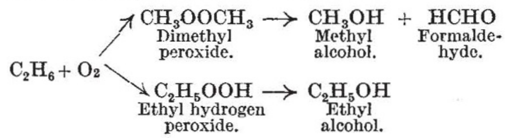
The molecular disruption of the primary peroxide results in the formation of alcohols, esters, glycols, acids, aldehydes, hydrogen, etc. Rieche and Hitz [3] have shown that methyl alcohol can be formed from methyl hydrogen peroxide by decomposition. Similarly, alcohols are formed by the decomposition of ethyl hydrogen peroxide or dimethyl peroxide.[4] These peroxides are formed primarily from ethane during slow combustion according to the Callendar and Mardles hypothesis, namely:



It is interesting to note that methane is unique amongst the paraffin hydrocarbons in having a very low temperature coefficient of gaseous reaction, especially with rich mixtures. This rather suggests that autoxidation by the moloxide occurs to an important extent. E. MARDLES.

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[1] NATURE, 127, p. 481, Mar. 28, 1931.
[2] *Engineering*, Feb. 4, 1927.
[3] *Ber.*, 62, 2460; 1929.
[4] Rieche, *Ber.*, 61, 951; 1928.

Velocity of Sound in Tubes: Ultrasonic Method.

FOLLOWING the experiments of Boyle and Froman,[1] further work has been done on the velocity of sound in liquids contained in tubes, and the experimental observations now appear to be satisfactorily explained.

A theoretical investigation shows that the frequencies, at which selective absorption of the longitudinal wave occurs, correspond to those of the resonant radial vibrations in the column of liquid. The radial frequencies are principally dependent upon the diameter of the containing tube and the properties of the liquid, the material and thickness of the tube wall being of much less importance. The selective absorption is caused by the energy of the longitudinal vibration being converted into a radial vibration. At the absorbing frequency the longitudinal wave is scarcely propagated at all, and the radial oscillation is very strong.

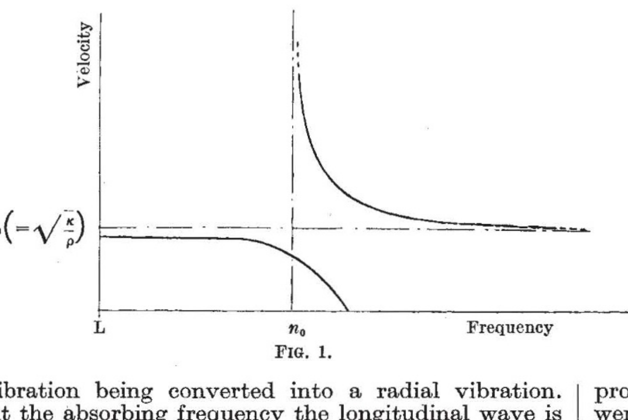

FIG. 1.

The theoretical curve (Fig. 1), which agrees well with experiment, indicates that for a range of frequencies just above the absorbing frequency (n_0) the velocity tends to have two different values, one high and the other low. This explains the experimental difficulty, noted by Boyle and Froman, in obtaining good stationary waves in this region.

The double-velocity effect is due to the fact that the wave-form below the absorbing frequency is different from what it is above, and the low-frequency type of vibration tends to persist slightly beyond the critical frequency. It may be remarked that in the absorbing region the wave is far from plane, but it becomes more and more so as the frequency becomes more removed from this region.

That there are two distinct types of vibration, one before and the other after the resonant radial frequency, has been experimentally verified by measuring the particle velocities for both cases with a Rayleigh disc.

Absorption of the longitudinal wave has also been measured and found to occur not only at the fundamental radial frequency but also at harmonics of it, the experimental and calculated frequencies agreeing very well.

It is to be noted that, following the usual procedure for sound, velocity has been plotted against frequency, whereas in optics (compare curves showing selective absorption) it is customary to plot refractive indices against wave-lengths. The optical method is rather illogical, because changes in refractive index mean changes in velocity and hence in wave-length; it is the frequency which is not affected by the absorbing medium. What is really plotted in optics is the refractive index (corresponding to λ_0/λ) against λ_0, where λ_0 is the wave-length that *would* have obtained if there had been no absorption. Velocity (actual) against frequency (actual) appears to be a much better method of expressing the facts.

Complete papers, covering the theoretical and experimental work outlined above, are shortly to be published elsewhere. GEO. S. FIELD.

National Research Laboratories,
Ottawa, June 16.

[1] NATURE, Oct. 18, 1930.

Control of Prickly Pear by the Cochineal Insect.

THE note in NATURE of June 27, p. 989, on the eradication of prickly pear in South Africa suggested that information about the use of *Dactylopius tomentosus* in the tropics might be of interest. The insects were imported by me into South India by courtesy of the Ceylon Government entomologist.

The object was to destroy clumps of *O. dillenii* in which dangerous snakes were harbouring around business premises. The insects would therefore be called, rather quaintly, in Australia 'private cochineal'.

The commencement of attack by a colony is very slow. For about two months in a shady clump, or perhaps twice as long in an exposed clump, no effects are generally visible. A few weeks after the attacks become visible the insects have overtaken the vegetable growth, and this is symptomised by heroic efforts of the plant to produce fruit; collapse quickly follows, and the insects then appear to concentrate upon producing winged males. It almost seems as if this were a consequence of starvation or the changed composition of the decaying juices. A good sign of the extreme selectiveness of the *D. tomentosus* is the fact that grass and weeds spring up untouched immediately a cactus clump collapses. Further evidence of this habit was also obtained when the *D. indicus* destroyed *O. monacantha* without touching the adjacent *O. dillenii*, in South India.

Indian farmers applied to me for infected stems, and cleared many thousands of acres simply by throwing these into objectionable clumps. Official attitude was not enthusiastic, but tolerant; European unofficial