

January 12, 1933

Color and Legibility.Information Section
Bureau of Standards, Washington

Some results have been obtained at this Bureau on the legibility of automobile license plates. It was found that dark letters on a light background are more legible than light letters on a dark background.

The following short bibliography lists the more important sources of information on this subject; following each title a brief summary of the several conclusions is given.

W. D. Scott, *The Theory of Advertising*, Small-Maynard, Boston, pp. 138-139; 1903. Black letters on a white ground are more readily perceived than white letters on black.

A. Kirschmann, *Ueber die Erkennbarkeit geometrischer Figuren und Schriftzeichen im indirekten Sehen*, Arch. f. d. ges. Psychol., vol. 13, pp. 352-388; 1908. Capital letters are recognized at a greater distance in indirect vision when printed in white type on a black background than when printed in black on white.

D. Starch, *Advertising*, Scott-Foresman, New York, pp. 189-190; 1914. Black type on white ground may be read 42 per cent faster than white type on dark gray ground.

M. Luckiesh, *Light and Color Advertising and Merchandising*, Van Nostrand, New York, pp. 246-251; 1923. Black type on yellow background is most legible, red on green, least. The order is: black on yellow, green on white, red on white, blue on white, black on white, red on yellow, green on red, red on green.

A. T. Poffenberger, *Psychology in Advertising*, Shaw, Chicago, pp. 262-265; 1925. Legibility depends upon the relation of color to background and the all important factor is brightness difference. The chromaticity difference is of little importance.

C. E. Ferree and G. Rand, *Intensity of Light and Speed of Vision Studied with Special Reference to Industrial Situations*, - Part II, *Transactions Illuminating Engineering Society*, vol. 23, pp. 507-546; 1928. White letters on a black background can be seen quicker than black on white; this superiority is particularly marked for high illuminations. For low illuminations and small letters black on white is slightly better than white on black.

D. G. Paterson and M. A. Tinker, *Studies of Typographical Factors Influencing Speed of Reading*, VI. *Black Type versus White Type*, *Journal Applied Psychology*, vol. 15, pp. 241-247; 1931. Black type on white background can be read with 10 per cent greater speed than white on black.

G. Holmes, The Relative Legibility of Black Print and White Print, Journal Applied Psychology, vol. 15, pp. 248-251; 1931. Words printed in ten point type are 15 per cent more legible when they are black on a white background than when white on black.

M. A. Tinker and D. G. Paterson, Studies of Typographical Factors Influencing Speed of Reading, VII. Variations in Color of Print and Background, Journal Applied Psychology, vol. 15, pp. 471-479; 1931. Black type on a white background may be read most speedily, red on green, least. The order is: black on white, green on white, blue on white, black on yellow, red on yellow, red on white, green on red, red on green.



