Chapter 9
The Progress of Scotland and the Experimental Method

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9.1 Introduction

The eighteenth century witnessed the emergence of a great number of learned societies all across Europe. The Royal Society of London (RSL) was the paradigm case of this kind of societies, but by no means the only one. With the RSL in mind as their inspiration, over 200 societies were established between 1700 and 1799,[1] some being 'specialized' societies (i.e. literary, cultural, agricultural, economic, political, poetical, scientific, and antiquary), some discussing a mixture of topics. Despite the great number and variety of learned societies, there have been only a few in depth studies regarding them, of course excluding the vast amount of literature available on the Royal Society. There are very few texts that deal with Scottish societies at length: H. Lewis Ulman edited and published the minutes of the Aberdeen Philosophical Society in 1990, Davis McElroy wrote his PhD thesis on Scottish societies and later published a book (McElroy 1952, 1969), and historian Roger L. Emerson has a number of articles (Emerson 1973, 1979, 1981, 1985, 1988) on the Philosophical Society of Edinburgh, besides his extensive and insightful research on Scotland in the enlightenment period. Other than these academics, the societies are only briefly mentioned in anthologies on Scotland and the enlightenment, or in biographies of the intellectuals of the eighteenth century, usually being little more than an anecdote.

One reason for this lack of research on the learned societies is the scarcity of empirical evidence, since only few of the original minute books, discussions, or publications from several societies have survived. Even so, there is enough material

[1] According to the database of the Scholarly Societies Project of the University of Waterloo, a total of 210 societies are listed as being established between 1700 and 1799. (http://www.lib.uwaterloo.ca/society/overview.html).

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worth looking into. This lack of a detailed research is shocking, especially because most of the intellectuals in the second half of the eighteenth century were members of at least one of such learned societies. Studying them will not only enhance our understanding of the Scottish enlightenment, but it could also help us shed light on the intellectual context and development of some of its most relevant figures.

In this paper I investigate two of the Scottish learned societies, The Philosophical Society of Edinburgh and the Select Society of Edinburgh, from a specific focus point: I am interested in the role played by the experimental method. This method, originating in Bacon's works and adopted and developed by intellectuals throughout the second half of the seventeenth and the whole of the eighteenth century, was regarded by most of the British philosophers to be the only method that made the acquisition of knowledge possible. I believe that this method played a very important role in the development and success of these learned societies, and an examination of the available material will provide enough evidence to support my claim. I will first introduce a relevant methodological framework for our present purpose: the experimental/speculative distinction. With this terms in mind, we can explore the main inspiration for most learned societies, Bacon's college described in his *New Atlantis*. These two aspects will provide us with a proper framework to examine the rules, question lists, and minute books of the societies to discover how the distinction played a prominent role. This is followed by an examination of some of the discourses and discussions to show that the use of the distinction was not just rhetorical, but expresses a deep commitment to the experimental method as *the* only way to acquire knowledge. Finally, we will take a look at the most important feature the experimental method could offer to the societies: the practicality that would allow them to contribute to the progress of Scotland as a nation.

9.2 The Experimental/Speculative Distinction

For the past 2 years I have been part of a research project at the University of Otago. It is titled "Experimental Philosophy and the Origins of Empiricism", led by Peter Anstey, with Alberto Vanzo, Kirsten Walsh, and myself contributing to the project. We are arguing for new terms of reference to approach philosophy in the early modern period. The distinction between rationalism and empiricism has been the traditional way of talking about philosophy in the eighteenth century. We believe that the distinction between speculative and experimental philosophy can provide us with a better understanding of the early modern period. Besides being the actual terms used by late seventeenth and eighteenth century philosophers (the terms 'rationalism' and 'empiricism' in their modern sense only emerged after Kant), they provide us with a more accurate interpretation of the development of early modern philosophy.

