CO_2 recovered would correlate with pressure.

Third, explosive decompression of any tissue will produce intra- and extracellular bubbles that would in all probability rupture cellular membranes and cause, among other effects, alteration of concentrations of Na^+ and K^+. Because the ratios of "non-inulin" Na^+ to K^+ reported by Joanny *et al.* depend on the amount of these cations remaining in the tissue slice after it has been drained of excess fluid (*3*), damage due to tissue bends could cause a net loss of K^+ and an apparent gain in Na^+ in the directions shown by their data. Such changes would correlate positively with pressure. That such effects also correlated positively with time may be taken as qualitative evidence that the effects were induced by oxygen because saturation of the tissue with gas could be assumed to have occurred in less than 1 hour. However, the degree of change in the ratios of Na^+ to K^+ caused by oxygen remains uncertain.

There is little doubt that the effects described by Joanny *et al.*—namely, inhibition of oxidation of glucose and Krebs cycle metabolites and a resulting change in Na^+ and K^+ balance—do in fact result from hyperbaric oxygen (*4*); there is doubt, however, that such effects have been clearly demonstrated by their results.

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D'Aoust suggests that high pressures of air or nitrogen would be more suitable controls for measurement of the effects of hyperbaric oxygen. High-pressure air involves increased partial pressure of oxygen and nitrogen and compression of tissues. Use of 3 atmospheres of oxygen seems to us to be a much closer control for the effect of 6 and 10 atm of oxygen than the former more complicated system. For example, in his suggested experiments, how could one control for "specific" effects of high-pressure nitrogen and for the effects of hypoxia?

Second, while we would agree that the stirring rate would have some effect on the diffusion of CO_2, we would have thought that 1 to 2 hours of incubation at a shaking rate of 120 per minute would insure reasonable mixing; it is usually considered satisfactory in manometric techniques. Significant failure to mix would result in an overestimation of the effects reported, as D'Aoust points out.

Third, we wonder whether there is any solution to the problem of tissue "bends." Slow decompression would probably result in the reversal of the effects of pressure before they could be measured. Therefore, transient effects not outlasting the increased pressure could not be studied. Our model is thus suitable for examining the consequences of fairly sudden compression and decompression, and not the effects of slow release from compression. The former seems to be one which in our opinion can be usefully studied.

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Polywater Discovered 30 Years Ago?

"Polywater" [Lippincott *et al.* (*1*) coined the term in 1969 and used it to describe a water-derived material found occasionally in glass capillaries] has subsequently generated considerable excitement, and understandably so. But glass surfaces and water vapor have been with us for years (*2*). Perhaps so has polywater.

In 1941, Eversole and Lahr (*3*) measured carefully the thickness of a rigid film of water distilled between an adjacent quartz lens and plate. The thickness of the film was measured by the extrapolation of radii of the successive Newton rings according to their equation

$$r_n^2 = (n\lambda R/\mu \cos \theta) - 2Rt$$

where r_n is the radius of the nth Newton ring, λ is the wavelength and θ the angle of the incident light beam, t is the thickness of the water film, R is the radius of curvature of the lens, and μ is the refractive index of the "water." The refractive index is what caught my attention, although its measurement was not the object of Eversole and Lahr's experiment. Their figure 3 (Fig. 1) shows the extrapolation procedure used to obtain t in the above equation. The extrapolation was repeated with air to cancel out any optical errors. The slopes of their lines for air and water as plotted should be proportional to μ (equation), and the ratio of the slopes should be exactly equal to the refractive index of water with respect to air (1.33). I calculate from the slopes that the "water" they obtained between the quartz surfaces had a refractive index of 1.44, well within the range of 1.38 to 1.51 for polywater solutions formed in capillaries (*4*).

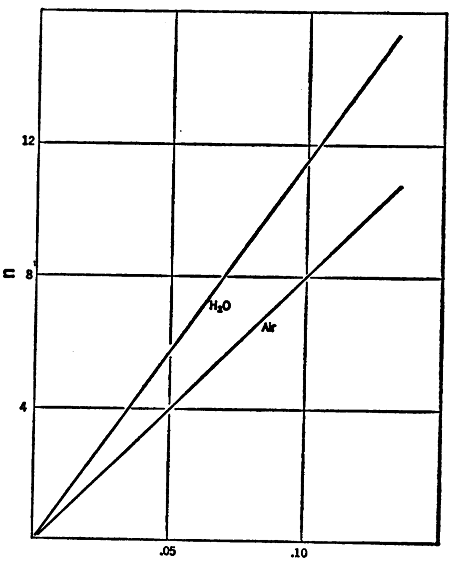

Fig. 1. Reproduction of Eversole and Lahr's figure 3 (*3*). Their data points, all well within the thickness of the lines, have been left out for simplicity. The slopes of these lines as plotted here will be proportional to the refractive index. [Courtesy of the American Institute of Physics]

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