The Singular and the Making of Knowledge at the Royal Society of London in the Eighteenth Century

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For my sister Isabel and Francesca

“It didn’t hurt him”, the Unicorn said carelessly, and he was going on, when his eyes happened to fall upon Alice; he turned round instantly, and stood for some time looking at her with an air of the deepest disgust.

“What-is-this?” he said at last.

“This is a child!” Haigha replied eagerly, coming in front of Alice to introduce her, and spreading out both his hands towards her in an Anglo-Saxon attitude. “We only found it to-day. It’s as large as life, and twice as natural!”

“I always thought they were fabulous monsters!” said the Unicorn. “Is it alive?”

“It can talk”, said Haigha solemnly.

The Unicorn looked dreamily at Alice, and said, “Talk, child”.

Alice could not help her lips curling up into a smile as she began: “Do you know, I always thought Unicorns were fabulous monsters, too? I never saw one alive before!”.

—Lewis Carroll, *Through the Looking-Glass*

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ABBREVIATIONS

AC	*Alumni Cantabrigienses*
AO	*Alumni Oxonienses*
BR	*Bulloch's Roll*
DNB	*Dictionary of National Biography*
DSB	*Dictionary of Scientific Biography*
FRCP	Fellow of the Royal College of Physicians
FRS	Fellow of the Royal Society
FSA	Fellow of the Society of Antiquaries
Journal Books	*Royal Society's Journal Books*
MD	Medical Doctor
MR	*Munk's Roll of the Royal College of Physicians of London*
NBU	Nouvelle Biographie Universelle
Record	*The Record of the Royal Society of London*
Philosophical Transactions	*Philosophical Transactions of the Royal Society of London*

NOTES ON SOURCES AND CONVENTIONS

Primary sources are defined as texts written before 1800, regardless of their date of publication. Unless otherwise noted, translations from both primary and secondary sources in any given chapter are by the author.

All dates are “old style”, except that the year is taken to begin on 1 January. Original orthography, punctuation, and emphases have been preserved except that italicized text has been Romanized.

PREFACE

This study initially grew out of my interest in the monstrous as a metaphor for difference. The historical understanding of beings described as monstrous in eighteenth-century Britain seemed to me a fertile and challenging subject to explore and enrich both my personal and professional identities. I soon realized that I share with many others a fascination with the singular and the extraordinary. The category of the "monster" has, in particular, become a rich source of meaning: "the vital counterpart" (Canguilhem 1967, 172), "the endless murmur of nature" (Foucault 1994, 155), the embodiment of "pure culture" (Cohen 1996, 4) to name just a few. Moreover, the recent and increasing number of teratogenic beings produced by genetic engineering has given the subject a new and urgent contemporaneity.

During the course of this study, I had not only to deal with the "monstrous" growth of my research, but also with the various recent publications on the topic. Ultimately, my project evolved into a more confined but in certain respects more general analysis than I had originally intended. It now focuses on the Royal Society of London and covers mainly the first half of the eighteenth century. This work remains centred on the monstrous but it also considers other occurrences of nature described as singular or extraordinary in the period.

This book is therefore conceived not only as a contribution to the growing literature on "monsters" and other curiosities of nature, but also to the historiography of natural history and of the Royal Society in the eighteenth century. I am, however, aware of the difficulty in covering thoroughly and with full scholarly rigour every facet of my subject; in other words, of the inevitably "monstrous" and fragmentary nature of any historical inquiry.

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I must first thank Nick Jardine who supervised my work as graduate student in the Department of History and Philosophy of Science of the University of Cambridge. His constant guidance and direction have always sustained and encouraged my work. I would also like to thank my advisor Jim Secord for his thoughtful readings and helpful discussions.

During my years in the History and Philosophy of Science community, I also benefited from the help and advice of various colleagues. Among them stand out Marina Frasca-Spada, Patricia Fara, Rina Knoeff, Natasha Glaisyer, Klaus Staubermann and Christoph Jedan. Beyond that community, I should also like to record my thanks to Michael Hagner, Lorraine Daston, Adrian Wilson, Fabian Krämer and Ullie kloeppel.

For assistance in this project, I am very grateful to the Foundation for Science and Technology, Portugal and to the Calouste Gulbenkian Foundation. Earlier versions of Chapters II, III and V appeared in *Notes and Records of the Royal Society of London* (Da Costa 2002a), *Studies in the History and Philosophy of Science* (Da Costa 2002b), and *History and Philosophy of the Life Sciences* (Da Costa 2004a). The last section of Chapter V is based on an article published in Willem de Blécourt and Cornelie Usborne (eds.), *Cultural Approaches to the History of Medicine. Mediating Medicine in Early Modern and Modern Europe* (Basingstoke: Palgrave Macmillan, 2003). I thank each of them for permission to reproduce relevant sections of my work here.

