($P = .01$) and the tolerant group ($P = .05$). This observation is consistent with the concept of an enhanced responsiveness of the central nervous system to the drug as an explanation of hypersensitivity.

Alternatively, the hypersusceptibility observed in the animals in group C might result from damage to the central nervous system caused by cerebral hypoxia during the periods of anesthesia on days 1 and 2. However, it has been shown that significant hypersensitivity is induced on day 30 in rats exposed to an atmosphere of 100 percent oxygen during anesthesia on days 1 and 2 (*5*). In addition, it was found that the oxygen content of venous blood, measured 75 minutes after the administration of barbital (200 mg/kg) to untreated rats, did not differ significantly from that in animals previously treated with saline. These findings indicate that induced hypersensitivity to barbiturates does not result from lack of oxygen in the brain.

We find that barbiturate-induced hypersusceptibility is probably not the result of a reduction in the activity of hepatic barbiturate-metabolizing enzyme. In view of the suggestion by Remmer (*6*) that long-acting barbiturates produce tolerance by an alteration of the responsiveness of the central nervous system to the drug, it is reasonable to expect that induced hypersensitivity may be based on a similar mechanism. These considerations do not, of course, obviate the possibility of alterations in the distribution of the drug across the blood-brain barrier or within the brain, particularly in view of the fact that it has been reported that barbital is differentially localized within the central nervous system (*7*).

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Traffic Signals and Depth Perception

Abstract. *Automobiles approaching red traffic signals at night appear to go beyond them when viewed from some distance to the rear. The phenomenon is doubly illusory because the higher of two objects has been presumed to appear more distant. The illusion is probably limited to small visual angles (about 2 degrees).*

An amusing illusion can be experienced by any motorist driving at night in city traffic whenever he finds himself following an automobile that is approaching a traffic signal. From a viewing distance of about a city block away, the taillights of the lead car will appear to "go through" a red stoplight and the car will appear to stop someplace beyond the intersection. As the follower closes the gap he sees the lead vehicle standing discretely well in front of the signal light. What the observation amounts to is this: at a certain low angle of elevation, a stimulus will look closer to the observer than a stimulus at or below eye level. In the traffic signal illusion the lower lights (taillights) appear to be beyond the upper (traffic signal) light. To make the lower lights appear to be just under the signal the automobile would have to be backed up, closer to the observer.

This illusion, which is readily experienced by anyone looking for it, does not appear to have been reported hitherto. The closest reference to such a phenomenon is a casual remark by Adelbert Ames (in *1*) in his description of unusual perceptual experiences to the effect that in an otherwise dark room a light on a wall below another light will appear more distant if both are above eye level and that the reverse effect appears if the lights are below eye level. Kilpatrick (*2*) cites the same perceptual effects.

In a laboratory study by Epstein (*3*) subjects judged two lights vertically separated by from 3½ to 7½ deg of visual angle and reported no differences in depth between the lights when no textural cues were present. It may be that the visual angles employed by Epstein were too large for the illusory or any other effect to appear in the absence of texture. He did find that when texture was supplied the upper light appeared more distant.

The illusion reported here is then doubly illusory in that, as Epstein reports, "the higher of two objects will generally appear more distant." The latter statement stems from Gibson's (*4*) descriptions of depth perception as a function of optical gradients of texture. It should be noted that in the illusion described here, textural cues are at a minimum, as the illusion is experienced best at night.

Because of the contradiction of reality and presumed common phenomenal experience, the illusion appeared worthy of some study, and the traffic situation was brought into the laboratory via a procedure that lends itself to numerous parametric investigations.

To reproduce the street situation, a box 8 by 2 by 1 foot (2.4 by 0.6 by 0.3 m) was constructed, open at the front end. The inside of the box was painted flat black. Ten inches (25 cm) above the floor of the box a small (½ inch) radio unfaceted ruby-light was mounted in a fixed position. On the floor of the box a small wooden block was arranged with strings leading from the front end and rear over pulleys so that a continuous loop of string could be manipulated to draw the block back and forth. On the block a duplicate ruby light was mounted. Both lights were powered by a 6-volt transformer. A stylus fitted to the block projected through a slit in the side of the box and ran along a meter stick mounted on the side. The box was fitted so that it could be placed on one side to provide a horizontal displacement. In principle, except for substituting lights for dowels, the box resembles the rather unreliable Howard-Dolman apparatus as discussed by Weymouth and Hirsch (*5*).

