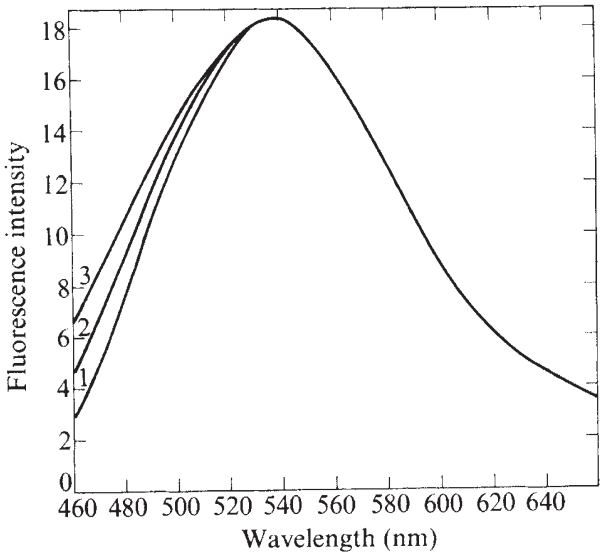

Fig. 1 Normalised time-resolved fluorescence spectra of a 10^{-5} M solution of all-*trans*-retinal in a mixture of 1:1 by volume of isopentane and methylcyclohexane at 100 K. The spectra were taken at the following times relative to the peak of the exciting light pulse (taken as zero time): (1) −1.5 ns; (2) +4 ns; (3) +10 ns. FWHM of the exciting light pulse ≃ 4 ns. A 7–60 Corning filter was used for excitation. The emission was analysed using a high intensity Bausch and Lomb scanning monochromator at a bandwidth of 19 nm. The spectra were not corrected for the variation of the photomultiplier–monochromator sensitivity with wavelength.

longer wavelengths the decay is virtually single exponential and independent of the emission wavelength; a decay time of about 0.1 ns is obtained in this wavelength region. It is significant that the variation of the form of the fluorescence decay with the emission wavelength occurs in the wavelength region for which the fluorescence spectrum is time dependent; this suggests that these two phenomena have a common origin. It should be noted that a decay time of

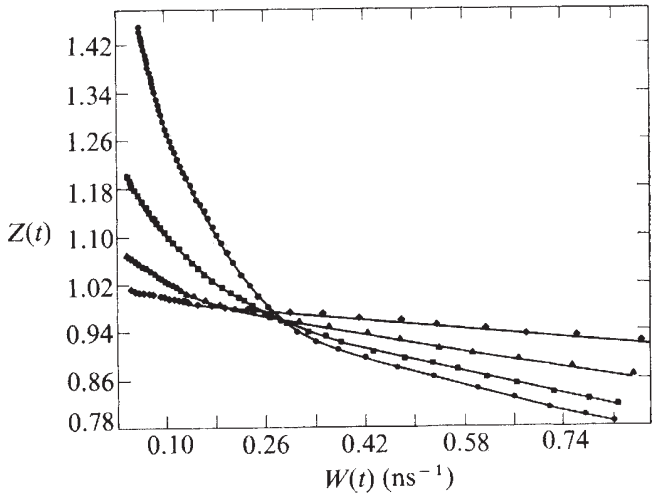

Fig. 2 Phase-plane plots for the fluorescence decay of a 10^{-5} M solution of all-*trans*-retinal in a mixture of 1:1 by volume of isopentane and methylcyclohexane at 100 K for the following emission wavelengths: ●, 460 nm; ■, 480 nm; ▲, 500 nm; ◆, 560 nm. The data were deconvoluted according to the method of Demas and Adamson[12]. Long times correspond to small values of $W(t)$. For a single exponential decay a phase–plane plot yields a straight line of negative slope equal to the decay time. A 7–60 Corning filter was used for excitation. The emission wavelengths were selected by using a high intensity Bausch and Lomb monochromator at a bandwidth of 19 nm.

~0.6 ns has been reported[4] in absolute ethanol at 77 K; this value apparently refers to the long wavelength region.

Calculations[10] have shown that, as a result of electronic delocalisation brought about by excitation, the excited state–equilibrium torsional angle φ_{6-7} between the cyclohexene ring and the polyene chain of all-*trans*-retinal is very different from that in the ground state. I infer then, that immediately after light absorption, relaxation will occur from the Franck–Condon electronic state, which is associated with the ground-state conformation, to an equilibrium excited state associated with a modified conformation. I therefore attribute the time and emission wavelength-dependent phenomena reported here to a relaxation process in the excited state resulting from rotation of the polyene chain about the C6–C7 bond. The relaxation time for this process depends of course on the microviscosity of the molecular environment. The spectral broadening observed in the nanosecond range implies that, under my experimental conditions, the relaxation process competes efficiently with the deactivation of the excited state by radiative and radiationless processes.

The results of a picosecond study[11] indicated that the formation of prelumirhodopsin when rhodopsin is irradiated probably involves a restricted change in the geometry of retinal rather than a complete isomerisation. The light-induced conformational change reported here may well be important in this first event of the visual process.

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Erratum

In the article "Persistence of CMV genome in lymphoid cells after congenital infection" by J. H. Joncas, J. Menezes and E.-S. Huang (*Nature*, **258**, 432; 1975) the correct name of the third author should be Eng-Shang Huang. In line 7 of the article C. H. Huang should read E.-S. Huang.