Several libraries and archives have been most helpful. I should like to mention in particular the following: the Cambridge University Library (especially the Rare Books and the Manuscripts Rooms); the Royal Society Library; the British Library, London; the Glasgow University Library (Hunterian Collection); and the Royal College of Surgeons Library, London.

I would like to thank my colleagues from the History and Philosophy of Science Unit of the Universidade Nova de Lisboa. In particular, António Manuel Nunes dos Santos to whom I owe a very special debt of gratitude for his generous friendship and enormous encouragement and

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INTRODUCTION

THE SINGULAR AND THE NATURE OF EXPERIENCE

The central subject of this book is the status and role of singular experiences in the making of natural knowledge. What is the nature of experience? What qualifies an "experience" as singular? What is the significance of singular experiences in the making of natural knowledge? How are singular experiences authenticated as knowledge? What is the relationship between an inquiry based on particulars and one based on regularities? What are the implications of singular experiences for systems of natural and social order? These are some of the general questions that I seek to address in this work. To this end, I will focus on a particular historical setting and period, that of the Royal Society of London in the eighteenth century.

The Royal Society has been widely recognized as being at the centre of the making and circulation of natural knowledge in eighteenth-century England. Yet, study of the Society in this period still suffers from serious historiographical shortcomings. The problem of this historical "valley of darkness" was first addressed by David Miller (1989) nearly three decades ago. Miller noted the dull image of the Society in the eighteenth century, as presented in standard survey histories.[1] He also pointed to the

[1] Henry Lyons (1944, 117) has maintained that "the Society as a whole seemed to have lost much of the enthusiasm which characterized the founders of the Society, and to have relapsed into the self-satisfied attitude which was characteristic of much of eighteenth-century life". Likewise Dorothy Stimson (1949, 138) has claimed that "under Sir Hans Sloane and his successors in office, many of the papers and studies presented to the Society tended to become more or less academic and some were downright trivial". A similar view is presented in Berman (1975, 35).

concentration of recent studies on the pre-history and early history of the Royal Society.[2]

In a recent contribution, Richard Sorrenson (1996) has analyzed four of the major elements contributing to this "inglorious" image of the Royal Society. He has pinpointed the often-stated belief that the Society failed to follow the illustrious example of Isaac Newton; the often quoted negative views of some eighteenth-century literary authors; as well as the continued popularity of Charles Babbage's *Reflections on the Decline of Science in England* published in 1830 and the intensive study devoted to the Society's early years, which has overshadowed later periods.[3] In opposition to the traditional view, Sorrenson (1996, 30-46) argues that the eighteenth century was in fact a period of significant productivity and growth for the Society. He bases his interpretation on the steady increase in its membership, as well as on the expansion of its annual income, and on the substantial number of contributions on subjects such as "mixed mathematics."[4]

Specimens and accounts of extraordinary phenomena of nature presented at the meetings or published in the *Philosophical Transactions* have contributed to the image of decline of the Royal Society in this period. Thomas Thomson (1812, vol. I, 114), for example, maintained that the papers on monstrosities published in the *Philosophical Transactions* cannot be considered of much value. Likewise, Dorothy Stimson (1949, 33) relegated some of the natural and artificial curiosities exhibited at the Society to the category of "just trash". More recently, John Heilbron (1983, 4) has lamented the fact that the experiments carried out or witnessed at the weekly meetings of the Society "always shared the stage with monsters and knickknacks". In his view, the attention given to curiosities of nature "made a constant noise against which we seek a small signal, the concern of active members of the Society with the subject of physics".

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[2] Among these recent studies, Miller has singled out Hunter (1982) and Dear (1985). On the pre-history of the Royal Society, see Webster (1967; 1975) and Webster (1975).

[3] On the appraisal of the historiography of the Royal Society in the eighteenth century, see also Rousseau and Haycock (1999). The image of the Royal Society in eighteenth-century literary satire will be addressed in Chapter IV.

[4] Within the subject of mixed mathematics, Sorrenson includes contributions on astronomy, navigation, surveying, cartography and geography. The number of Ordinary Fellows of the Royal Society rose steadily from 121 in 1697 to 195 in 1721, 303 in 1741, 352 in 1761, 479 in 1781, reaching 545 in 1801 (*Record*, 49). On the membership and finances of the Society in this period, see also Lyons (1944, 125-159).

