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Historical origins of the Geological Society's *Journal*

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Abstract: The Geological Society's *Transactions*, its earliest periodical (from 1811), published the full texts of a few selected papers, with fine illustrations, but generally long after they had been read at one of the meetings. Conversely, the *Proceedings* (from 1826) recorded all the papers soon after they had been delivered, but only in abstract and without illustrations. The launching of the *Quarterly Journal* (1845) was an attempt to combine the advantages and eliminate the disadvantages of the earlier periodicals. After a shaky start, it proved highly successful through the rest of the nineteenth century and much of the twentieth, and was the direct forerunner of today's *Journal*.

The Geological Society was a publishing body even before it was founded. That paradox is easily explained. One of the reasons for its foundation was the desire of a group of London 'men of science' (the later term 'scientist' would be anachronistic and highly misleading in this context) to give permanent form to meetings that had been concerned with the publication of a specific scientific work. Another reason was the frustration felt by others at the inability of the Royal Society to provide an adequate publication outlet for geological work, and particularly for work that was highly factual in character and localized in content.

Those two reasons for the foundation of the Society (there were others too) epitomize the two distinct kinds of publishing activities that have characterized learned societies ever since they proliferated in the eighteenth century. On the one hand there was, and still is, the need to publish the completed results of scientific research and thereby place them permanently on record. On the other hand there was, and still is, the need to inform those with particular interests about the current work of others with the same interests, whether the reasons for seeking such information are those of competition or collaboration or a mixture of the two.

Scientific societies have tried to meet both needs through their own publishing activities. By its very nature, the detailed results of scientific research generally appeal to only a relatively small and specialized public, and are therefore often unattractive to ordinary commercial publishers. One solution to this problem that was widely adopted before the twentieth century, and not only for scientific works, was to appeal for subscribers to a particular book *before* the printing process began; the subscribers' advance payments guaranteed the publisher against loss, and any further sales made after publication could go towards a profit. An alternative solution, however, was for all members of a scientific body, who by definition were a specialized public with common interests, to receive a continuing series of shorter publications in return for a continuing subscription. In effect, members with a great interest in one particular subset of papers received copies of those papers, which might not otherwise have been published at all, in return for subsidizing the papers that were of great interest to other members. This was, and of course remains, part of the rationale behind the publication of any specialized scientific periodical, and the Geological Society's *Journal* was and is no exception.

At the same time, however, the specialized common interests of the members of any scientific society provide the opportunity for the exchange of opinions and conclusions, and often of course for vehement controversy; indeed the desire for such exchanges has been one of the most common reasons for founding such societies. But unless all the members meet regularly face-to-face, and even more if they are spread widely and unable to meet in that way, they have often felt a need for some kind of newsletter to keep them informed of the current activities of others. Again, this was, and remains, part of the rationale behind the publications of scientific societies, and again the Geological Society was and is no exception.

Some of those who founded the Geological Society in 1807 were already subscribers to an important but costly publication. This was a three-volume monograph (1808) on the mineralogy and crystallography of calcium carbonate, by Jacques Louis, Count de Bournon, a French aristocrat who had fled to England from the Revolution in France. The work dated from before the profusion of crystal forms was explained satisfactorily in terms of a small number of types of symmetry and sets of crystal faces. In de Bournon's view, and that of his subscribers, his work required many expensive engraved plates, in order to reproduce a large number of detailed drawings of specific crystal specimens: in terms of illustration, crystallography was in the state in which palaeontology necessarily still remains. So the work was expensive, and could best be published by subscription. The subscribers were of course united by their common interest in research such as de Bournon's, and it was natural for them to regard themselves as a potential core for a permanent society to foster that kind of scientific work.

Most of them, however, were already Fellows of the long-established Royal Society, which had its own *Philosophical Transactions* for the publication of high-level scientific research (though not of book-length works such as de Bournon's). When, after the Geological Society was founded, its leaders began to talk about starting a periodical of its own, some of the members who were also FRSs were highly critical of that proposal; a few, including the Royal Society's autocratic president, Sir Joseph Banks, even resigned from the Geological Society and for a time put its future in jeopardy. In fact, however, the proposal had been for a periodical that would supplement, and not necessarily compete with, the *Philosophical Transactions*.

The concern of the leaders of the Geological Society was that the Royal would not, and perhaps could not be expected to, publish geological papers with highly detailed descriptions of mainly local interest. In other words they argued that there was a need for a more specialized periodical, to supplement the Royal Society's coverage of *all* the natural and mathematical sciences. But they also had in mind such Continental periodicals as the Parisian *Journal des Mines* (founded 1795), which published much practical material of interest to mining geologists as well as reports of more fundamental importance.

