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## Will Xerox Kill Gutenberg?

*Dead: one small commercial service that made life easier for lazy students.* In this news report there is nothing that obviously should worry scientists and scholars; yet trouble can first appear as "a cloud no bigger than a man's hand."

For 40 years a student-founded business near the Berkeley campus of the University of California supplied "Fybate Lecture Notes" to students who were unwilling or unable to take adequate notes. Graduate students earned money working for Fybate. Many professors cooperated by correcting the final draft. The enterprise filled a need, it gave employment, and it satisfied the customers. Why did the system collapse?

Xerography was the culprit. Fybate Notes were copyrighted, but students copied them and thus evaded paying their share of production costs and profits. The word "profits" has a bad press in our day; many students find virtue in preventing them. So the goose has been killed: there will be no more Fybate originals to copy. One can argue that the change is educationally for the better; but will the fate of Fybate next overtake books and journals?

When modern copiers were new, copies cost 10 cents or more per sheet, and few scientific books cost more than 3 cents per page. It was then silly to copy a book still in print. Now the economics are reversed. The cost of the 43 "Books Received" listed in *Science* for 28 October 1977 averages out at 7.1 cents per page. The most expensive item, *Transient Waves in Visco-Elastic Media*, costs 17.6 cents per page. Copying costs only 3 cents a sheet, and sometimes two book pages can fit on a single sheet, halving the cost. A really expensive book may be copyable for one-tenth its purchase price.

Unauthorized copying of copyrighted material is theft, but who among us can claim more than Hamlet, who said, "I am myself indifferent honest"? The higher book prices go, the less we hesitate to infringe copyrights. We face a textbook example of the destructive force of positive feedback. Original publication, with its expensive editorial and typographic costs, is markedly subject to economies of scale. In contrast, the cost of xerographing individual copies is nearly constant. Every increase in the economic advantage of xerography encourages more copying and less buying of books; this increases the price of future books published, encouraging more copying, which raises the price further. Are you willing to pay 17.6 cents per page for a book? How about 50 cents? Or a dollar? Publishers are caught in a vicious spiral.

Those who understand the danger best—authors and publishers—may hesitate to speak, knowing their arguments will be labeled "self-serving"—as indeed they are. But if the author were to give up his royalty the price per page would drop only to about 6.4 cents; and if the publisher followed suit, the price might fall as low as 5.7 cents. This would still be almost twice the price of xerography. The dynamics of the positive feedback system would be unaltered. How much longer can scholarly books and journals be published?

Must the gift of the Gutenberg be nullified by the new technology? Or can we devise an institutional defense against the imminent bibliocide? The floor is open to suggestions.—GARRETT HARDIN, *Department of Biological Sciences, University of California, Santa Barbara 93106*