The base for the project can be found in Peter Anstey's 'Experimental vs. speculative Natural Philosophy' (Anstey 2005). I will briefly present how the

experimental/speculative distinction plays out, leaning on Anstey's article. There are five main claims Anstey argues for:

1. This distinction is in evidence, in some form or other, from the late 1650s until the early decades of the eighteenth century.
2. This distinction provides the primary methodological framework within which natural philosophy was interpreted and practised in the late seventeenth century
3. This distinction is independent of disciplinary boundaries within and closely allied to natural philosophy
4. This distinction crystallised in the 1690s when opposition to hypotheses in natural philosophical methodology intensified
5. This distinction provides the terms of reference by which we should interpret Newton's strictures on the use of hypotheses in natural philosophy (Anstey 2005, p. 216).

Anstey's article focuses on the distinction within natural philosophy, but our research project goes beyond that. Roughly, when we talk about speculative philosophy we are referring to "the development of explanations of natural phenomena without prior recourse to systematic observation and experiment;" experimental philosophy consisted in "the collection and ordering of observations and experimental reports with a view to the development of explanations of natural phenomena based on these observations and experiments" (Anstey 2005, p. 215). I believe that such distinction also plays a role outside of natural philosophy: as a rhetorical device and as the expression of a methodological commitment to the experimental method. This commitment implied adopting an anti-hypothesis attitude and a strict emphasis on facts and observations as the sources of our explanations.

It also important to mention here that in Britain most intellectuals sided with experimental philosophy and in their works the term 'speculative' even comes charged with a derogatory tone. Not only was experimental philosophy the only valid path to knowledge, but those practicing speculative philosophy were doing nothing more than the mere construction of fables and fantasies that had nothing to do with reality. This is not to say that the distinction was used by the British as no more than a means of justifying the superiority of their intellectual inquiries; on the contrary, their deep methodological commitment to the experimental method was what justified their use of the term 'speculative' as derogatory.

The origins of the distinction (and the commitment to facts and observation) can be found in the works of Francis Bacon, but as Anstey points out, not in the same form it appeared in the last decades of the seventeenth century (Anstey 2005, p. 217). Bacon is relevant for the attitude he embodied, since he "famously opposed idle speculation and promoted the derivation of natural knowledge from experiment" (Anstey 2005, p. 217). This approach to the acquisition of knowledge got impressed in his *New Atlantis* which was the inspiration for the establishment of the Royal Society and subsequently most of the eighteenth century philosophical societies.

9.3 Bacon's New Atlantis and Philosophical Societies

It is evident that the institution of the Royal Society of London was inspired by, dedicated to, and based on Bacon's work, as we can tell from Cowley's ode to the society and Sprat's *History of the Royal Society*:

> Some few exalted Spirits this latter Age has shown
> That Labour'd to assert the Liberty
> (From Guardians, who were now Usurpers grown)
> Of this Old Minor still, Captiv'd Philosophy;
> But 'twas Rebellion called to fight
> For such a long oppressed Right
> Bacon at last, a mighty Man, arose
> Whom a wise King and Nature chose
> Lord Chancellour of both their Laws,
> And boldly undertook the injur'd Pupils caus (Sprat 1959).

Besides these first-hand accounts, the connection between Solomon's College of the *New Atlantis* and the Royal Society has been constantly mentioned in the scholarship.[2] As for the Scottish Societies in question, we know they also found their inspiration in Lord Bacon as well as in the Royal Society. It is therefore of our interest here to examine the nature of Bacon's Solomon College in order to shed light on the character of the Scottish learned societies we are investigating.

Lord Bacon's *New Atlantis* is a fable, according to Rawley's preface,

> devised to the end that He [Bacon] might exhibite therein a modell or Description of a Colledge instituted for the Interpreting of Nature and the Producing of Great Marveilous Works for the Benefit of Men: under the name of Salomon's house, or the Colledge of the Six Dayes' Works (Bacon 1900, p. ix).

Rawley also mentions that the work is incomplete, since Bacon had in mind the description of a model for the best state as well, but preferred to complete the description of the college first. It is a story about a ship crew that sets sail from Peru towards China, by the 'South Sea,' but gets lost on the way and stumbles upon the island of Bensalem. This country is unknown to the Europeans of the time, but the stranded sailors find a prosperous and civil nation that receives them and treats them as best as it is possible to imagine. After some days in the island, the stranded sailors start settling in, and discovering the day to day life of the island. They hear about Solomon's College, described as the "very Eye of this Kingdom," and our narrator eventually obtains a hearing with one of the fathers of the house, who describes the college and its workings.