The conflict within the early Geological Society reflected in part a difference of opinion as to whether it should model itself on a learned society such as the Royal Society, or make itself useful in a more practical way to the owners and managers of Britain's mineral resources. In the event, the former opinion triumphed, and the Society was not, after its earliest years, notably congenial to those whose interests were mainly practical or commercial, still less to those (such as the mineral surveyor William Smith) who did not share the wealth and social status of the Society's leaders.

Even within the former model, however, there was in fact a clear precedent for the Geological Society's publication plans. This precedent, which had never aroused the hostility of Banks and the Royal Society, lay in the volumes of the Linnaean Society's *Transactions* (founded 1791), with their detailed and specialized papers on plant taxonomy. In any case, the Geological Society soon launched its own *Transactions*, modelled on those of both the Royal and the Linnaean. The quarto format was decidedly lavish, and clearly designed to match the gentlemanly tastes and pockets of the Society's members. The first volume (1811) was priced at £1 12s [£1.60], the second (1814) at £3; these were substantial sums. Added to the membership fee, which rapidly rose to £4 a year, an active gentlemanly interest in geology did not come cheaply. (As a rough-and-ready guide to real values, an inflation factor of at least 50, and perhaps even 100, should be applied to these prices to make them comparable to modern prices.)

Since the price of the *Transactions* was not included in the membership fee, only the more enthusiastic or more wealthy members bought the volumes, and the sales languished accordingly. As with de Bournon's book, a major expense was the illustrations. Engraving on copper was by far the best medium for the pictures, maps and other diagrams that geological papers required; but engraving was a highly skilled and time-consuming craft, and correspondingly expensive. Furthermore, many geological illustrations required, or at least were greatly enhanced by, the use of colour. This could only be provided by applying watercolour washes by hand to every copy; and although this work was generally done by poorly paid female labour, it added further costs to the final plates.

Still, the volumes were impressive, with handsome letterpress and fine illustrations. The *Transactions* helped to establish the scientific reputation of the Society, and of the self-consciously new science of geology, both in Britain and abroad. But the periodical remained a medium of record rather than one for reporting work in progress. The intervals between successive volumes narrowed to about two years, as the Society became more established and the quantity of completed research increased; but there was still generally a long delay between the reading of a paper and its eventual publication. This was ill-suited to a science that was burgeoning rapidly into a major area of research internationally. Members of the Society could and did often seek alternative outlets for more rapid publication; but monthlies such as the *Philosophical Magazine*, which at this period carried many geological papers, could not provide comparable illustrations, which were so important in geology.

After the first decade, the Society took over the management of the *Transactions* from the commercial publishers who had handled it initially. A 'Second Series' was launched in 1822 to give the work a new look and to boost its sales. At the same time the opportunity was taken to adopt the new and cheaper technique of lithography in place of copper engraving. The price of the volumes was roughly halved, and authors could now be offered more space for their illustrations; an added bonus was that for most geological subjects (except perhaps maps) the more subtle tones of lithography were positively an advantage.

Meanwhile, however, the Society had hardly taken any steps to improve the exchange of provisional ideas and ephemeral information, beyond the primary arena of its meeting room. An 'arena' is what its meetings had famously become: in contrast to the other learned societies in London, the Geological permitted discussion of the papers that had just been read. This was at first a cautious experiment, because there were those who feared it would lead to acrimonious argument; but it soon became an established and successful tradition of lively debate.

Almost from its foundation, however, the Society had appealed for the collaboration of those living outside London. Its founders recognized that a geographical spread of the membership was even more valuable for geology than for many other sciences, since widely scattered members could report on local areas that they knew thoroughly. Such informants were enticed with the offer of free 'honorary' membership. But these provincial members could not get a first-hand impression of the current state of geological opinions in the Society, unless they were able to attend its meetings in person, on trips to London that for many of them were expensive, uncomfortable and therefore infrequent.