Such misinterpretations of the place of extraordinary phenomena at the Royal Society are, to a large extent, a result of historiographical practices based on present-centred categories and anachronistic evaluative methods.[5] In opposition to such categories and methods, a number of historians have stressed the need to recover and understand the terms, categories, concepts, and forms of discourse of past agents (Skinner, 1969; Cunningham, 1988). Moreover, the need to address the specificity and contingencies of the questions and agendas of past practitioners has been urged (Jardine, 1991).

One of the prevailing problems of the historiography of the Royal Society has been the misleading use of the term "science" (Cunningham, 1988; Cunningham and Williams, 1993). In fact, it was only at the beginning of the nineteenth century that that this term started to be used for studies of the natural world in something like the way that is used today (Ross, 1962). The inappropriate use of the term "science" is, however, only part of the more general problem of identifying the disciplinary boundaries, the "maps of knowledge" of different settings and periods.

In particular, Geoffrey Cantor (1982) has lamented the general lack of such a map of knowledge for the eighteenth century. "The eighteenth-century problem" can, however, only be addressed within specific historical contexts.[6] In contrast to other European academies, the Royal Society was a voluntary body that elected its own Fellows and relied upon them, and not the King, for funds and the promotion of their activities.[7] As this book will show, the heterogeneous membership of the Royal Society and the fact that it was not divided into subject-based classes, together with its openness to contributions from non-members of various social statuses and levels of education, had important implications for what counted as knowledge at the Society and for its modes of presentation. Indeed, one advantageous way of dealing with the problem of the map of knowledge at the Royal Society is to focus on actual practices such as the reporting and display of experiences at this institution.

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[5] On the issue of present-centred history, see Wilson and Ashplant (1988); Ashplant and Wilson (1988); Jardine (2000).

[6] On the map of knowledge as presented in British dictionaries and encyclopedias, see Mamiani (1983); Yeo (1991 and 1996). For a general appraisal of the subject, see Flint (1904) and Fisher (1990).

[7] On the particular organization of the Royal Society in the seventeenth century, see Hunter (1982). For a comparison with the *Paris Academy of Sciences*, see Hahn (1971) and McClellan (1985). On qualifications as a criteria for membership, see Crosland (1982-83).

Another persistent problem in the historiography of the Royal Society has been evaluative anachronism.[8] It is probably no coincidence that the only two detailed studies concerning the activities of the Society in the eighteenth century, John Heilbron's *Physics at the Royal Society during Newton's Presidency* (1983), and Marie Boas Hall's, *Promoting Experimental Learning. Experiment and the Royal Society, 1660-1727* (1991), focus on or end with the period of Isaac Newton's Presidency. Independently of their intrinsic value, these works suffer from a tendency to give preference to experimental and mathematical knowledge which is also manifest in most of the standard survey histories of the Royal Society and in other works on the history of the sciences. Heilbron and Hall have shown convincingly the importance of experimental activity during Newton's Presidency in contrast to other periods of the Society. The opposition between experimental and natural historical knowledge at the Royal Society has, however, been overestimated. Indeed, and as I will show in this book, the interest in strange phenomena of nature did not diminish during Newton's Presidency and was more or less stable throughout the first half of the eighteenth century.

The historiography of the Royal Society in the eighteenth century has been enriched recently by a special issue of *The British Journal for the History of Science*, entitled *Did the Royal Society Matter in the Eighteenth Century* (1999)? This publication contributes to the understanding of the Society as an eighteenth-century "gentlemen's club" with particular codes of sociability and modes of exchanging information about the natural world. It does, however, continue to stress natural philosophy to the detriment of other subject areas (Stewart 1999; Miller 1999; Sorrenson 1999). The almost total absence of natural history is by no means peculiar to studies of the Royal Society in the eighteenth century; unfortunately, it is all too common in other areas of the history of science.[9]

This book is concerned with experiences that were the epitome of individuality, those that were considered to be rare, unusual or singular occurrences of nature. In which ways did the singular and the individual contribute to a redefinition of the concept of experience? In his *Metaphysics*, Aristotle has defined experience as "that which is always or

[8] "Evaluative anachronism" can be defined as "the employment, tacit or explicit, of principles of selection, narration and estimation of past agents that are informed by anachronistic views of their value and significance" (Jardine 1991, 312).