In what follows I want to show, by relying on Bacon's text, how the learned societies can be viewed as the instantiation of Solomon's College. Most of the description given by the delegate from the college is occupied by a detailed listing of all the different houses, gardens, pools, caves, mountains and buildings they use

[2] For example see Hunter (1989), Lynch (2001).

for their experiments. Though very interesting, in this paper I am more interested in the specific end of the college and the description of the functions of the fellows. The purpose of the college is summed up in the following sentence:

> The End of Our Foundation is the Knowledge of Causes, and Secret Motions of Things; And the Enlarging of the bounds of the Humane Empire, to the effecting of all Things possible (Bacon 1900, pp. 34–35).

From this statement we can identify two aims of the college, the first being the actual science, and the second one the improvement of mankind (based on the achievements of science of course). The Edinburgh societies were committed to carrying out both this goals, but it was the second one that allowed them to contribute greatly to the progress of Scotland.

Bacon not only establishes the goals such an academy should aim for, but also gives us some guidelines on how to achieve them. The college assigned a number of functions to their fellows to be carried out for this purpose. They are of special interest because they summarize nicely what the Scottish societies established as the tasks they had to carry out. There are nine main functions described in the text (Bacon 1900, pp. 44–45):

1. Travel to foreign countries for the exchange of knowledge.
2. The written collection of experiments. (Scientific)
3. The written collection of experiments. (Non-scientific, e.g. liberal sciences)
4. Trying out new experiments.
5. Categorization of experiments. (Titles and tables)
6. Practical output of experiments.
7. Direct new experiments based on the former. (More penetrating into nature)
8. Execution of experiments.
9. Raise the discoveries of the experiments into Axioms and Aphorisms.

The remaining paragraphs of the description of the college are dedicated to the ordinances and rites, which are not of our present interest. The brief description we have given of the goals and functions of the college will help us sketch a picture of the Edinburgh societies that reflects Bacon's proposals.

The description given above of the end and functions of the college holds the essence of the experimental method. It was this approach to the study of nature that the British philosophers believed would give us knowledge and bring about the progress of humanity. This experimental method of the new philosophy was the driving force behind the Scottish societies. Solomon's college, more than a general model for the societies, embodied the advantages and benefits of following an experimental approach to the study of nature and the acquisition of knowledge in general, as opposed to a purely speculative approach that was detached from facts and observation. I will rely on the rules, minute books and some of the available essays to show that (a) The experimental/speculative distinction was employed in the societies, and (b) The societies were fully committed to the experimental method of the new philosophy in order to contribute to the progress of Scotland as a nation.

9.4 The Evidence

Although there are few written records from the time these Edinburgh societies functioned, we still have access to some very relevant texts and manuscripts, and hopefully we'll be able to identify more in due time. Regarding the Edinburgh Philosophical Society we have the eight volumes of collected essays published by the society between 1742 and 1771, and five volumes containing discourses solely from the absorbed Medical Society (1731–1737). Other than these collections of essays, we can rely on some mentions of the society in the correspondence and biographies of some of the members. The case with the Select Society is even worse, since they had no publications, though their minute book is available. The work done by Roger Emerson has been remarkable and has served as a perfect guide for this research. Still, from the primary sources we can find enough passages to shed light on our understanding of them.

Since there are no surviving minute books, records, membership lists, etc. belonging to the Philosophical Society of Edinburgh, we have to rely on the prefaces to their five published volumes of essays for information on the way the society was run and any kind of methodological statements. Besides these prefaces, the *Proposals for the Regulation of a Society for Improving Arts and Sciences and particularly Natural Knowledge* was published in the General index to the first 34 of volumes of the Transactions of the royal Society of Edinburgh. The *Proposals* outline the administrative regulations for the society, as well as certain rules regarding topics and guidelines for discussion. One rule in particular shows the strictly Baconian and experimental approach they had in mind:

> Authority is to be held of no weight in their reasonings. The shew of Learning, and Quotation of Authors sparingly used in their Papers. Things to be minded not words. Arguments to be chiefly drawn from proper Experiments and clear Consequences deduced from them or from evident Propositions. Metaphysical Subtilties not be insisted on (Emerson 1979, p. 165).

