A low cholesterol Christmas

A favourite ophthalmological theory is upset by the report on p 850 of this Christmas number of the BJO. Fisher and Hayes show beyond peradventure that the "coloured lights" in the Christmas tree cataract are definitely not due to cholesterol crystals but to microscopic multilayered structures which they have named parallel sided stacks of fused cell membranes or "membrane plates."

According to Fisher (personal communication) "The polychromatic lustre often present in the lens in certain types of cataract has always been an enigma." Because cholesterol crystals crystallise in very thin plates, when they are looked at obliquely an interplay of colours is often seen in vitro. Because of this it has long been thought that these crystals are responsible for the colour points in the crystalline lens. However, from improved techniques Feldmann has confirmed that there is no evidence that the cholesterol content of the lens is increased in early cataract.

In the case of uveitis, if a cataract develops, polychromatic lustre is often seen, though it is not invariably present. The points of colour are very small and always associated with disorganisation of lens fibres at the posterior pole. It is therefore very difficult to identify whether water clefts or other structures may be responsible. As in all these cataracts condensation of lens membranes have been observed, Fisher suggested that the compression of large numbers of lens membranes might be the structure which was responsible for the diffraction and interference, an effect similar to that produced by the minute scales on the wings of butterflies.

The rare Christmas tree type of cataract has enabled such a structure to be positively identified because it is large and measurable from slit-lamp appearances. Furthermore, it occurs in isolation embedded in cortical material which merely produces scattering of light and clouding of the lens. The exact mechanism whereby under certain conditions large numbers of lens fibre membranes are condensed to form flat multilayered sandwiches is of course still unknown. However, the paper in the present journal does illustrate the number of bizarre "bodies" which can be found in a cataractous lens and furthermore how some can produce a polychromatic lustre.

The authors are much to be congratulated for explaining so neatly a phenomenon which has puzzled ophthalmologists for decades. Along with Mr Bing Crosby, we can still dream of a White Christmas and as ophthalmologists might also dream of white mature cataracts, snowflake cataracts, Christmas tree capsular incisions, and even Christmas tree cataracts themselves, but in common with the rest of mankind we shall have to make do with a little less cholesterol, not only in our diet but in our theories about the crystalline lens.

References