[9] An important exception are the studies concerning Joseph Banks and the Royal Society. See, in particular, Gascoigne (1994;1998). On the historiography of eighteenth-century natural history, see Roger 1980; Jardine and Spary 1996; Sloan 1995.

that which is for the most part" (Aristotle 1990a, 1027a 20-27). It was in the early modern period that the association of experience with the regular course of nature was called into question. In particular, Peter Dear (1987; 1991a; 1991b) has argued convincingly that it was in the course of the seventeenth century that the Aristotelian notion of experience informing traditional natural philosophy was rejected by members of the Royal Society and Jesuit natural philosophers in favour of historically specific accounts of what happened at a particular time and place to a particular observer or experimenter. Histories of nature covering not only particular observations but also experiments became the new fabric of experience.[10] In contrast to the Aristotelian view in which "knowledge depends on the recognition of the universal" (Aristotle 1976, 87b 37-39), the individual now had a foundational rather than incidental relationship to the production of knowledge.[11] Experience become personally, locally and temporary situated. To the new concept of experience corresponded a new discursive form, the report or account of a specific event (Dear 1985; Dear 1991a; Shapin, 1984). How was the authority of this novel form established?

Seventeenth-century solutions to the problem of the validation of natural knowledge have recently received considerable attention. In particular, there has been a major interest in the authentication devices used by Robert Boyle and other early members of the Royal Society. These studies have revealed the importance of rhetorical mechanisms in framing the authority of the accounts (Dear 1991c; Serjeantson 1999). They have also shown the crucial role of the management of testimony of natural observations and experiments in their authentication as knowledge (Shapin 1995; Coady 1994; Lipton 1998, Kush and Lipton 2002, De Renzi, 2002, Shapiro, 2002). The history of the concept of "matter of fact" has also been central to these new historiographical studies. Its legal origins, including the role of credible testimony, have been established (Shapiro 1983; Sargent 1989; Shapiro 1994; Shapiro 2002). The role of the miraculous, the prodigious and the monstrous in the development of the concept have also been highlighted (Burns 1981; Daston 1988b;

[10] Peter Dear (1991, 21) distinguishes "experiment" from simple "experience" by defining the former "as involving a specific question about nature which the experimental outcome is designed to answer; by contrast, the latter merely supplies raw information about phenomena that has not deliberately solicited to interrogate a theory or interpretation". On the specificity of experimental accounts, see also (Bazerman 1988, 59-79).

[11] On Aristotle and the individual as the horizon of non-intelligibility, see Forrester (1996). On the new status of singular experiences, see Dear (1990).

Daston 1991; Daston 1994). Furthermore, Steven Shapin and Simon Schaffer (1985) have established the crucial role of matters of fact in securing agreement about claims to knowledge in the natural philosophical enterprise of Robert Boyle and other early members of the Royal Society.[12] For these natural philosophers, matters of fact were presented as supposedly theory-neutral statements about what someone had experienced and as the items of knowledge about which it was legitimate to be "morally certain". The use of this category implied, therefore, an increased reliance upon probability in contrast to the traditional use of demonstrative argument.[13] Moreover, it has been argued that the new emphasis on matters of fact was linked to protection of the civil order of knowledge-producing communities and to efforts to civilize academic manners (Shapin 1984, 502-511; Shapin and Schaffer 1985, especially 72-76; Daston 1991). In particular, it has been shown that the appeal to matters of fact was an effective way of overcoming sectarianism amongst natural philosophers (Shapin 1984, 502-507; Shapin and Schaffer, especially 72-76).

As I will show in the following chapters, it was mainly in the form of written accounts that the experience of the singular was present at the Royal Society in the eighteenth century. Therefore, one of my points of departure will be the new historiography related to the authentication of knowledge. To what extent, however, did the concept of experience change in this period? Moreover, how was the specific problem of the authentication of experiences described as singular addressed at the Royal Society in the eighteenth century?

The compilation of meticulous and accurate reportage was one of the central aims of the Royal Society from its foundation in 1660. The important place of this activity in the history of the institution has usually been traced back to its Baconian inheritance. Francis Bacon considered natural history as the foundation of natural philosophy because it served as the repository of particulars that should proceed and correct abstractions and generalisations (Bacon 1879, IV, 244).[14] This particular history was an integral part of Bacon's tripartite vision of natural history as "nature in course, of nature erring or varying, and of nature altered or wrought", that is, a history of creatures, a history of marvels, and a history of arts (Bacon 1879, III, 330).

[12] See also Shapin (1984) and Schaffer (1984).
[13] On the role of probability in seventeenth-century natural knowledge, see Shapiro (1983) and Daston (1988a, 191-210).
[14] See Morrison (1977).

