the fact that it yields with bromine a *crystallised* additive compound. These investigations are being continued.

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[1]) Not improbably, traces of moisture or of products of oxidation exercise a catalytic influence. A retardation was noticed when ocimene freshly distilled over metallic sodium was placed in dry oxygen.

[2]) Dihydro-*ocimene* boils at 168° at 763 mm. At 21 mm. the boiling point is 65°. Sp. gr. at 15° 0.775. The boiling point of dihydro-*myrcene* is 171°.5—173°.5 at the ordinary pressure and its sp. gr. 0.7802.