This rule highlights the attitude characteristic of experimental philosophy, rejecting any sort of speculation detached from observation ("metaphysical subtilties," emphasis on words and authority) and calling for a due attention to facts and experiments. It seems that this attitude was carried on from the *Proposals* to the established society as we can tell from the prefaces of their published volumes. The Philosophical Society of Edinburgh emerged in 1737 when Colin MacLaurin proposed to Alexander Monro, secretary and founding member of the Medical Society of Edinburgh, to enlarge the project of the society and include natural philosophy instead of just medicine. The Medical Society had published from 1731 to 1737 a number of volumes of essays, which were reprinted by the newly formed Philosophical Society. The second edition of the first volume contains a number of essays that are highly charged with the rhetoric of experimental philosophy, constantly referring to the emphasis on facts and observation. The volumes are also dedicated to Sir Hans Sloane and the RSL, which he presided. In the preface

Monro mentions that they follow the great example of the Royal Society, with the disclaimer that they would focus only on medical topics. Monro also includes in the preface a list of regulations for the acceptance of papers. Among them we find statements that show their adoption of the attitude of experimental philosophy and their method, highlighting the importance of facts and observations and rejecting any kind of a priori speculation:

> 2. (Regulations for papers) Whatever Relation may be found between the Changes in our Atmosphere and the epidemick Diseases, all seem to agree, that there are certain Circumstances and Symptoms which distinguish the Return of similar Constitutions and point out the most probable Method of Success in treating Diseases while such Constitutions prevail. The only way of discovering certainly these Circumstances and Symptoms, is a long continued Series of Observations, which we hope our Work will supply.
>
> 2. (Regulations for correspondants) The Descriptions and Virtues of simple Drugs, are to be clearly and succinctly told, without enlarging on arguments *a priori*, which are to liable to lead into Error (Philosophical Society of Edinburgh 1737–1738, pp. 17 and 19).

The society published the final volume of Medical essays in 1752, and the first volume of their *Essays and observations, physical and literary* was published in 1754. It was followed by two other volumes, one in 1756 and the last one in 1771, along with a second edition of the two first volumes. The preface to the first volume briefly summarizes the story of the society, mentioning that it follows the same goals which other established societies (RSL) have pursued:

> The object of this society is the same with that of the other academies, which have been established in other parts of Europe, the promoting of natural philosophy, and of literature, by communicating to the public such dissertations as shall be transmitted to them, either by their own members or by others. 'Tis allowed, that these two branches of learning, especially the former, are more promoted by the observation of facts than by the most ingenious reasonings and disputations (Philosophical Society of Edinburgh 1754, p. v).

It is worth noting that the writers of the preface (Monro and Hume[3]), tell us that the method should also be used outside natural philosophy, mentioning literature in particular. This supports the claim that their society was fully committed to the experimental method, regardless of the area of inquiry. Their praise for experimental philosophy is confirmed after the above passage, where there is a reference most likely to Bacon and Newton and their contribution to natural philosophy:

> There arise, from time to time, bold and happy geniuses, who introduce method and simplicity into particular branches of science; and reducing the scattered experiments to more general theorems, abridge the science of nature. Hints of this kind, we hope, may be able to pass thro' our hands; and at worst, our collections will be a species of magazine, in which facts and observations, the sole means of true induction, will be deposited for the purposes of philosophy (Philosophical Society of Edinburgh 1754, p. vi).

[3] Although the authorship of the preface is usually ascribed only to Hume, I am working on a paper that shows that this is not the case.

Although these passages show their full commitment to the experimental method, the society did feel that some topics had to be banned certain from being discussed at the society:

> The sciences of theology, morals, and politics, the society are resolved intirely to exclude from their plan. However difficult the inferences in these sciences, the facts, on which they are founded, are extremely obvious; and we could not hope, by our collections, to be, in this respect, of any service to the public (Philosophical Society of Edinburgh 1754, p. vii).

