a second absorbing factor at λ3280 A., the biological test is a necessary check on the physical. It is also a necessity, since it is the biological action of vitamin A which determines its value. (Incidentally, it has been found in this laboratory that while the crest of the absorption band for high vitamin oils lies at λ3280 A., that for certain concentrates, some of them of extremely high vitamin content, lies farther in the ultra-violet in the region of λ3130 A.).

The modern biological test depends upon the measurement of growth, but it is at least doubtful whether vitamin A is primarily a growth-promoting vitamin. It seems possible that the healthy state of epithelial and absorbing surfaces, induced in the animal by vitamin A, enables the absorption of the true growth vitamin, whether present in the oil or in the supposed vitamin-free ration. Some such argument as this might explain the varying factors used in different laboratories for converting spectrographic values to biological. These factors cover a range of 100 per cent, varying as they do from 1100 I.U. to 2113 I.U. for each $E\,\frac{1\text{ per cent}}{1\text{ cm.}}$.

Further disturbing factors are:

(1) The U.S. 'Reference' oil, on which the majority of tests have been based, is an abnormal oil. The ratio of vitamin A to vitamin D in this oil is given as 3000–95 I.U., which is most unusual in a cod liver oil.

(2) Are we sure that the 'Reference' oil now in use is the same oil it has always been? If so, it must have remarkable keeping qualities; and if not, what published tests are there of its successor?

(3) In the biological test on this oil, have sufficient precautions been taken to ensure that the rations used in different laboratories are strictly comparable?

The recent availability of supplies of pure β-carotene should lead to a clearing up of the matter provided the material in question is really standard in composition and gives uniform results.

With regard to the previous correspondence in respect to the 'Reference' oil, may we say that we are in hearty agreement with the suggestion made by Bacharach, Drummond and Morton, that all subsidiary standards should have their spectrographic assay stated as well as their biological, and that their keeping properties should be checked regularly by the spectrograph.

Everyone admits the importance of vitamin A in everyday life, and the task of the manufacturer of vitamin A products who endeavours to supply a genuine article would be enormously assisted if a satisfactory solution of this problem could be provided in the near future.

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The New Ergot Alkaloid

DURING the first half of the year 1935 communications appeared from four different laboratories, in three different countries, each describing the discovery and isolation of a new alkaloid from ergot, very different in its properties from those previously known. These communications dealt with researches which had been proceeding concurrently and independently, and in each case the authors gave a name to the alkaloid which they had obtained, so that four new names were put forward—Ergometrine[1], Ergotocin[2], Ergobasine[3] and Ergostetrine[4].

There was an obvious general resemblance between the substances thus variously named, but preliminary analytical indications, and certain minor discrepancies in the earlier published physical constants and chemical properties, left some doubt as to whether the four were really identical, or only closely related alkaloids. Later and more detailed publications have removed most of these discrepancies. It appeared to us, however, that the question of identity ought to be settled finally by an exchange of specimens, a careful comparison of them in the laboratories concerned, and, if possible, an agreed statement of the resulting conclusion. This exchange and comparison have now been carried out by the undersigned, of whom H. King has acted in the place of the late H. W. Dudley (who died on October 3, 1935).

Our comparisons of the melting points and mixed melting-points of the four alkaloids and of certain of their salts, and of their optical activities in different solvents in cases where sufficient material was available, leave us in no doubt that the alkaloid obtained in the four different laboratories was the same substance, and that the four names given to it are synonyms. Having reached that conclusion, we are content to leave to the world of science the choice of one of these names, for adoption into scientific literature as the recognised name of the one alkaloid.

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A Small Chemical Separation of the Chlorine Isotopes

A SMALL chemical separation of the chlorine isotopes has been observed by heating carbon tetrachloride with sodium amalgam, when the reaction

$$4\,Na + CCl_4 = C + 4\,NaCl$$

occurs almost quantitatively[1] and the light isotope reacts preferentially. Carbon tetrachloride (A.R.) was fractionated eight times (twenty-four fractions) and the densities of the middle fractions after drying with purified phosphorus pentoxide were compared by the flotation method, using a cylindrical pyrex float. After four successive fractions the density became constant. The float was controlled by means of a small piece of enclosed soft iron. The ground-stoppered vessel containing the carbon tetrachloride was placed in an outer vessel containing phosphorus pentoxide and supported by brass clamps in a thermostat at 23°. An intermittent Gouy regulator[2] controlled the temperature, which was read on a Beckmann thermometer by a travelling microscope reading to 0·002 mm., so that 0·00025° could be easily read. The thermometer varied 0·00019° per mm. with change of pressure. The velocity of the float varied linearly with temperature, 0·001° in set point corresponding with a density change of $1{\cdot}9 \times 10^{-6}$ and a velocity change of 0·0024 cm. per sec.