Baconian views on the significance of natural history informed the early historians and apologists of the Royal Society. In his *History of the Royal Society* (1667) (1966, 61-62), Thomas Sprat stated that the main purpose of the Fellows was "to make faithful Records of all the Works of Nature, or Art, which come within their Reach; that so the present Age and Posterity, may be able to put a Mark on the Errors, which have been strengthened by long Prescription; to restore the Truths, that have been neglected; to push on those, which are already known, to more various Uses; and to make the way more passable, to what remains unrevealed".[15] Similarly, in his *Reflections on Ancient and Modern Learning* (1697, 480-81), William Wotton sustained the view that the true business of the Royal Society was "to collect a perfect history of nature in order to establish thereupon a Body of Physics".

In adopting a Baconian "programme" as its preferred mode of operation, the Royal Society understood the concomitant requirement to establish and maintain a repository of particular experiences. Accordingly, the Society had a "virtual obsession with record-keeping" (Hunter 1989, 4). Moreover, the concept of the archive was integral to the very idea of institutionalizing a scientific society fashioned, as was the Royal Society, along the Baconian model (Feingold 1998, 173). Undoubtedly, natural history in its broadest sense became central to the activities of the Royal Society in its early history and, as I will show in this book, also in the eighteenth century. More problematic would be the completion of the Baconian aim for the use of natural history in the progress of natural philosophical enquiries.

It is not only within the Baconian principles for the importance of natural history that that the importance of this field of knowledge at the Royal Society should be understood. Medical practitioners were the largest and most active single group (about a fifth) of the early fellows and their preponderance in the Society's membership persisted into the eighteenth century (Hunter 1982, 25-34; Porter 1989; Sorrenson 1996, 36). As Arnaldo Momigliano (1985, 1-24) first pointed out, medicine is a discipline with ancient connections to history. Harold Cook (1996a, 253-70 and 1996b) has also noted the extent to which early modern physicians were often prominent natural historians, imbibing a commitment to "natural history as the best way of knowing".

More recently, some historians have rediscovered and enlarged on the relationship between medical and natural historical knowledge (Pomata and Siraisi 2005). They have stressed, in particular, the emergence in the

[15] On Sprat´s *History of the Royal Society*, see Wood (1980).

Renaissance of the medical genres *curationes* and *observationes* and their close relationship with the practice of consistent record keeping and a new sense of the value of empirical knowledge acquired through professional practice (Pomata 2005).[16] Laín Entralgo (1950, 67) has traced the growing importance of compiling medical case histories to the hippocratic revival of the second half of the sixteenth century. There is much evidence, however, suggesting that the emergent Renaissance medical case histories were fashioned after the Galenic and not a Hippocratic model (Pomata 2005, 124-125).

It is precisely these kinds of experiences that were favoured in the medical literature concerning case histories. As Gianna Pomata (2005, 130) has pointed out, what was of particular interest in this literature was the singularity of each case. Hence, there was selective attention to whatever was rare and exceptional.

In their ground-breaking article "Unnatural Conceptions", Katharine Park and Lorraine Daston (1981) have shown that accounts of monstrous births had an important place in the activities of the Royal Society of London in the seventeenth century. They have associated their presence at this institution with the previously mentioned Baconian project for the priority of history and more specifically to Bacon's injunction for a "special natural history of all monsters and prodigious births of Nature; of everything in fact that is novel, rare unusual in Nature. But to inspire confidence, this should be done with the most rigorous discrimination" (Bacon 1879, IV, 169). However, the understanding of the fruition of such a project, as well as of the general importance of natural history at the Royal Society, needs also to take into account the close relationship between this subject and medical knowledge.

Rarity gave strange phenomena of nature a special status. It also contributed to their wide appeal and frequent presence in both popular and learned literature. One of the problems was that the occurrences, or claimed occurrences, of monstrous births and other unusual phenomena had been variously charged with religious and political meaning. In particular, a long and lasting tradition had presented monstrous births and other unusual phenomena as signs of divination or prodigies. They were described as phenomena contrary to nature which often incurred divine wrath. Indeed, the Latin word *monstrum* means a wonder, a portent and

[16] Both the genres of *curationes* (medical case histories involving successful treatments) and *observationes* (medical case histories) give pride of place to the precise and detailed description of the single case, abstaining from interpreting it in the light of doctrine or, if that is done, it is done in a separate section of the text, under the rubric of *scholium* (Pomata 2005, 131).

the verb *monstrare*, which was formed from *monstrum*, means to show, point out, or denounce. By proclaiming the need for a collection of extraordinary phenomena presented in a truthful way and devoid of any emblematic meaning, the Baconian Programme contributed to the naturalization of this kind of phenomena in the early modern period (Park and Daston 1981).

