Non-luminous Flame Gases

PROF. W. T. DAVID and his co-workers have published a moving-film record of the passage of flame gases along a glass tube[1]. Such records have frequently appeared elsewhere[2], but the explanation given by the writers of the letter, namely, that "the flame gases, although luminous after the early stages of flame-front travel from the igniting spark, suddenly become non-luminous after further travel (due apparently to a sudden change in the mode of combustion in the flame-front)" is a mis-reading of the photograph.

The apparent luminosity persistence after the spark has passed, and behind the flame front, is due to the elongation of an expanding ellipsoidal shell of flame, so that the later luminosity is that of freshly ignited gas. A detailed description and explanation of such records was first published in 1928[3].

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[1] *Nature*, 155, 273 (1945).
[2] See, for example, Ellis, *Fuel in Science and Practice*, 7, 409 (1928).
[3] Payman, *Proc. Roy. Soc.*, A, 120, 90 (1928).

THE long duration of the "later luminosity" or "after-glow" militates against Dr. Payman's view; and, indeed, its incorrectness is demonstrated by Dr. Ellis's instantaneous photographs (see, for example, *Fuel in Science and Practice*, 7, No. 9, 410, photographs Nos. 8–10).

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An Illusion of Size

IF one looks at two nickel threepenny bits, a brand new one and a mat old one, with reduced illumination, the old one appears considerably bigger. The difference is striking if the illumination is correctly chosen. Out of fifty people, two only did not see the phenomenon immediately; even those two recognized it when the experiment was repeated. Older people realized it quicker than younger ones. Colour does not play any part, as the same difference is recognizable with shillings.

The phenomenon is obvious with a neutral or dark background, but is not provoked, or it may be inverted, when the two objects of different light value are viewed against a white background. Here the new coin sometimes appears bigger than the old one, when light is reduced.

The only explanation of the effect which I can offer is as follows: The old coin appears fogged when light is reduced, while the shining new piece of metal reflects light and is seen sharply. We are accustomed to linking a greater distance with a fogged object and therefore to over-estimate its size. Thus the moon seen through thin clouds appears bigger than a clear shining one; and misty hills seem to be at a greater distance than those sharply outlined and the size of the latter is correspondingly undervalued (Luckiesh[1]).

This explanation is supported by the fact that the difference of size is more impressive after some seconds, as the phenomenon is psychological and not a purely physical one. If we use a white background the experiment fails. It seems that there is not sufficient light reduction to create the adequate dimness of the old coin, while irradiation may interfere in the case of the new one. Using Ostwald's colour papers as background, I found that variation of colour does not influence the intensity of the size illusion, but that different greys of the $A - P$ series produce it sufficiently, the darker greys being no better than the middle ones.

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[1] Luckiesh, "Visual Illusions", 166 (New York, 1920).

Avoidance of Obstacles by Bats

MR. OLIVER G. PIKE, in his interesting article on bats in *Nature* of January 27, suggests that these creatures avoid obstacles in the dark by means of "a sense of which we know little, and to which it is very difficult to give a name, but which appears to be connected with the 'earlet' . . . and . . . the 'horseshoe'. . . . These organs, *combined with their keen sense of hearing*, assist them to dodge all obstructions, and to find insect food while flying in the dark" (my italics).

The phrase in italics contains the key to the problem. Recent work in America by Galambos and Griffin[1,2,3] has shown that the mechanism of obstacle-avoidance by bats depends on their utterance of supersonic cries, the echoes of which from insect prey or obstructions are picked up by the cochleæ. The 'stereoscopic hearing' resulting from central analysis of these supersonic echoes compares very favourably with binocular vision. It is interesting to reflect that a biological application of principles now widely used for the detection of military targets has thus been revealed.

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[1] Griffin, D. R., and Galambos, R., *J. Exp. Zool.*, 86, 481 (1941).
[2] Galambos, R., and Griffin, D. R., *J. Exp. Zool.*, 89, 475 (1942).
[3] Galambos, R., *J. Acous. Soc. Amer.*, 14, 41 (1942).

Marine and Other Biological Laboratories

PROF. J. H. ORTON'S article[1] contains certain inaccuracies as regards the status of marine biological laboratories in Scotland. First, the Millport Laboratory is not attached to the University of Glasgow, but is the property of the Scottish Marine Biological Association—an organization parallel with the Marine Biological Association of the United Kingdom to which the Plymouth Laboratory belongs. The Millport Station receives welcome aid from all the Scottish universities, more particularly Glasgow.

Further, it might be pointed out that "St. Andrews, Nigg" has no meaning. The University of St. Andrews owns the Gatty Laboratory at St. Andrews, but the former station at Nigg was operated by the Fishery Board for Scotland and not by the University of Aberdeen.

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[1] *Nature*, 155, 550 (1945).