Even though they still describe them as 'sciences' and founded on facts, they exclude them because they want to avoid topics that will lead to personal disputes, and not because they could not be treated like the other sciences. This particular exclusion is most likely one of the reasons why a number of the members of the Philosophical Society of Edinburgh decided to establish the Select Society of Edinburgh, which debated questions in morals, politics, economy, arts and literature. There is nothing in the rules annexed to the minute book, or any methodological statement that can tell us explicitly that they also followed the experimental method. There is a rule on the topics to be debated that only excludes topics on "revealed religion, or which may give occasion to vent any Principles of Jacobitism," presumably for the same reason their parent society excluded political and religious topics. Roger Emerson mentions in his paper on the society that they followed what he calls 'empirical methodological norms,' praised the work Locke and Newton, and that experience was their guide in moral science. But there is nothing in the minute book or question book that points this out. Emerson's conjecture is probably based mostly on the character and other works of the famous members of the society, like David Hume and Adam Smith.

What we can say of the Select Society from the available manuscripts is that they were fully committed to Lord Bacon's purpose where the society was supposed to contribute for the progress of the nation. Besides the minute book, the society kept a question book which contained the topics proposed by the members to be discussed at the meetings. Among them we find many that were strictly related with the actual state of the country and ways to contribute to its progress. Many members of the society were Edinburgh businessmen involved with trades and manufactures and were interested in debating questions directly related to the improvement of their enterprises, and in consequence the economic and industrial progress of Edinburgh. The question book shows that the members proposed and debated a number of questions related to trades, taxes and manufactures. The following are just a small sample of them: "Whether Bounties on the exportation of Corn be advantageous to Trade and manufactures as well as to agriculture?", "Whether the Numbers of Banks now in Scotland be useful to the trade of their Country? And whether paper Credit be advantageous to a nation?", "Whether the Bounty should be continued on the Exportation of low priced linens made in Scotland?", "Do the Laws in Scotland relating to Coalers and Salters promote the Interest of this Country?" (Minutes of the Select Society of Edinburgh, MSS 170).

Besides the vast number of questions recorded that have something to do with the economic and social progress of Scotland, the society created two off-shoot

societies specifically designed to promote the progress of Scotland: the Edinburgh Society for the encouragement of arts, sciences, manufactures and agriculture, and The Society for promoting the reading and speaking of the English language in Scotland. The former gave premiums in different categories, with the following purpose in mind:

> To encourage genius, to reward industry, to cultivate the arts of peace, are objects deserving the attention of public-spirited persons.
>
> That the inhabitants of Scotland may become diligent in labour, and excellent in arts, is the concern of all who indeed love their country (Edinburgh Society for the Encouragement of Arts, Sciences, Manufactures and Agriculture, p. 3).

They gave prizes for the best essay in taste, best essay in vegetation, best discovery in science, best printed book, best printed cotton cloth, best beer, best carpet, best crop of potatoes, of tulips, and so on (An account of the Edinburgh Select Society 1755, pp. 126–130). The members of the society believed that this was the encouragement needed to promote the Scottish industry. But the efforts of the society to contribute to the progress of Scotland did not stop at the awarding of prizes. There is one situation in particular that shows the practical outcome of the debates of the society. The society debated a question regarding the roads of Scotland, as we know from the list of questions given in the *Scots Magazine* for March 1757, namely, "What is the best method of getting public highways made, and repaired: whether by a turn-pike, as in many places in G. Britain? By county or parish work? By a tax? Or by what other method?" (Questions treated in the Edinburgh Society 1757, p. 164). The same periodical published in 1759 part of a document that related the outcome of the debate, which resulted in a set of proposals and a plan that eventually resulted in the improvement of the Scottish roads.

The other off-shoot society, for the English language, was created due to the poor prose of the Scottish university students and the desire of government officials to be more eloquent. For this purpose the society subsidized a series of lectures on the English language given by Thomas Sheridan. I quote the *Scots Magazine* for 1761 to show the success of the lectures:

> They were attended by more than 300 gentlemen, the most eminent in this country for their rank and abilities; who expressed no less satisfaction with the ingenuity and justness of his [Sheridan's] sentiments, than with the elegant and interesting manner in which he deliver them (Lectures on the English tongue by Mr. Sheridan 1761, p. 390).