The Society's very first publication, mooted almost immediately the Society was founded, and issued three years before the first volume of the *Transactions*, was in fact directed at these provincial members, and at those of the 'ordinary' or London members who found themselves travelling for any reason. The publication was a small booklet of 'Geological Inquiries' (1808), which listed the kinds of observations that could usefully be made, and the kinds of specimens collected, in more or less remote areas. It was probably inspired by, and partly based on, the famous 'Agenda' published in 1796 by the great Swiss naturalist Horace-Bénédict de Saussure. Like that model, it was based on the belief that far more empirical information needed to be collected in the field, before it would be appropriate or profitable to indulge in high-level theoretical speculation about the structure or history of the earth. The Society's booklet certainly produced plenty of local information, most of it in the form of letters to the first President, George Bellas Greenough; in due course he incorporated much of it in his great geological map of England and Wales (1820). Together with the provincial members themselves, the 'Inquiries' gave the Society a network of local informants, so that its premises in London quickly became a centre of research material for the whole of Britain and beyond. However, this still did not give those informants much in return.

In 1826, just 20 years after the foundation of the Society, a decision was taken to publish summaries of the papers that had been read, without waiting for their possible and eventual appearance in full in the *Transactions*. This marked the start of

the Society's *Proceedings*, a publication that in effect complemented the older and grander periodical. The papers had been summarized in writing since soon after the Society was founded, but only in manuscript for its official minute books. From 1827 the summaries began to be printed and distributed to the Fellows (as they had been termed since the Society's formal incorporation in 1825). The *Proceedings* was published as a small octavo booklet about six times a year, during the Society's 'season' from November to June. Each issue contained summaries of the papers read at the most recent meetings, together with the names of new Fellows elected and other Society business. One issue each year was devoted to the business of the AGM, and also contained the president's 'Anniversary Address'. The latter had grown from a mere review of the Society's domestic affairs into a summary and assessment of all the papers read during the previous year. Some presidents expanded their survey beyond the Society, giving a major evaluation of the state of geological research nationally and even internationally, and often focusing on some particular aspect of the science.

The *Proceedings* immediately became an important medium for the rapid exchange of news and views about geology in Britain. The periodical was not primarily designed to keep provincial Fellows informed, and indeed they were again at a disadvantage: in view of the high costs of postage, the newsletter (as it was in effect) was distributed only within London, and provincials did not receive it unless they could arrange for a friend in London, or their London club, to hold it or forward it for them. But in practice it was distributed and read widely beyond the capital. Furthermore, the summaries of papers could soon be read even by those who were not FGSs, because the general scientific monthlies took to reprinting them from the *Proceedings*. So any author who had his paper read at a meeting of the Society could be sure of having at least a summary in print, and widely read, within a month or two. By contrast, the authors of papers selected for publication in the *Transactions* (after a refereeing procedure much like that of the present) often had to wait a couple of years or more, before seeing their work fully in print and with its illustrations attached.

As the volume of work presented at the Society's meetings grew, and its average quality improved, so the disadvantages of this two-track system of publication became more and more apparent. The *Transactions* languished again, as authors became impatient at the long publication delays; sales remained small, and the financial burden on the Society correspondingly great. Conversely, although the *Proceedings* provided rapid publication, it was at the cost of omitting the details, and particularly the illustrations, that would have given the papers most of their value and persuasive power. The effects of that dilemma can be seen in the successive issues of both periodicals. The number of papers published in the *Transactions* declined, in proportion to the number read, while the summaries published in the *Proceedings* became on average progressively longer. Even a few illustrations crept into the latter, as the Society began to adopt the technique of wood engraving. This was less effective for fine detail than copper engraving; but it was adequate for small maps and sections, it was much cheaper, and above all a wood engraving could be printed on the same page as the text to which it referred, rather than having to be bound separately at the end of the volume.

In 1842, a substantial issue of the *Transactions* brought the problem to a head, because although it was a scientific success it finally made the financial burden of the periodical almost intolerable. The following year the trend mentioned above was formally recognized, when the Society resolved to modify the format of the *Proceedings* to include much fuller summaries of the papers, with small illustrations on a regular basis. Even a few folding lithographed plates, of maps, sections and fossils, were included. But this palliative failed to yield the anticipated increase in sales. So in 1844 the Society tried another tack. The commercial publishers Longmans agreed to produce a new *Quarterly Journal* in octavo format, at their own risk and profit and for a trial period of one year. This was to incorporate the *Proceedings*, now extended to full texts of the papers, and fully illustrated with wood engravings and larger lithographed plates. A 'second, or miscellaneous part' would make the new periodical still more attractive, by reporting on recent geological books and other publications in Britain, and by printing abstracts or extracts, in translation, of significant work from abroad. The intention was that the *Transactions* would meanwhile continue 'when a paper could only be advantageously given in quarto'.