College student subjects ($N = 23$) from an elementary psychology class were seated so that the lower light was at eye level, 20 feet away. The upper light was seen at an angle of approximately 2 deg (head position was not fixed). In a darkened hallway the subjects could see nothing of importance but the two lights. The experimenter gave the endless loop of string to the subject and asked him to pull one way or another to bring the lower light precisely under the upper light (vertical condition) or to bring the right light next to the left light (horizontal condition). Half the subjects went through the vertical condition first; the other subjects began with the horizontal condition. The experimenter moved the comparison stimulus well ahead or well beyond the standard before each trial. Each sub-

ject made 15 settings in each condition. The method of average error was followed and deviations from the correct setting were scored + or −, depending on whether the comparison stimulus was set at a greater or lesser (closer to the subject) distance.

The average error score of the 23 subjects in the vertical condition was −4.73 inches (standard deviation, 3.81 inches). In general, then, the subjects drew the lower light ahead of the upper light when they attempted to equalize the positions. Their average error score in the horizontal condition was −0.86 inch (standard deviation, 2.17 inches). With 44 degrees of freedom the t of 4.23 between vertical and horizontal settings is significant at better than the .01 level. Only two of the 23 subjects tended to be satisfied with settings that resulted in the lower light being set beyond the upper one. In the horizontal condition seven of the subjects had such positive constant errors.

It is evident that a negative constant error was markedly and predominantly present when the subject tried to locate a lower light below an upper light. This tendency was also present (significantly greater than 0.0) in the horizontal condition but to a far less degree.

From the results it is clear that the street scene was successfully reproduced in the laboratory in a miniature model. The illusion is open to further exploration of such variables as intensity and color of lights, visual angle, location with respect to eye level, and so forth. The present limited objective was to demonstrate the illusion per se.

Under the conditions that were established it appears that an illuminated stimulus that is in fact slightly farther away (the upper light) appears closer to the observer than a similar light at eye level. Although the present experiment did not explore the variable of degree of elevation, it is clear from street observations that the illusion disappears as the visual angle is increased. The present conclusions apply only to the angle employed, that is, 2 deg, and to the unstructured or untextured conditions. Whether "the higher of two objects will generally appear more distant" may depend on how much higher it is in the absence of other cues.

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Intrauterine Devices: Contraceptive or Abortifacient?

In his report on the effects of intrauterine contraceptive devices (IUD), Wynn (*1*) states that one manner in which the IUD functions is that it "creates an environment unfavorable for blastocystic attachment;" he then goes on to say that this mechanism is therefore "primarily contraceptive rather than abortifacient. . . ." This conclusion is, strictly speaking, incorrect, since "contraception" means "against conception" (which refers to fertilization) (*2*) and, moreover, is artificial, since blastocyst formation requires not only fertilization, but also development of the resulting conceptus. From a strictly scientific point of view—arbitrary definitions aside—the development of a new individual begins with fertilization of the ovum; prevention of implantation is therefore as "abortifacient" in this sense as would be dislodgement of an implanted blastocyst. On this basis, the IUD's must still be considered abortifacient.

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Contraception, a term introduced in 1910, means prevention of conception. The *Oxford English Dictionary* defines conception as the "fact of being conceived in the womb," adding that the primary notion of conceive is "take in and hold" (see, "catch"). Etymologically, conception derives from the Latin *cum* or *con* and *capere* (to catch, seize, or grasp). Although dictionaries differ in their definitions of conception and pregnancy, according to one interpretation conception begins with implantation, that is, the "catching" of the blastocyst by the endometrium.

Webster's Third New International Dictionary defines abortifacient as "inducing abortion," which is the "expulsion of a nonviable fetus." A fetus is defined as an "unborn or unhatched young vertebrate, especially after passing through the earliest developmental stages and attaining the basic structural plan of its kind."

The purpose of my report (*1*) was to suggest that the IUD acts to prevent nidation rather than to dislodge the implanted blastocyst. I should not, perhaps, have assumed that all biologists agree on the definition of conception. Interdisciplinary discussions, on the contrary, point up the lack of consensus (*2*). I am unconvinced, however, that it is "strictly scientific," as Krotoski suggests, rather than "arbitrary" to determine exactly when development of a "new individual" begins. It is equally difficult to adduce proof of the precise point at which human, as opposed to biological, life begins or at which the soul first enters the embryo.

The British Council of Churches has made the following statement, which seems consistent with the view expressed in my report:

"Our conclusion was that a distinction must be drawn between biological life and human life, and that in the absence of more precise knowledge, nidation may most conveniently be assumed to be the point at which the former becomes the latter. We agreed that abortion as a means of family limitation is to be condemned. But a woman cannot abort until the fertilized egg cell has nidated and thus becomes attached to her body . . . we see no objection . . . to the use of a technique which would prevent implantation. Such a method, which might be described as contra-nidation, could also quite properly be called contraception" (*3*).

In light of the foregoing semantic, biological, and theological considerations, I find no cogent reason to change my conclusion that the IUD is not abortifacient in the customary sense of the term.

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