

TOO FEW "BIRDS"— RESPONSE TO DYSON'S "BIRDS AND FROGS"

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Introduce you a great article for all Mathematician and Computer Theoretists.

“Some mathematicians are birds, others are frogs. Birds fly high in the air and survey broad vistas of mathematics out to the far horizon. They delight in concepts that unify our thinking and bring together diverse problems from different parts of the landscape. Frogs live in the mud below and see only the flowers that grow nearby. They delight in the details of particular objects, and they solve problems one at a time.”

I first came across Freeman Dyson’s popular science writings in 1980s. One day, as I was reading the Chinese translation of “Unfashionable pursuits” by Dyson, I was totally trapped in the story of Kent Gödel and Dyson’s beautiful writing (as well as the translations).

This was the second piece I read from Dyson’s general writing: I found it very insightful and direct. In “Birds and Frogs,” Dyson wrote:

"Until you can prove rigorous theorems, you do not fully understand the meaning of your concepts." What a great suggestion he gave to all young scientists in research! After I read this article, I immediately sent an email to this world famous scientist.

Dear Professor Dyson,

I would like to fly as a bird after I read your marvelous article "Birds and Frogs" Notices of AMS, Feb 2009. I cannot be a frog because I do not have great math skills. I do not think I can be a bird either. However, I would like to be and to see the future of Math.

This is not my first time reading your articles. That was many (20-30) years ago, I read an article you wrote about Godel. Do not remember the English title, someone translated to Chinese. The article is about Godel's research that was not fashionable. But he still insisted and later on it become huge industry (computer). You mentioned how difficult Godel become a professor at IAS. I mentioned this article to a colleague in China who was a physicist. He said, "Dyson, he is a great Genius in Physics."

I am so happy to read your article again. You still write for mathematicians.

One thing I had a little disagreement with you is about Von Neumann. He was not only a frog, but also at least a bird in Computer Science. His idea of putting the instructions of solving procedure into memory is a "bird's thing."

Please write more for us!!!

Dyson also mentioned his friend Yuri Manin in the article. Mannin said: today math has gone in the wrong direction in that most people use old technology to solve long-lasting problems. Dyson concluded that because it is easy to get recognized and to receive big awards. Too few people are worried about the direction of math. Manin accused Hilbert's 23 problems of being such an example. However, in Hilbert's time, people often use the problem to motivate the invention of new methodology. But since technology and communication is so efficient and effective, today. Old technology can still solve long-lasting problems with the help of fast computers. People forgot the purpose of math is not only for old problem solving.

People do not care about the motivation behind Hilbert's problems but about the problem itself. People want to obtain fame rather than expand science, which is why so few new theories in math were discovered and so few techniques were created recently. Another factor should not be ignored since surviving for mathematicians has become a critical issue today. Solving a famous problem would allow them to obtain a tenured position, which is much easier than inventing a new theory that requires five, ten, or even twenty years to be recognized.

In the last 25 years, people created most of the awards for mathematicians for more enjoyment of our academic life. It is sort of like Wall Street giving bonuses to their high level managers. It shall be worried that in later years, the new generation might laugh at us due to the "tine bit" of the new mathematics and the plethora of awards.

Fortunately, not every one enjoys today's awards; Grigori Perelman rejected the most prestigious award in mathematics. He just wanted people know he has three posts on arxiv.com that solved the Poincare Conjecture.

Modern technology did provide a great asset to the modern mathematical society. We have created the www.arxiv.com to recode mathematicians' work. When more people understand what we really need in mathematics, the only thing a good mathematician should do may be to post papers in www.arxiv.com!

Perelman represents a right way of doing for true mathematicians. He has a pride heart and rich mind. I would like to say that it is a positive light for modern science research.

[1] Freeman Dyson - *Birds and Frogs*, Notices of the AMS, Vol 56, No 2, 2009, pp 212-223.