The *Quarterly Journal* started to appear in 1845, but after the first year Longmans reported that they had made a loss on the venture and would not renew the agreement. In retrospect the reason for the failure is clear. The Society had allowed Fellows to continue to receive the *Proceedings* free, as they had always done, as an alternative to subscribing to the new quarterly (incorporating the *Proceedings*) at the commercial price. As the Society's centenary historian commented, many Fellows were evidently 'more concerned in appending F.G.S. to their names than in adding the *Quarterly Journal* to their bookshelves' (Woodward 1907, p. 157).

However, the format of the new periodical was so attractive that its publication was continued at the Society's own expense and risk. Significantly, the *Proceedings* were no longer to be available separately; Fellows were now faced with an all-or-nothing choice. Conversely, the *Transactions* virtually came to an end as soon as the *Quarterly Journal* began. Three small issues appeared in 1845–46, printing papers that had been in the pipeline before the change was decided. By the time a final issue appeared a full decade later, the *Transactions* had clearly become redundant.

The Society had thus decided, in effect, to adopt a compromise between the two earlier forms of periodical, between lavish but slow publication on the one hand, and quick but abbreviated publication on the other. As its name implied, the *Quarterly Journal* was published rather less frequently than the old *Proceedings*, but much more frequently than the *Transactions*. Like the former, it ensured reasonably quick publication; like the latter, what it published were the full texts of papers. Its octavo format made it look like the *Proceedings*; but it provided illustrations virtually as good as those in the Society's original periodical. They ranged from small wood engravings embedded in the pages of text, to substantial folding engraved plates of geological maps, some of them hand-coloured, and lithographed plates of fossils and geological sections.

Although initially regarded as an uneasy compromise, the *Quarterly Journal* proved to be a highly successful formula. It combined the advantages of both its predecessors, with just the right balance to satisfy most authors and most of their readers. In particular, it combined in an adequate manner the functions of both newsletter and medium of record. After the first few years its cost was absorbed into the Fellows' annual fee, so that its purchase became in effect a compulsory condition of

membership; that ensured a steady and predictable level of sales, which made it financially sustainable.

The *Quarterly Journal* continued to serve as the Society's sole periodical throughout the rest of the nineteenth century and beyond the middle of the twentieth. The volumes became fatter, and the techniques of illustration were improved, or at least enlarged, by the adoption of photography for landscapes, rock exposures and fossils, and of chromolithography and other methods for coloured geological maps and sections. But the format remained almost unchanged until 1971, when the 'Quarterly' was dropped and the present *Journal* appeared in its place. Significantly, it has reverted to a larger format similar to the original *Transactions*, allowing for many larger illustrations to be included without the expense of fold-outs. Even before that change, the need for a separate newsletter had re-emerged, for the quick publication of relatively ephemeral material; in that respect the modern *Circular* (*Newsletter* from 1972–1990), and its recent successor *Geoscientist*, represent a revival of one of the functions of the old original *Proceedings*. In conclusion, the Society's periodicals are now once more surprisingly similar, in form and function, to those of its earliest decades and first Golden Age.

Bibliographical note

The system of references conventional in scientific papers is ill-suited to a historical article such as this. Readers who want to pursue this topic further will find that the following historical works ('secondary' sources, in historians' jargon) provide some starting points; they also give references to the contemporary ('primary') sources on which all historical research is properly, indeed necessarily, based. It should be noted that although the pace of research in the history of science is quite as intensive as in geology, historical books and articles generally enjoy a much longer useful life than those in the sciences.

Woodward's centenary history (1907) of the Society is still a valuable source, since it prints much otherwise unpublished material from the Society's archives; but it is chaotically organized, and scarcely attempts any historical analysis or interpretation. My article on the foundation of the Society (Rudwick 1963) was based particularly on the manuscript papers of the Society's first president; a more recent analysis of the Society's 'prehistory' is by Weindling (1979). Laudan (1977) and Miller (1986) both analyse the micropolitics behind the Society's early emphasis on fact-gathering and its rejection of theorizing; Moore *et al.* (1991) describe its museum and early collecting activities. The present paper is, as far as I am aware, the only analysis, albeit a very brief one, of its early publications; my earlier review of the origins of what I termed the 'visual language' of geology (Rudwick 1976) discusses the importance of illustrations, and emphasizes the crucial role of the Society's publications in the establishment of a consensual practice that routinely combined maps, sections and other illustrations. Recent detailed analyses of two major geological controversies serve incidentally to demonstrate the role of the Society's publications in the concrete practice of geologists during the period covered in this paper: they are Secord's account (1986) of the famous arguments over the Cambrian and Silurian systems, and my account (Rudwick 1985) of the establishment of the Devonian.

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