Comment on “How Science Survived: Medieval Manuscripts’ ‘Demography’ and Classic Texts’ Extinction”

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Exciting though it may seem, the mathematical model developed by Cisne (Reports, 25 February 2005, p. 1305) to analyze the transmission of texts and manuscripts from Antiquity and the Middle Ages does not hold up to scrutiny. It seriously underestimates the losses, thus leading to conclusions that are unwarranted.

Cisne (1) introduced a mathematical model from population biology—the Verhulst equation of logistic growth—as a way of studying the transmission of ancient texts and medieval manuscripts. After testing this model on the works of the Venerable Bede (735 A.D.), he claimed that more texts and manuscripts survived than was previously thought.

Cisne’s figures suggest a two in seven survival rate for Carolingian manuscripts of Bede’s most popular textbook, De Temporum Ratione (DTR), which would imply a total population of just under 300 copies in the ninth century. This appears to be a serious underestimate for a book of this vintage. DTR was a cornerstone of Carolingian education. Ever since Charlemagne placed the study of calendars on the curriculum in 789 A.D., the work has been heavily copied, frequently excerpted, and often rearranged in anthologies (2–4). The limiting size was therefore well above 300. The Carolingian empire alone included 180 cathedrals and 700 monasteries (and hence 880 libraries) (5). Including England and Ireland, the saturation level rises at least to 1000. Moreover, the surviving evidence shows that many libraries had multiple copies of this standard textbook (4). The losses must consequently be far greater than the model indicates, the more so as textbooks were subject to hard wear and misuse by students (3).

In the absence of quantitatively based figures, Cisne used three instances of cohort survivorship to crosscheck his estimates. All three suggest figures similar to those obtained by the model. However, the first example (Tours) is not valid because it is based not on real figures but on a guess by a paleographer. The other two (Bobbio and Exeter) are anecdotal and not representative, for there are other cases that contradict his figures (6, 7). Moreover, both instances concern the survival rate of manuscripts from particular libraries, whereas the model purports to address the survival of manuscripts of individual texts. Nevertheless, library figures can be interesting. In Great Britain, more than 6000 medieval books from some 500 libraries are still identifiable today, but they are unevenly distributed: Nearly half of these books come from only 14 libraries, whereas there are more than 400 libraries from which we have only between 1 and 10 books (8). These figures show that, contrary to Cisne’s assertion, the losses must be tremendous and practically immeasurable.

The assumptions on which the model is based are equally problematic. A constant environment, “death rate,” and limiting size make no sense in the case of manuscripts (9). According to Cisne, these assumptions nonetheless apply to what he calls “ideologically neutral” texts such as Bede’s technical works, which seem to fit the model, in contrast to a religious work by the same author, which does not. To explain this contrast, there is no need to invoke a vague concept, which certainly does not apply to manuscripts that were once in existence.

Given the uncertainties, though, it is virtually impossible to estimate even roughly what proportion of manuscripts has survived, let alone to determine exactly the fraction of manuscripts surviving from any time in the past; Cisne’s supporting material contains an equation that assumes just that. The far-reaching conclusions he draws from his model, not only regarding the survival of manuscripts but also concerning that of the texts themselves and even of science in general, are therefore not warranted.

References and Notes
15 July 2005; accepted 19 October 2005
10.1126/science.1117462

550 May 2005; accepted 19 October 2005
10.1126/science.1117462

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Science 310 (5754), 1618.
DOI: 10.1126/science.1117462