cleaving eggs or embryos were found *in corpore*.

Eggs and sperm from each of the ovotestes were isolated in dishes of sea water. Fertilization *inter se* gave entirely normal larvae. Normal eggs fertilized with sperm from the ovotestes gave normal larvae, as did also the eggs of the ovotestes fertilized with normal sperm.

Subsequently all five gonads were preserved and sectioned. There were thus three types of section: ovarian, testicular, and ovotesticular (from the median zone). Both ovarian and testicular lobes showed normal structure, with masses of ripe and immature eggs or sperm, as the case might be. In the median section, where the ovarian and testicular structures lie side by side, the acini were intermingled. Ripe ova occurred among the sperm. A few eggs showed fertilization membranes, which must have been the result of the recent handling, since no division stages or embryos were found *in corpore*.

It is worthy of note that in a similar hermaphroditic specimen of *Strongylocentrotus pulcherrimus,* Okada and Shimoizumi (*3*) found that, when selfed, the eggs and sperm resulted in imperfect larvae, while larvae resulting from outcrossing were normal. Thus, their findings differed from those in the experiments described above (*4*).

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4. This study was aided by a University of California research grant.

25 August 1958

"Shutoff Pulse Illusion"

Abstract. Visual signals produced by sharp illumination decrements are commonly misinterpreted because of the presence of an illusory sharp increment at the moment of switching. Conditions for occurrence of the illusion are outlined, as well as conditions under which it is not reported.

During evaluation of a device in which information was tranmitted by means of a step-modulated light beam, the visual appearance of certain light signals was found to disagree consistently with these same signals as electronically received and recorded. The discrepant element

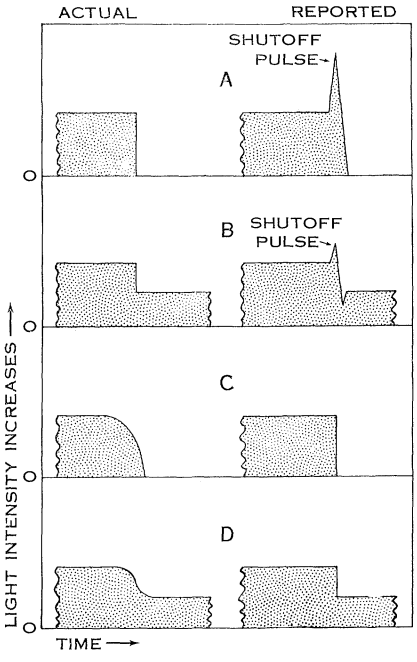

Fig. 1. Conditions associated with "shutoff pulse" illusion.

in all instances was found to be a positive pulse of short duration, reported when the illumination ceased or declined sharply. This illusory signal, here called the "shutoff pulse," is shown diagrammatically in Figs. 1*A* and 1*B*. It was noted regardless of whether the light source was a high-temperature filamentary lamp or a glow lamp, provided the lamp supply was direct-current; it was noted at all supply frequencies above about 40 cycles/sec with high-temperature filamentary lamps and at all supply frequencies above about 250 cycles/sec with glow lamps. It was not noted with low-temperature filamentary lamps, and it was masked by flicker and stroboscopic effects at low supply frequencies.

The illusion could be lessened or removed entirely by "fading" the light source in place of "stepping" it, as shown in Figs. 1*C* and 1*D*, but the amount of "rounding" seemed to be different for different observers, and some inconsistencies suggested hour-to-hour changes for the same observer.

No simple relation could be observed between the rate of change of illumination and the observed "iris overshoot" of the observer. This well-known "hunting" phenomenon is an oscillatory change in the iris aperture in response to a rapid change in illumination. When illumination changes by a factor of 2, the iris attains a new equilibrium aperture in from 50 to 250 msec with most subjects. When the rate of change of illumination was slow enough for the iris overshoot to be undetectable, the "shutoff pulse" was never reported.

The conditions for maximum illusory effect appear to be moderate illumination, light intensity change by a factor of 2 or more, and illumination filling at least several degrees of the observer's visual field. With very strong illumination, the illusion, if present, is masked by afterimages. At very weak illumination, it is not reported. If the change in light intensity is very small, the illusion is not reported, and, in some instances, the step modulation is not perceived.

When the key light source is not only weak but also fills only a small portion of the observer's visual field, such as 30 min of arc, the shutoff pulse is not reported. If the light is near the edge of the observer's visual field and is relatively weak, he is likely to report that "it moved" when the intensity is keyed.

This illusion is possibly related to some phenomena recently reported by Baker (*1*) and Bouman (*2*). It is roughly analogous to the subjective portions of the "key click" problem, which has plagued the wire and radio-communications industries since their inception, and the "shutoff pulse" illusion is one of the reasons why keyed or step-modulated light beams, with visual reception, are not a satisfactory means of rapid communication.

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11 August 1958

Venom of the Stonefish *Synanceja verrucosa*

Abstract. Moderate doses in rabbits produced hypotension, increased respiratory rate, and myocardial injury. Respiratory arrest occurred with fatal doses when the blood pressure had declined to very low values. The active substance (or substances) was nondialyzable, and the potency of the protein-containing lyophilized or glycerol-treated extracts was maintained well on prolonged storage.

Stonefishes of the genus *Synanceja* have caused a number of deaths in human beings through stings by the venomous spines (*1, 2*). Two large venom sacs are present on each of the 13 dorsal spines, and much smaller ones on two pelvic and on three anal spines (*1*). Wounds have occurred commonly on the hand or foot as a result of punctures by the dorsal spines of the fish, which inhabits shallow water over wide areas of the tropical Indian and Pacific oceans. Extreme pain ensues within a few minutes after the sting and then spreads from the wound over the entire extrem-