



## EDITORIAL

### *The Origin of Scientific Journals*

In the Renaissance, during the 15th and 16th centuries, a “scientific revolution” took place in Europe that laid the foundations of modern science. In this period, people interested in scientific knowledge the “natural philosophers” — began to advocate using the scientific method of investigation and the direct observation of nature as a source of knowledge. In the words of Francis Bacon (1620), “for we are not to imagine or suppose but to discover, what nature does or may be made to do” [1].

The important cultural, political, social, and scientific changes that Europe experienced were linked to technical developments and innovations. Advances in astronomy were due to the need to improve navigational instruments to determine the position of ships making ocean voyages; the development of botany, hydrography, or mechanics facilitated agricultural exploitation; mathematics made it possible to respond to technical and administrative demands such as the provision of water in cities, the creation of cadastres, and the construction of road networks [1].

Before the middle of the 17th century, the main means of communication of scientific discoveries was private correspondence [2]. It was a very slow and limited means of personal communication, since it reached a small circle of correspondents. The authors of the discoveries sent their letters to those colleagues with whom they had a close relationship, but not to those who would try to question their contributions. On the other hand, as a consequence of the difficulties in proving the priority of observations, it soon became common practice to encrypt these letters in order to preserve the secrecy of the discoveries, which further hindered the advancement of knowledge. The book was not a suitable means of dissemination because of the costs and fragmented results in exact and natural sciences that were not sufficient to gather the contents of a book [3]. At the same time, a sharp process of competition began for the originality of discoveries based on experimentation, which needed to be validated by consensual forms of the nascent scientific communities. This competition generated systems of encryption and even shorthand designed to prevent the appropriation of such discoveries. At the same time, the accelerated expansion of activities in different European countries required a process of communication, cataloguing, and mass dissemination that had no precedent in existing organizational forms.

All these processes were resolved in concrete terms with the development of publications associated with the

academies, particularly in England, France and Germany, coinciding with the expansion of science in those countries. One of the first initiatives was carried out by the historian of the French royal house Francois Mézeray, who obtained a privilege to edit a literary-scientific journal to publish current news in the fields of archeology, literature, science, arts and crafts. This proposal did not materialize, but left the initiative latent. France and England would later approach this initiative in different ways. Parallel to the progress of the various disciplines, new ways of organizing scientific activity arose, which crystallized in the creation of academies and societies that brought together intellectuals interested in science: the Accademia del Cimento in Florence (founded in 1657), the Royal Society in London (1660), or the Académie Royal des Sciences in Paris (1666). These scientific societies represented the formalization of the invisible colleges, informal networks of scientists created through personal contact and private correspondence, and are a key factor in the development of the scientific journal [3].

One of the functions of the Royal Society since its creation in 1660 was to put an end to the frequent disputes between authors about the priority of discoveries. Accusations of plagiarism were common and affected, for example, William Harvey, Isaac Newton, Robert Boyle or Edmond Halley. The solution proposed was to create a record book in which the descriptions of techniques, theories, observations, etc., made by members of the Society were recorded together with the name of the discoverer and the date, a practice that has survived to the present day in the form of publication of the date of receipt of manuscripts by the editorial boards of journals. The first two scientific journals to see the light of day were the French Journal des Sçavans and the British Philosophical Transactions of the Royal Society, both published for the first time in 1665. The first issue of the Journal des Sçavans appeared on January 5, 1665, with a weekly periodicity indicative of the speed and obsolescence of the discoveries. Founded by Denis de Sallo, the objectives of the journal were clear in its first issue: a) to catalog and review editorial novelties; b) to publish obituaries of prominent figures giving an account of their work; c) to report the results of experiments in physics, chemistry and anatomy, describe inventions and record meteorological data; d) to cite the main decisions of civil and religious courts; and e) to transmit to readers events worthy of curiosity [4].

The first scientific journal in English, Philosophical Transactions, —subtitled Giving some accompt of the present undertakings, studies, and labours of the ingenious in many considerable parts of the world—,

appeared two months later. Its first issue was published on March 6, 1665. Promoted by Henry Oldenburg, secretary of the Royal Society, the journal excluded legal and theological issues to focus on recording the observations and experiments carried out by the members of the group. The journal was published on a monthly basis and was to appear on the first Monday of each month. The Royal Society's decision to publish it, reflected in the minutes of a meeting held on March 1, 1664, already mentioned the need for articles to be submitted to a review process that set the precedent for the peer review that would be systematized in the mid-nineteenth century [5].

The members of the Royal Society had access to the first issues of the *Journal des Sçavans*. Oldenburg himself was invited to participate in the publication, which served as a model for the development of their own journal, so the importance of the *Journal* in the process of birth and consolidation of the scientific journal should not be underestimated. In 1682 an important scientific journal appeared in Germany: *Acta Eruditorum*, founded by the Leipzig professor Otto Mencke, which lasted more than a century. It was published in Latin and had the collaboration of prominent scientists. Other journals, on the other hand, followed the model of the *Journal des Sçavans*, which by dealing with a wide variety of subjects, in addition to experimental science (especially History, Theology, Law, and Philosophy), allowed the sale of material at levels that facilitated the maintenance of the publication.

Journals more focused on the description of original experiments appeared only between 1780 and 1790 in publications specialized in Physics, Chemistry, Biology, Agriculture, and Medicine. By 1830 there were about 300 journals of this type. A great expansion was that of specialized medical journals demanded not only by professionals in this discipline but also by the public interested in health issues [2].

The European scientific journals of the time still included contents and formats very different from those of today.

However, periodic publications devoted to medicine began to appear that were no longer the mouthpieces of academies, nor were they written by a single author and his or her associates; they were true organs of communication used by very broad groups of authors and readers of scientific and professional information. Some of them would reach our days, such as *The Lancet* (from 1823) in Great Britain, the *Archives Générales de Médecine* (from 1823) in France and several *Archiven* and *Zeitschriften* in the Germanic countries. In Spain only five journals were founded. Two of them in 1820: the *Periódico de la Sociedad Médico-Quirúrgica de Cádiz* and the *Décadas de Medicina y Cirugía*. The following year the *Periódico de la Sociedad de Salud Pública de Cataluña* appeared [2].

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