The Codependent Arising of Math and Mathematicians (and Where Do We Go From Here?)

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Selected Bibliography

I. Problem Solving

F. Dyson, *Birds and Frogs*, Notices Amer. Math. Soc. **56** (2009), no. 2, 212–223.

Freeman Dyson explains that "mathematics is rich and beautiful because birds give it broad visions and frogs give it intricate details... The world of mathematics is both broad and deep, and we need birds and frogs working together to explore it." He gives historical examples of both birds and frogs.

A. Jaffe and F. Quinn, *"Theoretical Mathematics": Toward a cultural synthesis of mathematics and theoretical physics*, Bull. Amer. Math. Soc. vol. **29**, no.1, July 1993, p. 1-13.

Jaffe and Quinn propose changing the publishing conventions to allow for more speculative and conjectural mathematics to be presented and debated.

M. Atiyah et al., *Responses to "Theoretical Mathematics": Toward a cultural synthesis of mathematics and theoretical physics*, Bull. Amer. Math. Soc. vol. **30**, no.2, April 1994, p. 178-207.

A collection of interesting responses to the article by Jaffe and Quinn, from a collection of well-known mathematicians.

W. P. Thurston, *On proof and progress in mathematics*, Bull. Amer. Math. Soc. vol. **30** no. 2, April 1994, p. 161-177.

William Thurston, a brilliant mathematician, gives a particularly thoughtful response to Jaffe and Quinn's article. He discusses the different modes of communication in math, the incredible variety of ways of understanding math, the nature of math and proof, and the motivations of mathematicians.

II. Proofs and Obscurity

L. A. White, *The locus of mathematical reality: an anthropological footnote.* In "18 Unconventional Essays on the Nature of Mathematics." ed. Reuben Hersh. Springer, 2006.

Leslie White, an anthropologist, confidently explains that mathematics is an element of human culture, and therefore objective yet culturally contingent.

R. Hersh, *What is Mathematics, Really?*, Oxford Univ. Press, 1999. 368 pgs.

Reuben Hersh, the figurehead of the humanistic mathematics movement, outlines his philosophy.

R. Nunez and G. Lakoff, *Where Mathematics Comes From*, Basic Books, 2001. 512 pgs.

These cognitive scientist begin a study of the cognitive science of mathematics, applying findings in that science to explain how our brains process and do mathematics.

W. Byers, *How Mathematicians Think*, Princeton Univ. Press, 2010. 424 pgs.

William Byers, a mathematician and Zen Buddhist, shows the role that ambiguity, paradox, and contradiction play in how we do mathematics. He proposes recentering mathematics on the ideas, and perhaps even injecting more subjectivity into mathematics.

III. Math as Art

T. Tymoczko, *Value judgements in mathematics: Can we treat mathematics as an art?*, in "Essays in Humanistic Mathematics", ed. Alvin M. White, MAA Notes #32, 1993.

Tymoczko makes the case that the development of mathematics continually requires value judgements, and proposes that aesthetic criticism can provide these judgements. He makes the case for treating mathematics more like an art, and even analyzes the proof of the Fundamental Theorem of Algebra as an art critic would.

IV. Diversity and Math Literacy

H. M. Enzensberger, *Drawbridge Up: Mathematics - A Cultural Anathema*, A. K. Peters, 2001. 48 pgs.

This excellent essay by the poet and essayist Hans Enzensberger asks why it is that mathematicians are isolated and the public is mathematically illiterate. He offers several possible causes and remedies.

P.J. Davis and R. Hersh, *The Ideal Mathematician*, from "The Mathematical Experience", Mariner Books, 1999.

A funny six-page caricature of the "ideal mathematician", presenting many of the cultural quirks and philosophical contradictions most of us carry.

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