ered as an explanation of the geochemical anomalies described at the K/T boundary. I wish to point out that their choice of analytical methods precludes the attainment of their stated objectives and that their data do not support the discarding of the asteroid-impact hypothesis.

First, their study encompassed only the < 2-μm fraction of the boundary clays. With the elimination of all components larger than 2 μm, surely most of the mineralogically exotic materials expected from an asteroid impact will have been missed. If one wishes to distinguish this material from ordinary volcanic ejecta or land-derived detrital components, then one must look at the size fraction in which they would most probably occur (> 2 μm). Studies of altered volcanic ashes (tonsteins) in coal beds have shown that the nonclay mineral components that characterize these rocks as volcanic in origin are much larger than 2 μm (*2*). To ignore this larger-sized component almost eliminates any possibility for determining whether the samples are volcanic or not.

Can the clay fraction < 2 μm be useful at all in determinations of origin? By these investigators' own admission (*1*), the glassy phase of fine ejecta from an asteroid impact might be altered to a clay mineral such as smectite, which might be difficult to distinguish from the volcanogenic smectite present in the marine boundary sections. Glasses of similar compositions, regardless of origin, would be expected to alter to similar clay minerals on the ocean floor. Clay minerals in the limestone and marl beds enclosing the boundary clays also would be expected to be derived mostly from ubiquitous volcanic glass settling from the water column along with the calcareous component. The Late Cretaceous, after all, was a time of intense volcanism, as pointed out by Rampino and Reynolds (*1*). Thus, would one expect to find large differences in clay mineralogy between the boundary clays and the surrounding rocks?

Second, the method of sedimenting the clay fraction (< 2 μm) onto glass slides for x-ray diffraction analysis was a poor choice for this study. Gibbs (*3*) and many other workers since have shown that sedimentation onto glass slides allows size fractionation to occur, masking coarser components with finer-sized clay minerals. Thus, diffraction from the finest clay-sized material of the < 2-μm size fraction will be preferentially enhanced on the x-ray pattern. If any exotic material from the impact event were present in the < 2-μm fraction, the likelihood of its being revealed on the x-ray diffraction pattern with this type of mount is remote.

In summary, because of the choice of analytical methods, the conclusions drawn from this study are based on incomplete data and do not represent a clear assessment of the available mineralogical information from these samples. We still do not know whether these marine K/T boundary clays represent detrital, volcanic, or extraterrestrial events. Consequently, the asteroid-impact hypothesis remains alive and well and living in Berkeley.

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28 February 1983; accpted 8 July 1983

Bohor seems to have missed the point of our investigation. We did not undertake this study to prove or disprove a volcanic origin for the clay layer but to perform what seemed to be a clear-cut test of one of the predictions of the asteroid-impact model, namely, that the fine-fraction mineralogy of the layer should give some indication of an exotic origin.

We concentrated on the < 2-μm fraction specifically because this is the material with significant stratospheric residence times that would be widely dispersed to form the dust cloud of the impact model (*1*). We avoided the > 2-μm fraction precisely because it could (and in fact does) contain local contaminants (*2*). Investigators who have examined the fraction of the boundary layers coarser than 1 μm report no common carrier phase for the supposedly extraterrestrial elements (*3*). Our main findings were that the boundary layers were different mineralogically at each locality studied and that the clay layers were similar to clays stratigraphically above and below them, in contrast to the predictions of an impact origin (*4*).

The glass slide method does indeed enhance the diffraction contribution from the finest grain sizes and diminishes the intensities of diffraction from the coarser material. However, it is much too strong to say that this method makes detection of the coarser material in the < 2-μm fraction remote. In the usual case, intensities may be reduced by 20 to 30 percent of the amount present for minerals concentrated near the bottom of the slide. We claim approximately a 5 percent detection limit; the differences between 5 and 6 or 7 percent are insignificant.

We agree with Bohor that it is difficult to differentiate between smectite produced by volcanic glass and smectite formed from glassy impact debris. Our position here was based largely on philosophical grounds. In the context of Ockham's razor, a line of reasoning seems unnecessarily contrived if it requires that one of the altered glassy horizons in Upper Cretaceous rocks has an origin that is qualitatively different from the many that are clearly of volcanic derivation.

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27 October 1983

Receptor Binding Studies

In their recent discussions of receptor binding and Scatchard plots, neither Klotz (*1*) nor Munson and Rodbard (*2*) addressed problems in the estimation of free ligand concentrations. In general, the tissue concentrations of cellular receptors are very low and their binding activities are unstable. Consequently, receptor interactions with hormones and other effector molecules have been studied almost exclusively with rapid, nonequilibrium methods that separate and quantify only receptor-bound radioligands. Although the free ligand concentrations that existed at equilibrium prior to the separation step are required for

Science

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Science **223** (4632), 191.
DOI: 10.1126/science.6318319

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.