This does not mean that natural explanations for the origin of monstrous births were not used before. As Jean Céard (1977) has shown in his influential work *La nature et les prodiges: l'insolite au XVI siècle*, a tradition of interpreting monsters as facts of nature devoid of any portentous meaning can be traced back to Aristotle's *On the Generation of Animals* (Aristotle 1990b).[17] In Céard's account, the incorporation of monsters within medical studies by physicians such as Martin Weinrich, Jean Riolan and Fortunio Liceti at the end of the sixteenth century, what he calls the "new science of monsters', was concomitant with their refutation as prodigies. He has, however, pointed out that physicians did not necessarily dispute the existence of prodigies as long as monsters were not counted among them (Céard 1977, 454).

The process of naturalization of monsters at the Royal Society and other institutions did not preclude the persistence of their interpretation as signs of divination in the early modern period. For example, William Burns (1994) has argued that the reception of the monstrous as portentous in England did not expire until after the Reformation, but that the providential interpretation of prodigies still had an important cultural presence in the Restoration, it being one of the Royal Society's missions to combat it.[18] In addition, Sara Schechner (1997) has pointed to the intimate relationship between "high" and "low" culture in changing perceptions of comets as portents. More recently Laura Knoppers and Joan Landes (2004, 6) have stressed the conflation of attitudes toward the monstrous in the early modern period and the way in which they continued to define and defy "religious, ethnic, and national boundaries; legitimating faith; asserting cultural identity; or reincribing anomalous, strange, and aberrant

[17] Céard (1977) pointed to two other traditions that were influential in the understanding of monsters, a "prodigy" approach interpreting them as signs of divination dating back to Cicero's *De divinatione*; and a "wonder" tradition appealing to the creativity and playfulness of nature initially based on Pliny's *Natural History* and Augustine's *City of God*. Céard's tripartite typological scheme has also been adapted in Friedman (1981) and Park and Daston (1981). More crude and recent adaptations of the scheme are Fischer (1986a) and Wilson (1993).

[18] On the interpretation of monsters as prodigies, see also Curry (1989), Niccoli (1990) and Da Costa (2004b).

experiences". A. W Bates (2005) has also emphasised the persistent emblematic nature of monsters. In this way, the coexistence and overlap of different modes of thought in the understanding of monsters has been highlighted.[19]

In the aforementioned article, Park and Daston have located an epistemological shift during the sixteenth and seventeenth centuries "from monsters as prodigies to monsters as examples of medical pathology". However, in their recent and comprehensive work *Wonders and the Order of Nature, 1150-1750* (1998, 11) they have set out to abandon "a plot of linear, inexorable naturalization for one of sensibilities that overlapped and recurred like waves". They have proposed writing a history not only of wonders as objects of inquiry but also of the very emotions that they evoked.

Daston and Park's recent work has been a valuable source of information and inspiration. Its last chapter is devoted to attitudes to the marvellous in the Enlightenment. Here, they discuss its rejection by "the learned" in opposition to its appreciation by "the vulgar". They argue that by the eighteenth century "the wonders of preternatural philosophy and the strange facts of the early scientific societies were discredited wholesale, by appeal to a new metaphysics and a new sensibility. Nature abandoned loose customs for inviolable laws; the naturalist abandoned open-mouthed wonder for sceptical sangfroid" (Daston and Park 1998, 331). The increasingly sceptical attitude of the learned in this period is generally accepted. However, Daston and Park's account of the demise of the marvellous in the eighteenth century overlooks the specificity of contexts like the Royal Society. As this book will show, the reporting and display of strange facts and, in particular monstrous births, continued to have an important place at this institution, especially during the first half of the eighteenth century. Moreover, Daston and Park acknowledge their account to be focused on "wonder and wonders as an elite tradition" (Daston and Park 1998, 19). It is, however, not always clear how this elite is defined and how it varied according to specific contexts and periods.

