

therapeutic importance of the products resulting from the oxidation of the terpenes with either atmospheric oxygen or ozone. What the effect of the pure terpene, devoid of any added oxygen, may be has apparently received less attention. Indeed, it might be difficult to ascertain such action, since these hydrocarbons are now known to possess a great avidity for this element, which constitutes an important part of the atmosphere in which the animal and human organisms live upon whom the experiments must be conducted.

For a rational consideration of the entire subject it is necessary to differentiate, first of all, between the ozonides, the products of the action of ozone on the terpenes, and the peroxides, the products of the action of atmospheric oxygen on these mostly unsaturated hydrocarbons. Secondly, it should be recalled that, in either case, the addition reactions are by no means simple, *i. e.*, they do not necessarily run their course in one direction. Thirdly, it must be remembered that these addition products are very unstable, on which property their therapeutic value largely depends, yielding other oxidation products with the excess of terpene, and that all of these reactions are readily modified by differences in temperature and other conditions.

As a matter of fact, we know as yet so little about the chemical products that result from the initial addition of oxygen to the terpenes and the subsequent rearrangements of the labile oxides, both ozonides and peroxides, that the literature on the entire subject is apt to prove confusing rather than enlightening. Hence, a survey of the entire field, pointing out the difficulties as well as those phases of the subject which may be comprehended, at least after a fashion, seems desirable at the present time. This would seem true if for no other reason than to guard against exploitation by those who are interested commercially rather than scientifically.

CAMPHENE IN HEMLOCK OIL.*

BY E. V. LYNN.

A pinene fraction obtained from commercial hemlock oil, which had been used several years ago by the class in phyto-chemistry for the purpose of isolating borneol after the saponification of the oil had been effected, had been submitted to the action of dilute potassium permanganate solution by Mr. Max Phillips in an attempt to prepare pinene glycol. The unoxidized portion had been recovered by steam distillation and was used in an attempt to prepare optically active pinene nitrosochloride. After the inactive nitrosochloride had been filtered off, the mother liquid was set aside to allow the optically active addition product to separate. However, in place of the active nitrosochloride, crystals were obtained which had a camphor-like odor and which melted at 42°. Borneol, however, melts at about 203° and camphor at about 175°, whereas camphene melts at about 49°. Its identity with this hydrocarbon was established by converting it into borneol, m. p. 204°, by the Bertram-Walbaum hydration reaction. Camphene had not previously been identified in hemlock oil.

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