The rules and prefaces give us a picture of the beliefs of the founders of the societies regarding the purpose of their institutions and the method to carry it out. Even though it is clear that they followed the experimental method, the available discourses and essays provide even more evidence of the commitment to the experimental method the members of such societies had adopted. Most of the essays included in the three collected volumes express in some way the rejection of mere speculation and the promotion of the experimental method. I will only refer to some of the more explicit passages that illustrate this.

The first two essays of the first volume are on the laws of motion. The first one is by Henry Homes, Lord Kames, and the second one by John Stewart as a reply to

Kames' essay. Even though they disagreed, we can see that the discussion is always held within the bounds of experimental philosophy, both of them relying on experiment and observation for their arguments. Lord Kames' essay starts with the following statement where he shows his apathy towards speculative philosophy:

> Nothing has more perplexed philosophy, than an unlucky propensity, which makes us grasp at principles, without due regard to facts and experiments. . .This bent of the mind is productive of manifold errors. Prepossessed once by a favourite principle, we are no longer open to conviction. Every phenomenon must be accommodated to that principle, and every opposite fact, however obstinate, must go for nothing.
>
> Even in Natural Philosophy, theory was introduced before experiment, and every philosopher urged his own notions, without regard to truth or reality. This produced a mass of undigested and contradictory theory; which at length could not fail to bring on the discovery, that the whole was a little better than a fancy and chimera.
>
> But tho' our only sure guides to truth are fact and experiments, it is however expedient to keep the end in view. Facts and Experiments are useless lumber, if we are not to reason about them, nor draw any consequences from them. . .Theory becomes only a source of error, when we indulge in it too much, or attach ourselves to it beyond what facts and experiments can justify. In short, theory is vain without experiment, and experiments are best understood by applying them to theory (Philosophical Society of Edinburgh 1754, pp. 1–3).

Lord Kames is constantly referring in his essay to facts and observations, and to the rejection of false hypothesis. He concludes his essay by reminding us that his comments are based on facts and observation and not mere conjectures:

> I shall conclude the essay with the following observation, that the powers I have ascribed to matter, are in nothing similar to occult qualities. The error of those who dealt in the doctrine of occult qualities was, in attributing every different effect to some quality or cause confined to that single effect. . .This was not advancing a single step in knowledge, but amusing one's self with words in place of things (Philosophical Society of Edinburgh 1754, p. 68).

John Stewart's reply is also written using the rhetoric of the experimental method, always talking about experiments and observation as the only sources of knowledge, but there is no explicit methodological statement like the ones found in Kames' essay. We do find such statements in an essay by Charles Alston on the sexes of the plants. His aim is to give an overview of the available theories regarding the sexes of the plants and reject them for not being based on facts and experiments. After reviewing most of the argument from different botanists, he even rejects arguments from analogy in natural philosophy, which he believes are not reliable:

> Thus I think I have sufficiently answered all the arguments for the sexes of plants, taken either from the structure of flowers, or experiments of any consequence that I could meet with. But since no small stress seems still to be laid on the analogy between plants and animals, as much favouring this doctrine; I must beg leave a little to consider it also. . . the method of reasoning by analogy, is but too apt to lead us into mistakes. . .for mere analogy, based on facts, and extended by conjecture, however plausible, can at most, but furnish motives for a reasonable doubt, and further inquiry (Philosophical Society of Edinburgh 1754, p. 270).

We can see here that Alston rejects the argument from analogy since all it does is extend facts by conjectures, showing his full commitment to the experimental method and rejecting even the more plausible theories regarding the sexes of the plants. We find similar expression of this commitment in two essays by a fellow

teacher of Alston at Edinburgh, the chemist Andrew Plummer. His first essay in the collection relates some observations on chemical solutions. Plummer introduces the essay by clearly stating his methodology:

> I shall lay down these remarks by way of propositions, and, after each, shall mention the facts or experiments which gave occasion to the remark, or which confirm and illustrate the proposition (Philosophical Society of Edinburgh 1754, p. 284).

Similarly, in his second essay Plummer contrasts speculative and experimental philosophy. The essay is about neutral salts and in it he uses some principles of motion. He concludes the essay with the following remark:

> These principles of motion in matter, are not the vain fictions of men merely speculative in philosophy, but evidently deduced from observations and experiments on a great variety of bodies in many different circumstances (Philosophical Society of Edinburgh 1754, p. 340).

