

entirely to C_{18} unsaturated acids. It is admitted, however, that it had not been definitely shown by isolation of pure hexabromide or of other derivatives that butterfat does contain linolenic acid.

In this Laboratory, by submitting butterfat acids to low-temperature crystallization from acetone at $-50^{\circ}C$., followed by fractional distillation of the methyl esters, a concentrate of highly unsaturated C_{18} acids (iodine value 151.3) was obtained. Bromination of this concentrate under the conditions described by White and Brown⁷ yielded hexabromostearic acid (m.p. $180-181^{\circ}$, not depressed on admixture with authentic hexabromostearic acid) in amounts corresponding with the presence of 14.02 per cent linolenic acid, as compared with 14.99 per cent obtained by the alkali isomerization technique of Hilditch, Morton and Riley². There seems, therefore, little reason to doubt that the octadecatrienoic acid content of New Zealand butterfat consists almost entirely of linolenic acid. On the other hand, in agreement with the extensive researches of Hilditch¹ on English butterfat, it appears most improbable that the octadecadienoic acid of New Zealand butterfat is linoleic acid, as the ether-soluble, petroleum ether-insoluble bromides yielded no tetrabromostearic acid (m.p. 114°), even when submitted to recrystallization from hot petroleum-ether according to the technique of Hilditch and Shorland⁸, by which it is possible to detect small amounts of added linoleic acid in admixture with other polybromides. These findings may be contrasted with those of White and Brown⁹, who claim to have established in samples of butterfat that two-thirds to three-quarters of the octadecadienoic acid is ordinary linoleic acid. The detailed report of this work is awaited with interest.

It has been previously suggested¹⁰ that animal fats may be divided into two classes, homolipoid and heterolipoid, according to whether or not their composition is readily affected by the incorporation of dietary fatty acids. Beef tallow¹¹ has been shown to contain not more than traces of linolenic acid, while the present investigation establishes the presence of appreciable amounts of linolenic acid in milk fat. It appears, therefore, that not only are there species differences in regard to the influence of the dietary fat upon the composition of the depot fat, but also that within a given species the various fats are affected in varying degrees by the composition of the dietary fat.

F. B. SHORLAND

Fats Research Laboratory,
Department of Scientific and
Industrial Research,
Wellington,
New Zealand.
June 21.

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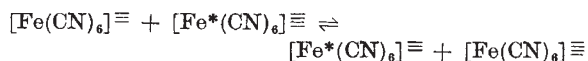
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Instantaneous Electron Transfer and Interaction Absorption

ISOTOPIC exchange by electron transfer between complex ions containing an element in different oxidation states has been demonstrated for quite a number of elements. In some instances, such as :



the exchange is so rapid as to seem instantaneous¹. Systems containing an element in two oxidation states sometimes exhibit abnormally deep and intense colorations. For example, crystals of $(\text{NH}_4)_2\text{SbCl}_6$, which are believed to contain the complex ions $[\text{SbCl}_6]^{3-}$ and $[\text{SbCl}_6]^{-}$, are jet black². The coloration of both solid $(\text{NH}_4)_2\text{SbCl}_6$ and its solutions is so much more intense than that produced by the component complex ions separately that it is described as arising from interaction absorption.

An attempt has been made recently to test the hypothesis that there is a correlation between instantaneous exchange by electron transfer and interaction absorption³. The result was inconclusive, mainly because of the great difficulty of deciding whether any exchange involving radioactive isotopes is instantaneous or not. There is apparently no sure way of discovering whether an exchange involving radioisotopes occurs in solution before separation, or whether it occurs during the separation of oxidized and reduced forms of the complex ions⁴.

Because it is possible to detect rapid electron transfer without any chemical or physical separation of oxidized and reduced forms, the system $\text{D}[\text{Os}^{\text{II}}(\text{dipy})_3] (\text{ClO}_4)_2$ and $\text{L}[\text{Os}^{\text{III}}(\text{dipy})_3] (\text{ClO}_4)_3$ lends itself to testing the hypothesis that rapid electron transfer is accompanied by interaction absorption. We have accordingly examined mixed solutions of $[\text{Os}^{\text{II}}(\text{dipy})_3] (\text{ClO}_4)_2$ and $[\text{Os}^{\text{III}}(\text{dipy})_3] (\text{ClO}_4)_3$ for interaction absorption in the region 7,000-4,000 Å. In view of the high dilution of the solutions used ($5 \times 10^{-4} M$), for which exchange was complete in less than 15 sec., it is perhaps not surprising that we failed to find any interaction absorption. Nevertheless, the failure does prove that there is no correlation between the two phenomena.

Since these experiments were completed, Bonner⁵ has shown that even in solutions which exhibit interaction absorption (solutions containing trivalent and pentavalent antimony), electron transfer may be quite a slow process. Further evidence against the above hypothesis has been adduced by Pauling⁶ in a discussion of the origin of the colour of crystals of $\text{Cs}_2\text{Au}_2\text{Cl}_6$, which are black. The existence in these crystals of two distinct complexes, namely, linear $[\text{Au}^{\text{I}}\text{Cl}_2]^{-}$ and square $(\text{Au}^{\text{III}}\text{Cl}_4)^{-}$, rules out the possibility that the intense colour is due to resonance of electrons among the metal atoms.

F. P. DWYER
E. C. GYARFAS
D. P. MELLOR

Department of Chemistry,
University of Sydney.
June 26.

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