

Barry Watts

Alan Beverchen

Dear Alan,

I really liked the current draft of "Chance and Complexity in the Real World: Clausewitz on the Nonlinear Nature of War." The title is something of a mouthful, but the piece is quite good and I am cheered that *International Security* is going to publish it.

The only substantive comment I will offer at this late stage is that I personally would not hesitate to say outright that we can—and should—have no qualms about reconstructing Clausewitz's notion of general friction in light of subsequent knowledge about war. You chose to lean more heavily on exegesis of the text of *On War*, and it may well be that this was the wiser choice in the present environment. But armed with what I have learned about friction from being able to dig very deeply into the recent Gulf war, I find myself increasingly less willing to be cautious.

Regarding the letter to *Air Power Journal* that I sent you, the editor down there has informed me that he isn't willing to publish any of it. In his view it is not only too long, but far beyond the intellectual reach of his readership. He offered some soothing words about how he wished that his readers knew enough about science to be able to comprehend what I covered, but then had to say that, sadly, since they do not, he couldn't print anything serious about scientific methodology. I pointed out that the Temple piece he had published had, at best, done much to contribute to precisely the sort of ignorance he was lamenting. Squirming ensued, but that was about all. I find myself, frustratingly, more and more forced to concede that Brodie had a point when he kept insisting that military officers tended to be thick as stumps and unable to think their way out of a paper bag. Sigh.

All of which hardly solves your problem with footnote 56 and the editors at *International Security*. Here are some additional suggestions. In the text itself on page 24, I would recommend adding the word 'most' to the sentence to which footnote 56 is appended so that it reads: "A second form of chance described by Poincaré is deeply embedded in *On War*, even though it has not been apparent to **most** commentators." As for the footnote itself, you might try the following if you want to get published references:

56. An exception is Barry Watts. See Barry D. Watts, *The Foundations of U.S. Air Doctrine: The Problem of Friction in War* (Maxwell Air Force Base, AL: Air University Press, 1984), pp. 48, 53-54 & 119-121; James G. Roach & Barry D. Watts, "Choosing Analytic Measures," *The Journal of Strategic Studies*, June 1991, Vol. 14, No. 2, pp. 191-94; and Watts, "Rethinking War and Defense Analysis," unpublished manuscript. See also Bassford, *Clausewitz in English*, Chapter 1.

The 1984 book doesn't explicitly mention nonlinearity. Instead I appealed to entropy, undecidability, and information theory as scientific concepts that might help us get a better grip on war and friction. However, the book does conclude with a clear statement that friction dominates war because such things as unpredictable interactions with the enemy are endemic to combat processes in much the same sense that Poincaré's

second form of chance is built into physical systems. There is also a clear suggestion that it is the "cumulative or collective" aspect of friction—each slight error or unexpected turn of events building up on earlier ones—that is the crux of the problem, and this idea does look awfully close to sensitive dependence on initial conditions. In particular, the discussion of Tom Fabyanic's notion of collective risk on page 54 ends with the observation that "this ubiquitous, cumulative aspect of actual combat operations" is what I take to be "the core meaning of Clausewitz's contention that *Friktion* constitutes the very atmosphere of war."

The *Journal of Strategic Studies* article, which *International Security* turned down by the way, is explicit in saying that the nonlinear nature of combat processes means that quantitative, analytic measures of the kind associated with the linear, deterministic view of science pushed by Laplace will never suffice (e.g., "Other measures and other forms of analysis are required to supplement the Procrustean bed of linear science into which we have been futilely trying to force the study of war..."). So between these two published references you should certainly be able to justify the first sentence in Footnote 56 (i.e., that Watts is an exception). And if the editors at *International Security* cannot stand any reference to an unpublished manuscript, then don't worry about it. The suggested revision of Footnote 56, even without the "Rethinking War and Defense Analysis" reference, looks to me like it should more than suffice. (As a matter of fact, I was somewhat surprised myself, in going back and looking at the cited pages from the 1984 book at how evident the notion of sensitive dependence on initial conditions seems to be. At that stage I hadn't dug into nonlinear dynamics, so I didn't have exactly the right words and concepts. But I don't think I'm stretching things to perceive myself to have been clearly groping in that direction. After all, Clausewitz was in the same position, and we both agree that he, too, was groping in this same direction based on his recurring and adamant refusal to give up his strong emphasis real war in favor of the soothing simplifications war on paper.)

I look forward to seeing you while you're in DC. Meanwhile Cohen's Gulf War Air Power Survey continues to ruin my life. But I hope to get out from under the mountain by the end of September.