

Discrete Thoughts

Essays on Mathematics, Science, and Philosophy

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Chap. 2 KAC *Mathematics: Tensions*

12-3 CORRUPTED ATTITUDE the late G. H. Hardy[...] took pride in the fact that nothing he had ever done could be conceivably applied to anything outside pure mathematics. [...] I find this attitude just as conducive to fostering professionalism as that of an incurably pragmatic “applied” mathematician who takes pride in not needing the “fancy abstraction” of his “pure” confrères. *There is only one source of corruption in mathematics, and that is the motivation by anything except curiosity and desire for understanding and harmony.*

15 A BAD INCENTIVE FOR “NEW MATH” A set of axioms [for Euclidean geometry] so complete as to make even the computer happy was not proposed until 1895 (by David Hilbert) in a feat of deep and subtle thought which has had a profound influence on the subsequent development of mathematics. But this surely is not a sufficient reason for feeding it to the young.

15 TEACHING NOT ALL THE TRUTH my Cornell colleague, the late W. A. Hurwitz, used to say that in teaching on an elementary level one must tell the truth, nothing but the truth, but not the *whole* truth

16 DEATH BY AXIOMS *Complete axiomatization*, someone has rightly said, *is an obituary of an idea*, and Hilbert’s great feat was, in a way only a magnificent necrology of geometry.

16 DON’T CREATE MISTAKES “*Never teach how not to commit errors which are not likely to be committed*” is another sadly forgotten principle of sound pedagogy.

Chap. 3 SCHWARTZ *The Pernicious Influence of Mathematics on Science*

19 SUMMARY TOOLS FOR IDEAL SCIENCE (GONSETH ☺) It is a continual result of the fact that science tries to deal with reality that even the most precise sciences normally work with more or less ill-understood approximations toward which the scientist must maintain an appropriate skepticism.

21 PRECISE VS STABLE ARGUMENT The physicist rightly dreads precise argument, since an argument which is only convincing if precise loses all its force if the assumptions upon which it is based are slightly changed, while an argument which is convincing though imprecise may well be stable under small perturbation of its underlying axioms.

Chap. 4 KAC *Statistics*

27 IT IS DIFFICULT TO PREDICT, ESPECIALLY THE FUTURE it is not the problem [= research activity], or the name attached to it that is pertinent. *What matters is the special combination of the men, the problem, the environment* – in fact, exactly those things which no one can possibly predict.

34-5 VAGUE QUESTIONS there is nothing wrong with vague questions; it is the combination of vague questions and vague answers that is bad. Many imprecisely stated questions have a tremendous amount of good science in them.