Michael Hagner (1999) has clearly emphasized the challenge of monsters to Enlightenment culture as problematic cases for any social and natural order. However, there are also important limitations in the understanding of the place of the singular in eighteenth-century culture solely from the perspective of the Enlightenment. This approach usually projects an understanding of the eighteenth century in terms of order and

[19] On cultural and cognitive meanings of monstrosity, see also Haraway (1977), Baldick (1987, 10-29), Richards (1984, 377-378), and Cohen (1996).

regularities so as to undermine from the outset the significance of the singular and the monstrous.[20]

The tenacity of our adherence to an "enlightened" intellectual heritage explains why the debate about the order of monsters at the Paris Academy of Sciences in the eighteenth century has been a privileged topic (Tort 1980; Park and Daston 1998, 204-207; Fischer 1986a, 27-37; Hagner 1999, 186-191). There are relatively few recent publications dealing specifically with beings described as monsters in eighteenth-century Britain.[21] In this respect, the published literature is almost wholly restricted to the notion of the power of the imagination of the mother in the conception of monsters, a debate that occurred outside the Royal Society (Seligman 1961; Rousseau 1969; Boucé 1987; Wilson 1992; Huet 1993; Shepard 1995; Todd 1995).[22]

The growing literature on the practice of collecting and displaying natural and artificial curiosities has recently given a new impetus to historical studies on natural history (MacGregor, 1985; Kenseth ed. 1991; Pomian 1994; Findlen, 1996; Elsner and Cardinal, eds. 1994; Daston and Park 1998; Arnold 2006; MacGregor 2007) These studies have shown that the culture of curiosity flourished in Renaissance Italy in the context of a noble, wealthy and learned sociability, and courtly patronage. Continental collections of rarities provided the background against which corresponding collections in Britain were to develop. It has been argued that this culture was a cosmopolitan one, where the travels of the collector and voyages of exploration and trade with newly-discovered lands created a steady influx of new specimens and objects. What usually qualified objects and specimens for inclusion in cabinets of curiosities was the value derived from their rarity or scarcity. Thus, the exotic, the singular and the

[20] See Hankins (1985, especially Chapter One); Stafford (1991, especially Chapter III) and Clark, Golinski and Schaffer (1999) and Daston (1999). On the English Enlightenment, see Porter (1981) and Gascoigne (1994, especially Chapter II).

[21] The special issue of the *Durham French Colloquies* (vol. 1, 1987), *The Monstrous*, focuses mainly on the monstrous in literature. Steintrager (1997) and Francus (1997) focus on moral monstrosity. See also Curran, Maccubin and Morrill ed. (1997).

[22] The notion of the power of the imagination of the mother in the conception of monsters can be traced back to Biblical narrative. Prominent figures such as Ambroise Paré and Malebranche used the concept in the explanation of certain kinds of monstrosities and they were often cited in the authorization of this notion. It began to be challenged in the eighteenth century but continued to be used by various authors throughout this period. The most notorious debate on the concept occurred between Daniel Turner (1723) and James Blondel (1727). See Wlison (1992).

anomalous had a prominent place. Many specimens, such as monsters and fossils were often also perceived as blurring the boundary between art and nature. Moreover, cabinets of curiosities were usually conceived of as visual tributes to the variety and plenitude of nature and art. They were also a visible manifestation that could confer status, both moral and economic, on the owner.

In opposition, the eighteenth century has received relatively little attention in the literature on the culture of curiosity.[23] It has been suggested that there was, in this period, a decrease in the importance of the "traditional" cabinet of curiosities, associated with new interests in natural history and in art collection. Krzysztof Pomian (1994, 48) has argued that they "were already on the wane, even if some could be found, and after the 1750s they become very few and far between indeed. With the great surge in passion for natural history, the very different kind of interest which had been shown in rare things died down, and exhibition rooms accordingly changed in appearance". Likewise, Arthur MacGregor (1985, 158) has asserted that from the beginning of the eighteenth century, "it was increasingly the connoisseurs of painting and sculpture ... who come to dominate the collecting scene and who set new standards which ensured that matters of taste and aesthetics displaced curiosity as the common currency of the British Collector". These assertions are, however, based on limited evidence. Pomian's view is based entirely on Parisian and Venetian primary sources and MacGregor's can only be viewed as conjecture. The importance of curiosity in eighteenth-century culture needs, therefore, to be reassessed from other historical contexts, such as that of the Royal Society.

This book aims to understand why singular phenomena of nature and the culture of curiosity continued to have an important presence at the Royal Society in the eighteenth century and what this reveals about the structure and the map of knowledge at this institution.

The analysis presented in this work will be mainly focused on singular experiences related to the generation of living beings such as monstrous births and extraordinary pregnancies. However, I will also take into account other extraordinary phenomena associated with the body. The main sources for this work are the articles published in the *Philosophical Transactions* on the topic together with the minutes of the ordinary meetings of the Royal Society. To have based my account exclusively on the *Philosophical Transactions* would have given a limited perspective on the subject; for this periodical was not the official responsibility of the

[23] On Curiosity in the early modern period, see Benedict (2001).

