LATERAL VISION AND ORIENTATION

TO THE EDITOR OF SCIENCE: Professor C. C. Trowbridge furnished an illuminating paper, printed in SCIENCE September 29, on "The Importance of Lateral Vision in its Relation to Orientation."

In dealing with the question of the process used by man, with his binocular frontal vision, in estimating distances to objects that come within his observation, Professor Trowbridge says:

> It is a well-established principle that binocular vision gives to human beings a means of determining the relative distances between near-by objects, as well as the distances of these objects from the observer. The basis of this power lies in seeing the objects from two points of view, giving a stereoscopic effect, which, however, is decreasingly effective as the objects are removed from the eyes. It is apparently partly the decreasing stereoscopic effect with increasing distance which forms the basis of measurement, and partly a judgment of distance in some way through the muscular movements of the eyes, and those governing the accommodation of the lenses. . . .

From the above quotation it appears to the writer that Professor Trowbridge has missed the fundamental principle of estimating distances to observed objects by human binocular vision. If the writer's view or theory is correct, when a man estimates such distances by his vision, he unconsciously performs a trigonometrical operation, in which the distance between the pupils of the eyes is the base of a triangle, the two lines of vision from the pupils, converging in the observed object, being the other sides of the triangle.

The same principle is used by the "range-finder" on a ship of war, who has a rod about ten feet long as the base of his triangle, from each end of which is measured the angular inclination of the two lines converging in the target, five or ten miles distant. The "binocular" observer has a base two and a half or three inches long, for objects a few hundred feet distant and less. The range-finder makes accurate calculations based on measurements; while the "binocular" observer, from long practise, acquires a sort of "rule of thumb" facility in making such estimates with more or less approximate accuracy, which operation from long habit is performed intuitively and without conscious mental effort.

A man with only one eye, or with defective vision in one of his eyes, finds a difficulty in estimating the correct distance to an object which he extends his hand to grasp; or when inserting a key in a keyhole he must sometimes aid his vision by the touch of a finger to locate the keyhole.

It follows of course that a man with only one eye is without the power to invoke the principle of trigonometry in the estimating of distances to observed objects.

If the above theory is unsound the writer will be glad to have further enlightenment on the question discussed.

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A COMMON, BUT INCORRECT, STATEMENT CONCERNING THE NUMBER OF BACTERIA IN MILK

THE literature discussing sanitary milk problems is full of statements like this: "Certified milk is not allowed to have more than 10,000 *bacteria per c.c.*"; or "Grade A milk should not have over 60,000 *bacteria per c.c.*"; and many other similar statements specifying the *number of bacteria per c.c.* in milk of various grades. These counts are commonly made by the standard agar plate method recommended by the American Public Health Association.

A perusal of a number of bacteriological text-books by American authors shows a general recognition of the fact that these counts are probably counts of groups of bacteria rather than of individual bacteria and that they are probably always lower than they should be because of the fact that not all bacteria will grow on nutrient agar at the incubation temperature used. In spite of these qualifications specifically stated in the majority of these text-books, their authors ignore them in all subsequent discussions and accept agar plate counts as showing the *number of bacteria per c.c.* Occasionally in these books or elsewhere in bacteriological literature, one even finds the bald assertion that each colony