This is perhaps the most explicit expression of the experimental/speculative distinction in the collection of essays, although there are many instances where the praise for the experimental method is present. Thomas Melville reinforces this sentiment in his essay on light and colors. He contrasts Euler's theory with Newton's, preferring the latter for the method and consistence with experience. Here is Melville praising Newton:

> As it is of great consequence in philosophy, to distinguish between facts and hypotheses, however plausible; it ought to be observed, that the various refrangibility, reflexibility, and inflexibility of the several colours, and their alternate dispositions at equal intervals to be reflected and transmitted, which are the whole ground-work of the Newtonian system, are to be considered as certain facts deduced form experiment (Philosophical Society of Edinburgh 1754, p. 50).

Not only does he praise the Newtonian method, but later on when mentioning Descartes he shows his aversion to speculative philosophy:

> From the lazy method of philosophizing in the closet, among books and diagrams, there never arose, never will arise, any discovery of consequence (Philosophical Society of Edinburgh 1754, p. 88).

There are plenty more passages where the allegiance of the authors can be detected, either from their rejection of vain speculation or their constant references to facts, observation, and experiments as the only foundation for their claims. The quotes provided here illustrate nicely the attitude held by the Society and its members. But the adoption of the experimental method by them was not just expressing an attitude and following a methodology. The Scottish societies found great value in the emphasis on practical outcomes contained within the experimental method.

9.5 The Progress of Scotland

So far we have examined the commitment of the society to the experimental method, but not much has been mentioned of their impact on society. This is where Bacon's Solomon's college plays an influential role. If we recall Bacon's

description, acquiring knowledge through the experimental method was only one part of the purpose of the college. Knowledge was not enough unless it was used for the progress of mankind. Nowhere was this attitude as important as it was for the Edinburgh societies. Their desire and willingness to follow the functions proposed by Bacon and develop practical uses for their experiments was attempted and achieved with success in some cases. In what follows I will show some examples of how some of the undertakings of the society evolved into practical contributions for the development of Scotland.

One of these undertakings was the proper mapping of the country, specifically of Orkney, the Shetland Islands, and the northern coasts. The main reason for carrying out this task was that there was a lack of accurate maps for large areas of the country, and completing them would benefit trade and commerce by accurately mapping out trade routes.

The society ceased to be active after the death of Colin MacLaurin in 1746, but it was revived around 1750 and started meeting again. With the revival a change of vice-presidents was in order, and this shifted the societies focus to a much more industry-oriented output. Lord Kames and Robert Whytt occupied the positions, the former being the one that drove the societies experiments and discussions to have some impact in the public life of Scotland. The Philosophical Society discussed a number of papers on fisheries, the uses of peat, a proposal for an engine to raise water from coal or lead mines, as well as all sort of questions on improvements to make mines more efficient.

A letter from Alexander Dick shows this drive to put their experiments into practical use:

> I have been wishing for the Aera to see those collections of facts and circumstances (I have been making in relation to our entails, our high roads, the employment of the industrious poor, & the increase of our population, in which my good Lord kames & some others have given me great assistance) brought into real utility. I have no other ambition for the years I have to live but to contribute all in my power to improve Medicine. . . (Cited in Emerson 1981, p. 154).

Sir Alexander also carried out, with the help of the chemists of the society, an alternative to linen rags which supply was decreasing. They engaged in paper-making from a plant found at the ponds around Edinburgh. This alternative helped not only stop the decrease, but it actually contributed to arise in linen production, as Emerson points out (Emerson 1981, p. 163). Description of operations and diseases helped advancements in medicine, specially the work on fevers by Robert Whytt, William Cullen, and John Pringle. The Monro's also read a number of papers on operations and dissection, which proved to be helpful for the medical students and increase the reputation of the Edinburgh Medical School.

These are just some examples of the impact the activities of the society had on Scotland's public life. They show that the society was concerned with the utility of their discussions, turning facts and observations into practical uses for the progress of the country. This practical consideration was attached to the adoption of the experimental method, and without this methodological commitment the societies would not have had the impact they had on eighteenth-century Scotland.

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