perature of the water, and the vapour pressures, ^{16}p and ^{18}p, of $H_2{}^{16}O$ and $H_2{}^{18}O$.

Conversely, evaporation will cause a rise in the oxygen-18 abundance, a_f, in the remaining water.

By repeated circulatory processes, consisting of drying up on account of ΔT^0 cooling, warming up and renewed saturation, fractionation takes place, whereby the oxygen-18 abundance of the vapour, a_v, converges towards a value where the deviation from the oxygen-18 abundance in the added vapour constitutes :

$$1{\cdot}22 \times 10^{-4} \times \Delta T \frac{f}{1-f} \text{ atom per cent,}$$

where f is the ratio of the absolute humidity of the atmosphere at the beginning and at the termination of the condensation.

Since

$$a_p \cong a_v \frac{^{16}p}{^{18}p},$$

the value of a_p for a certain precipitation depends on : (1) the nature of the circulatory processes earlier passed through by the atmosphere, namely, evaporation temperature, magnitude of earlier precipitations of water, and condensation temperature ; (2) evaporation during precipitation from the cloud to the ground ; and (3) origin of the vapour.

Point (3) implies that vapour from freshwater (continental vapour) is considerably lighter than ocean vapour. Thus, 106 measurements of oxygen-18 abundance in vapour, a_v, from the Copenhagen area, taken over a period extending from about April 1953 to April 1954, showed that there was a distinct correlation between a_v and deviations of the wind from the easterly direction. There were, moreover, appreciable seasonal changes in a_v in the course of the year. The deviations from a set standard varied between $+ 10{\cdot}3 \times 10^{-4}$ atom per cent in July and $- 5{\cdot}8 \times 10^{-4}$ atom per cent in February, corresponding to a more intensive cooling off in the winter season.

For a certain locality, the oxygen-18 abundance, a_f, of freshwater also depends on : (4) the proportions of water lost by drainage and by evaporation from the ground ; (5) the exchange of oxygen-18 between the ground water and substances in the ground containing oxygen.

Measurements of sixty-one samples of precipitation showed comparatively large variations in a_p (ranging from $+ 9 \times 10^{-4}$ to $+ 31 \times 10^{-4}$ atom per cent) ; however, the mean value ($+ 22 \times 10^{-4}$ atom per cent) was in agreement with that of a_f for the ground water ; consequently, points (4) and (5) can scarcely be of any significance in the conditions prevailing in Denmark.

Since the significance of point (3) for the oxygen-18 abundance, a_p, of the average precipitation can be determined from climatological data, while point (2) is of no significance in violent and/or persistent precipitation, it is possible by measurements on the precipitation, the vapour and the ground water and by noting the climatological and the geographical conditions, to arrive at a quantitative interpretation of oxygen-18 abundance for freshwater, a_f, at a given locality.

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Odour and Chemical Constitution

In a discussion of this problem, Dr. G. Malcolm Dyson (*Nature* of May 1, p. 831) refers to "the 'camphor-like' groups in which such diverse substances as camphor, hexachloroethane, benzene hexachloride and perchloronaphthalene have closely related odours".

Many years ago (*J. Chim. Phys.*, **35**, 331 (1938), and also 3e Congrès National des Sciences, Bruxelles ; 1950) and in my recent book, "Les Constantes Physiques des Composés Organiques Cristallisés" (Masson and Co., Paris, 1953, pp. 49–51 and p. 500), I have pointed out that most such substances belong to a natural group of organic compounds, defined by their low entropy of melting (< 5). As their molecules have a spherical shape, I proposed for them the name of 'globular compounds' ; they possess many other common properties, although as different in their chemical constitution as natural camphor, α-hexachlorbenzene and artificial camphor, $CCl_3.C(CH_3)_2OH$.

So far as I know, most compounds smelling like camphor have that configuration (methyl*cyclo*pentanol has not), but all globular compounds do not smell like camphor.

I have directed the attention of physiologists to this curious relation between the olfactory properties and the stereochemical configuration of such compounds, a relationship which is quite different from the study of small changes in the chemical constitution of organic compounds and their physiological action, as has hitherto been made.

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Caution in the Use of Liquid Propane for freezing Biological Specimens

One of the recent innovations in freezing and drying technique is the use of liquid propane for rapid freezing. This material has explosive possibilities when cooled in liquid nitrogen that many investigators do not seem to realize. Liquid nitrogen boils at $- 195{\cdot}8°$ C., liquid oxygen at $- 183{\cdot}0°$ C. It is common experience that if a vapour trap is cooled with liquid nitrogen and open to the atmosphere, oxygen will condense in it. Since propane melts at $- 189{\cdot}9°$ C., in the range of temperatures between its melting point and the boiling point of oxygen it is theoretically possible to get a mixture of liquid oxygen and liquid propane.

On one occasion when I was slowly condensing propane in a flask chilled with liquid nitrogen, I obtained what appeared to be such a mixture : that is, I obtained two distinct layers of liquid in the flask, one of which had the characteristic appearance of liquid oxygen.

This experience suggested two precautions to be observed when working with liquid propane : (1) when condensing the material, to keep a sufficiently rapid flow into the condensing flask to exclude air ; (2) keep the material at all times above the boiling point of oxygen, say, above $- 180°$ C. Of course, similar precautions should be observed with other combustible materials the melting point of which is below the boiling point of oxygen.

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