MATHEMATICAL ARTICLES AND BOTTLED WATER

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The system for publishing mathematical articles should be reformed and the new system should resemble, on the economic side, the bottled water industry. My main theses are: (i) the results of the mathematical research should be available to the public just like tap water, (ii) the role of the commercial (and non-commercial) publishers should be to sell an upgraded version of the product ("bottled water"), and (iii) only a coordinated action of big and powerful institutions (i.e., universities and the government) can bring about the change to the system.

The advent of electronic databases and the Internet changed the economics of mathematics publishing. In the past, a mathematical paper used to be sold only once, on paper. Recently commercial (and not only commercial) journal publishers started collecting journal articles in their private databases. Then they started selling access to their databases—an article can now be sold an unlimited number of times over an indefinite period. Electronic databases have a huge technical advantage over paper versions of journals—they offer search facilities unparalleled by anything one can possibly do with paper copies.

Distinct mathematical results do not compete with each other the way various models of automobiles do—a mathematician must have access to all known results in the field to be efficient and competitive. Hence, universities cannot choose between various publishers—they have to subscribe to all major journals and databases. This gives the publisher of a journal the monopoly power, even if the company owns only a small proportion of the scientific literature in the field. As a result, some journal prices are outrageous. The emergence of commercial electronic databases only aggravated the situation.

Mathematical articles should be made available to the public in the same way the water is. Public money is used to provide safe and cheap drinking water to most people. Companies selling bottled water exploit the fact that many people are willing to pay a premium price for bottled water for various reasons—taste, portability, etc. People have a choice—to drink tap water, provided free or almost free at many locations, or pay an extra fee for extra value.

The public and private universities, and the government should create databases for mathematical papers in their least refined form. The Mathematics ArXiv is an example of such a database. The articles deposited there are not refereed. They are available in several electronic formats but the typesetting is only as good as the author chooses it to be. This is equivalent to tap water. The universities and the government should make it mandatory for mathematicians supported in any way by salaries or grants to deposit their articles in one of such databases.

Journal publishers should be in business of selling "bottled water," i.e., the enhanced version of research articles. The enhancements would include elegant typesetting and linking to other articles, for example. If the new system is implemented, one might expect that the journal prices would go down. The price of bottled water cannot be too high, as long as everyone has access to tap water.

The new proposed system would work only if the universities had a choice to opt out and cancel subscriptions to commercial publisher databases. But this will be a realistic possibility only when the free, university and government supported databases of articles in their raw form are complete. One cannot expect that voluntary submissions of some articles by some researchers would make a difference. An appeal to the universities to create free databases and an appeal to the mathematicians to deposit their manuscripts in them will have little effect even if a small but non-negligible proportion of researchers ignore it. The universities and the government agencies such as the National Science Foundation have a legitimate claim to ownership of the mathematical results as they are the organizations who pay for the research. They should make it mandatory for the mathematicians to submit their preprints to free public databases in the final (revised) form before transmitting them to the publishers for typesetting.

My proposal is far from a new camouflaged form of taxation in which the government takes away from mathematicians the fruits of their labor. It is much closer to the government imposed and enforced traffic laws—even extreme libertarians might approve traffic lights. I believe that all mathematicians would be happy to distribute their theorems for free to all other mathematicians and to the general public. Many mathematicians send their recent results to their colleagues as paper preprints or electronic files, post their articles on their personal Web pages or deposit them in public archives. The current system is chaotic with the result that for most articles, the access is free only to a limited number of people and only for a limited amount of time. Only a government action could introduce the order in the system and assure the permanent free access to all of mathematical

literature for everyone.

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