enzyme extract. This method has been applied for the fractionation of inulinase and invertase which always occur in mixtures in certain fungi extracts.

	Original extract	Fractions		
		Top	Middle	Bottom
Inulinase units	7.0	1.2	6.0	11.0
Invertase "	6.5	4.5	6.5	6.0

Results typical of a fractionation with inulinase extract are given in the accompanying table, which shows clearly that a separation of the two components can be effected by this method. Each of the fractions can be similarly treated to secure a more efficient separation of the components.

In addition to effecting the concentration and fractionation of enzymes, the method gives us a comparative idea of the relative molecular weights of the enzymes. A low temperature, and an elimination of adsorbents and elutants which characterises the operation, renders the method applicable to the most labile and sensitive of enzymes. The method is capable of wide application in the study of protein hydrolysates, viruses and toxins. A detailed account of the method will shortly appear elsewhere.

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A Reducing Substance in Tumours

THE indications previously obtained¹ that the high reducing capacity of tumours in our dichlorophenolindophenol test is due principally to a substance other than vitamin C have now been confirmed. In determinations of vitamin C content, by the histological tooth protection method, groups of guinea pigs were given 5 gm. each per day of freshly excised Jensen rat sarcoma (kindly provided by Mrs. Barbara Holmes). The various control groups received 0, 1, 2, 3 and 4 c.c. of orange juice, and 5 c.c. of orange juice plus 5 gm. of sarcoma. The degrees of protection afforded were found to be 1-2 for the sarcoma, 0, 1-2, 2-3, 3, 3-4 respectively for the orange juice controls, and 3-4 for orange juice plus sarcoma (4 = complete protection). It follows that 5 gm. of the tumour is equivalent in vitamin C content to no more than about 1 c.c. of orange juice.

Had the reduction titre of the tumour been due entirely to vitamin C, 5 gm. of tumour would have equalled about 3.3 c.c. of orange juice. Hence some two-thirds of the reduction is due to a constituent other than vitamin C. Tests by the Sullivan method show that no appreciable quantity of cystein is present. Other reducing substances known commonly to occur in animal tissues do not titrate under the conditions of our test. It follows that the actively growing cell structure of the tumour tissue contains notably high concentrations of a hitherto unrecognised and unusually powerful reducing substance, for which, for ease of reference, the name 'reducytin' may be employed.

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¹ Harris, NATURE, 132, 27, July 1, 1933.

Association of Hippoboscids with Lice

ON July 2 a Song Thrush was captured in the Vicarage Garden, North Mimms, Herts, by Messrs. D. Buxton and J. F. Shillito. The bird was a young one and in a very weak condition, being unable to stand up for more than a few seconds at a time when it was caught. It was noticed that there were at least twenty specimens of a Hippoboscid on the bird. Four of these were caught, the rest escaped. The Hippoboscids together with the bird were brought to the British Museum and Dr. F. W. Edwards determined the Hippoboscids as *Ornithomyia avicularia* Linn., a widely distributed parasite of many passerine and raptorial birds.

At the suggestion of Dr. Edwards the bird was brought to me by Mr. Shillito to examine for Mallophaga. I succeeded in obtaining thirteen specimens of lice and one flea. On examining the lice I found representatives of the following three species: *Degeeriella marginalis* Nitzsch (7♂♂4♀♀), *Degeeriella merulensis* Denny (1♀) and *Philopterus merulae* Denny (1♀).

I also examined the Hippoboscids, and on the posterior margin of the abdomen of one of them, a female, I found three lice firmly attached by their mandibles. These lice proved to belong to the species *Degeeriella marginalis* Nitzsch which is a common parasite of birds of the genus *Turdus*.

As a result of this record coming to my notice I decided to examine all the specimens of *Ornithomyia avicularia* Linn. in the National Collection in order to see if there were any with lice attached to them. I found one specimen, a female, with eleven examples of the species *Degeeriella marginalis* Nitzsch fixed to the posterior portion of the abdomen. The data relating to the capture of this Hippoboscid is as follows: "Caught on window, Surrey, Woking, 9-vii-1910, G. C. Champion."

So far as I am aware, these records bring the number of recorded instances of lice being carried by *Ornithomyia avicularia* Linn. to a total of thirteen. The previous records for England number only two, the earliest record of all by Dr. Sharp¹ in 1890 and the recent one by Warburton² in 1928. Of the remaining nine records, six are for North America, two for Finland and one for Germany.

Ewing³ (1927) summarised the data relating to previous records of lice being carried by Hippoboscids and pointed out that nearly all the instances relate to the one species *Ornithomyia avicularia* Linn. and that the species of lice found on the Hippoboscids have, in every case except two (in the case of Dr. Sharp's record the lice were not determined and efforts to trace Dr. Sharp's specimens have been unsuccessful), been found to belong to the genus *Degeeriella*.

The total number of recorded instances of lice found on Hippoboscids is now sixteen. The question whether this association has a definite object naturally arises. Ewing has put forward the following suggestions in the form of questions as possible explanations of this Hippoboscid-lice relationship:—"1. Could the lice be attached to the bird-flies for reasons other than transportation? 2. Are the lice attempting to obtain some of the blood the flies have imbibed from their bird hosts? 3. Do the lice attach to the flies because the latter have become temporarily warmed by contact with the skin of the bird host? 4. Could the bird-fly give off any odour or secretion that is attractive to the lice?"