

**Zuckerman H & Merton RK, Patterns of evaluation in science: institutionalization, Structure and Functions of the referee system. *Minerva* 9:66-100, 1971**

This paper traces the beginnings of the referee system in seventeenth-century scientific journals and examines its operation in contemporary journals, first by comparing rates of rejection of manuscripts in 15 fields of science and learning, and then, by detailed analysis of authorship and refereeing in *Physical Review*, the world's leading journal of physics. [The *Social Sciences Citation Index (SSCI)* and the *Science Citation Index (SCI)* indicate that this paper has been cited in over 165 publications.]

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This inquiry began with two unrelated events: publication of the voluminous *Correspondence of Henry Oldenburg*<sup>1</sup> and the decision by editors of *Physical Review* to find a home for its outdated files. The first renewed our interest in the origins of the scientific journal and the slow emergence of procedures for evaluating scientific papers. Charged in 1665 with overseeing the Royal Society's new periodical, the *Philosophical Transactions*, Oldenburg wrote of grappling with the vexing problems of ensuring authors' intellectual property and vetting their contributed papers.

The editors of the *Physical Review*, for their part, had turned to the American Institute of Physics for advice. Historians there, in turn, inquired about our interest in the journal's files, which included such documents as submitted papers and referee reports. For sociologists concerned with the evaluation system in science, these archives were a gold mine. They allowed us to study the actual application of universalistic and particularistic criteria in editorial decisions rather than adopt the usual but unsound practice of inferring these solely from published papers. Then, as now, we focused

on behavioral indicators of conforming to and departures from the social norms of science that call for research to be judged in terms of its assessed contribution to certified knowledge.

This paper has three distinct parts: it treats the emergence and institutionalization of the referee system in seventeenth-century journals, compares acceptance rates for 83 contemporary journals in 15 fields of science and learning, and analyzes authors', referees' and editors' practices.

Why has the paper been frequently cited? Without a detailed quantitative analysis of the citation data, we can only hazard guesses based on later developments in social studies of science. Behavioral and structural research on the scientific ethos and social stratification in science continues apace and, in some measure, has drawn on our work. More specifically, our analysis was a forerunner of later inquiries into peer review in journals<sup>4</sup> and in the allocation of research funds.<sup>5,6</sup> While much research interest in peer review continues,<sup>7</sup> editorial and referee behavior are less well studied, a curious situation given the centrality of publication in the scientific enterprise.

Several findings in particular have elicited interest: first, rates of acceptance of papers in the physical and life sciences are far higher than those in humanities and social sciences; second, referee agreement is high in this prime journal of physics, greatly exceeding chance;<sup>8</sup> third, an often-assumed model of status solidarity in which referees are most apt to accept the papers by their status peers does not hold; and fourth, performance-based authority of authors does count in assessing their submitted papers. The study gives no comfort to those who believe that universalism or particularism exclusively determines publication decisions.

Had we the chance now, we would write three papers, not one. This one is too rich a brew. Papers, Henry Small finds, are "concept symbols"<sup>9</sup> They come to be known for one idea or finding; other messages they contain are obliterated. Just so. The section on the historical sociology of refereeing in our paper seems to have been lost. A pit that Small's work came after, not before our own; we would have learned from it

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1. Hall AR & Hall MB, eds. *The correspondence of Henry Oldenburg*. Madison, WI: University of Wisconsin Press, 1965-1973, Vols.1-9.
  2. Ibid. London: Mansell, 1975-1977. Vols.10-11.
  3. Ibid. London: Taylor & Francis, 1984, Vols. 12-13.
  4. Stossal TP. Reviewer status and review quality: experience of the Journal of Clinical Investigation. *N. Engl. J. Med.* 312:658-9, 1985.
  5. Cole S, Rubin L & Cole JR. Peer review in the National Science Foundation: phase one of a study. Washington, DC: National Academy of Sciences, 1978. 193.p.
  6. Cole JR & Cole S. Peer review in the National Science Foundation: phase two of a study. Washington, DC: National Academy Press, 1981. 106 p.
  7. (Whole issue) *Sci. Technol. Hum. Val.* 10(1), 1985. 87 p.
  8. Hargens L. Unpublished manuscript, 1986.
  9. Small HG. Cited documents as concept symbols. *Soc. Stud. Sci* 8:327-40, 1978.