Royal Society until the middle of the eighteenth century and represented, in part, the personal interests and connections of its editor.[24] The minutes themselves, usually referred to as the Royal Society's Journal Books, give a partial account of what went on at the ordinary meetings. For example, they only recorded the names of the persons who presented papers at the meetings or had special permission to attend them; authors were often mentioned only by their titles and surnames which sometimes makes their full identification difficult; and only a limited account was provided of the Fellows' interventions at the meetings. Moreover, sections of the minutes were recopied and emended on more than one occasion, and in the process their content may have been edited (Feingold 1998, 178).

The information in the *Philosophical Transactions* and in the minutes of the ordinary meetings has been complemented with other archival sources, such as letters by the authors of the reports and other manuscripts at the Royal Society as well as manuscripts from the British Library and the University of Glasgow Library.[25] The research is mainly focused on the first half of the eighteenth century but also covers research outside this period. My treatment of the articles published in the *Philosophical Transactions*, for example, covers the years 1665 to 1780.

The experience of the singular at the Royal Society was not isolated from other aspects of eighteenth-century British culture and I have used a range of primary sources including newspapers and journals, natural histories, medical treatises, medical periodicals, midwifery manuals, dictionaries, encyclopaedias, and literary satires to bring this out more clearly.

In order to contextualise such a wide range of sources, this book draws on a variety of secondary literature including the growing scholarship on the history of the book (Darnton 1997; Chartier 1994; Johns 1998; Frasca-Spada and Jardine eds. 2000). In particular, I have attempted to be sensitive to the genres of sources, and their processes of production, as well as the audiences for which they were intended. I have also drawn on the growing literature exploring the relationship between history and

[24] This has been one of the problems with previous accounts on the importance attached to reports of monsters at the Royal Society in the eighteenth century such as those of Moscoso (1998) and Daston and Park (1998).

[25] I have, in particular, used manuscripts from the following Royal Society archival sources: Certificates of Election; Classified Papers; Council Minutes; Early letters; General Manuscripts; Journal Books; Letters and Papers; and Miscellaneous Administrative Papers of the seventeenth and early eighteenth centuries. On the Archival sources at the Royal Society, see Bluhm (1954-57) and Moore with additions by Sampson (1995).

literature by paying particular attention to the language used in the reports and to the literary strategies used in their authentication (Christie 1987; Christie and Shuttleworth 1989; Dear 1991b; Toulmin 1995; Benjamin, Cantor, and Christie, eds. 1987). Furthermore, I have taken some of the literary satires of the period as the main source of analysis for one of the chapters of this book. Sociological approaches in the history of science have also been influential in discussing some of the issues presented in this book (Shapin 1982; Golinski 1990; Pickstone 1993).

The experience of the singular and monstrous was framed within a culture of sight and display. The image had a crucial bearing on the perception and depiction of monsters. Moreover, due to their unusual occurrence, visual representations had a determinant role in the validation of their existence. I have, therefore, also used original drawings, woodcuts, and printed engravings as primary sources. I have tried to address the specificity of this medium of representation and, at the same time, to treat images and their texts as a whole (Baxandall 1985; Gaskell 1997). It has been especially important not to privilege any particular source as providing unmediated access to the past since all sources, whether textual, visual, or material are problematic and entail their own interpretative difficulties (Jordanova 1999, 9-11).

An interdisciplinary approach is deliberately adopted in this book. The chapters that follow are interdisciplinary in the sense that they use materials conventionally associated with various disciplines and in that they draw upon insights and methods derived from particular academic fields. Singular experiences challenge the notion of conceptual and disciplinary boundaries and the very subject and period therefore dictated a somewhat eclectic approach. However, of equal importance was the pleasure achieved by looking at the world, past or present, from such diverse perspectives.

Chapter I focuses on the place of reports of extraordinary phenomena within the natural historical agenda promoted at the Royal Society. It also examines the literary form and language used in the accounts and their authorship. I show that physicians and surgeons who were active members of the Society had a special interest in reports of extraordinary phenomena. I argue, however, that the majority of the contributions should be understood within the context of the general importance of natural history at the Society from its foundation until at least the second half of the eighteenth century as well as to the fact that correspondence was the favoured medium in the making and circulation of natural knowledge at the Royal Society. I also debate the significance of singular phenomena of