The mean intensity from all stars is 3·2 for λ4388 and 5·2 for λ4472, these values nearly agreeing with those of Russell. We conclude that while the relative abundance of atoms in the mp^3 and mP levels is subject to considerable variations in different stars, the average ratio triplet/singlet in stellar spectra is not very different from that observed in the laboratory under normal pressures.

OTTO STRUVE.
Observatory, Cambridge,
Nov. 15.

Striations in Explosive Flames.

IN a recent paper by Egerton and Gates (*Proc. Roy. Soc.*, A, **116**, 516; 1927), reference is made to peculiarities exhibited by certain flame photographs (not reproduced) obtained, on a rapidly revolving film, when mixtures $1C_2H_2 : 2{\cdot}5O_2 : 10N_2$ were ignited at one end of a closed cylinder 19 cm. long and of 10·7 cm. internal diameter, as follows: "Some of the photographs show distinct closely-spaced bands, indicating that the combustion has a vibratory character. The number of vibrations per second in the after-flame is about 2500, and the spacing is consistent with the view that successive sound waves are reflected from the end-plates."

The accompanying photograph (Fig. 1, a negative) shows striations in the flame (more particularly in the after-flame) of an explosion of a 3·35 per cent pentane-air mixture at 4 atm. initial pressure ignited at one end of a horizontal cylinder 38 cm. long and of 15·2 cm. internal diameter. A manometer of the diaphragm type, fixed at the end of the cylinder distant from the point of ignition, recorded the fluctuations of pressure within the cylinder simultaneously with the flame-photograph. The frequency of the striations is 1200 per second, a value which we have found to be independent both of the composition and of the initial pressure of the explosive mixture. When, by the rapid rotation of a fan, a high degree of turbulence was created within the mixture during its inflammation, the bands in the after-flame were less distinct, but their spacing was the same. These observations, together with the fact that the frequency of the striations observed by Egerton and Gates and by ourselves varies inversely as the lengths of our explosion vessels, seem to preclude the possibility of their being due to helical movement of the flames, such as has been shown by Campbell and Finch (*J. Chem. Soc.*, 2094; 1928) to occur during the explosion wave in certain gaseous mixtures. The most probable explanation of the striations in our photographs seems to be that given by Egerton and Gates for theirs, namely, a stationary wave compounded of sound-waves reflected from the opposite end-plates of the cylinder.

This striated appearance of the flame during an explosion invariably precedes a 'knock' in our closed cylinder which appears to be closely related to 'pinking' in an internal combustion engine.

G. B. MAXWELL.
R. V. WHEELER.
Department of Fuel Technology,
University of Sheffield.

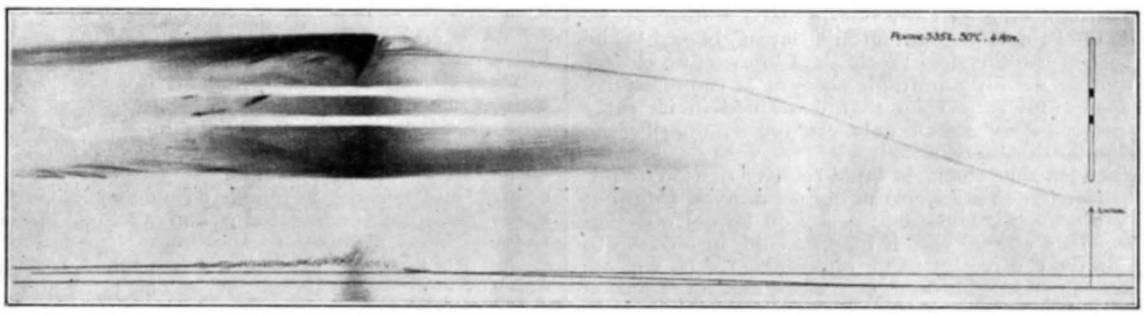

FIG. 1.—Flame photograph and pressure record of explosion of 3·35 per cent pentane-air. Time intervals, 1/100 sec.

The Understanding of Relativity.

I CAN understand a good deal of H. D.'s courteous reply to my letter (NATURE, Nov. 24, p. 808), for example, that there are degrees in understanding. But much remains as to which I should like information. I know I am ignorant, but since my state of mind is almost universally representative, it is important. Is knowledge of the fact that clocks in rapid relative motion do not keep time derived from abstruse calculation, or from actual observation? If the latter, is there any explanation of that which seems to the ordinary man unaccountable? I assume that the swing of the pendulum of the clock in motion is not disturbed by its speed, or by a changing pull of gravity; for such alteration would be due to simple mechanical causes, easily explainable, and not due to what I suppose is meant by relativity—a mystical conception which appears to result in contradictions.

What does "curvature of space" mean? I can understand the curvature of a given area of space, for example, that occupied by the earth. But we are within illimitable space. Is curvature of such space a necessary axiom of thought? If so, why? We are told of straight lines, and also of their curvature. To the ordinary man this seems a contradiction in terms. We are told of parallel lines and of their meeting. Again we have a contradiction. On earth we have curved lines of longitude; they meet, but are not parallel. We have curved lines of latitude; they are parallel and never meet—not even if we trace such lines round and round the earth, in the same latitudes to all eternity; or so it seems to me.

Suppose two observers, A and B, both gifted with supernatural powers of seeing, stood a yard apart, with eyes on the same plane, and gazed at spots, also a yard apart and on the same plane, situated on an immensely distant object (say a star), then their lines of sight would be parallel. But where would they meet? At a spot beyond the star? But suppose the observers gazed at points a yard apart at this other spot? And so on. I can conceive that the lines of light proceeding from the star might curve for some reason—gravity or what not—but the curvature of lines passing through space is one thing; the curvature of space itself is quite another thing. Must we assume that, even in theory, straight and