ing experimental confirmation of our proposal several years ago concerning the existence of a possible hexagonal polymorph of diamond [S. Ergun and L. E. Alexander, *Nature* **195**, 765 (1962)]. We had pointed out that, in view of the existence of a number of tetrahedral structures in both cubic and hexagonal crystalline forms (for example, SiC and ZnS), it was remarkable that C, Si, and Ge had been reported to exist in only the face-centered cubic form. By stereochemical considerations it was shown that mixed cubic and hexagonal structures can result only from stacking variations along one axis, the *c*-axis of the hexagonal lattice. Calculations of the positions and intensities of the Debye-Scherrer lines, to be expected for the hexagonal diamond phase, showed that the presence of an appreciable proportion of hexagonal stacking sequences would have the effect of broadening and shifting such face-centered cubic diffraction lines as (111), (220), (113), and (133). The recent work shows similar effects, on the face-centered-cubic lines, produced by mixtures of hexagonal and face-centered cubic crystallites in the meteorites.

SABRI ERGUN

U.S. Bureau of Mines, Pittsburgh, Pennsylvania 15213

LEROY E. ALEXANDER

Mellon Institute, Pittsburgh 15213

19 April 1967

Tetrodotoxin: Action on Graded Responses

In their paper, Benolken and Russell (*1*) do not mention a well-established distinction among graded responses, and this omission distorts interpretation of their data. Generator potentials of sensory neurons, as well as postsynaptic potentials, are inherently graded responses, because the membrane component that produces them is electrically inexcitable, and thus there is no feedback between the electrogenic processes and the changes in membrane potential (*2–4*). These electrically inexcitable responses are not affected by tetrodotoxin or saxitoxin (*4, 5*). However, electrically excitable membrane components can also produce graded responses given appropriate conditions of the local circuit, or of ionic permeabilities and gradients, or of both (*3, 6*).

When this graded, electrically excitable electrogenesis depends on Na^+-activation, it may be expected that it will be eliminated by tetrodotoxin. Such an effect was observed for an electrically excitable graded component in the photic response of the honeybee (*7*) and this is also what Benolken and Russell (*1*) appear to have observed now in *Limulus*. The response that was eliminated by tetrodotoxin in their illustrative experiment (Figs. 1 and 2) was a pulsatile depolarization of some 6 to 7 mv. It arose from a generator depolarization of about 35 mv that was not affected by the drug.

The authors (*1*, p. 1577) summarize Benolken's earlier findings on this component as follows: "the transient response can reverse the resting potential level of the cell" (that is, it may overshoot to inside positivity) and "while graded over much of its range, the transient component exhibits regenerative properties over a portion of this range. . . ." These are characteristics of electrically excitable activity (*3, 6*). Benolken's findings, as well as other data, led to the conclusion that a membrane which is predominantly receptive in function and which is electrically inexcitable may have some electrically excitable components interspersed in it (*4, 8*). The finding by Benolken and Russell (*1*) that only the pulsatile early component of the photic response of *Limulus*, but not the generator potential, is eliminated by tetrodotoxin thus supports the distinctions between electrophysiological and pharmacological properties of electrically inexcitable and electrically excitable electrogenesis.

HARRY GRUNDFEST

Department of Neurology, College of Physicians and Surgeons, Columbia University, New York, New York

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31 March 1967

The comments by Grundfest refer to a report of Benolken and Russell (*1*) in which an uncomplicated experimental question was phrased as follows: Is the graded response of the *Limulus* eye sensitive to tetrodotoxin? Tetrodotoxin blocked a graded transient component of this visual response (i) when the eye was in a light-adapted or dark-adapted state, and (ii) when transient responses were of small amplitude or as large as 35 mv. The action of the drug on the membrane sites could not be reversed competitively by photoproducts at quantum flux densities sufficient to saturate the response mechanisms in the absence of the drug. The answer to our limited experimental question seemed uncomplicated: Yes, the graded transient component of this visual response is blocked by tetrodotoxin.

As indicated by Grundfest's quote, we pointed out that this graded transient response appears to exhibit somewhat unusual properties, and we also included a reference to a discussion of "electrically inexcitable and electrically excitable electrogenesis" (*2*). We assumed that the reader might, or might not, wish to extend the interpretation of our data to more general problems. Apparently at least one reader chose to consider the data in a more general context, and we agree that our data do not seem to argue against his generalizations.

We should like to comment on one remark by Grundfest. He refers to the transient component of the response as a "pulsatile depolarization." This usage of "pulsatile" may be a source of confusion. There is one component of the graded response in the *Limulus* eye which includes a brief "initial pulse" about 10 msec in duration. The transient component, on the other hand, may persist for as long as a second in a dark-adapted eye. While the transient component is sensitive to tetrodotoxin, the drug does not affect the earlier "initial pulse."

R. M. BENOLKEN

Zoology Department, University of Minnesota, Minneapolis 55455

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15 May 1967