

Published in O F Hamouda, C Lee and D Mair (eds), *The Economics of John Rae*, London: Routledge, pp. 243-58, 1998

RAE AND THE TRADITION OF SCOTTISH POLITICAL ECONOMY

Alexander Dow, Sheila Dow, Alan Hutton and Michael Keaney

Presented to the John Rae 1796-1872, Bicentenary Conference, University of Aberdeen, March 1996.

ABSTRACT

The purpose of the chapter is to investigate how far Rae is representative of the Scottish Political Economy Tradition, where tradition is understood in terms of continuity in a shared approach, allowing for theoretical differences. While Rae conforms to most features identified with the Scottish tradition, his opposition to Smith's methodology suggests a divergence of approach which would put him outside the tradition. It is argued here that this divergence applies only to Rae's professed methodology, not to his practice.

June 1996

INTRODUCTION

Attention has been drawn in some recent writing to the concept of a Scottish tradition in political economy. Macfie (1955) first drew attention to what he saw as uniquely Scottish characteristics in the development of economic thought. This was picked up by Dow (1987) and Mair (1990) as something worthy of attention in considering the current crisis in economics. They suggest that the characteristics of the Scottish tradition hold much in common with modern non-orthodox economics. In seeking an alternative to modern orthodox economics, therefore, it was suggested that it would be productive to consider the Scottish tradition further. Such a consideration would be useful for its own sake, as a case study of an alternative body of thought. But further it is useful in that various strands of modern non-orthodox economics may be seen to have been directly influenced by the Scottish tradition. For example, Skinner (1990, 163) notes elements in common between the Scottish tradition on the one hand, and the German historical school and American institutionalism on the other, while Prychitko (1995, 13) finds Scottish roots in Austrian economics. Mair (1990) makes the point about Scottish ancestry explicitly with respect to Rae, pointing to his (sometimes) acknowledged influence on Austrian economics, American institutionalism and Schumpeterian economics (see also Elliott, 1983; Edgell and Tilman, 1991).

It is the purpose of this chapter to consider the particular issue of whether or not Rae should (as Macfie and Mair attest) be regarded as representative of the Scottish tradition. The first step is to consider what is meant by the concept of tradition itself. In the following section we consider why we might expect Rae to conform to the Scottish tradition (particularly given his emigration from Scotland). Then we consider in some detail the Scottish tradition in political economy, and Rae's work in relation to it. Since Smith is often taken (eg by Dow, 1987) as archetypal of the Scottish tradition, and yet Rae is often seen as counterposing himself to Smith, particular attention is paid to a comparison between Rae and Smith. It will be argued that Rae may indeed be treated as representative of the tradition in many respects, particularly with reference to his practice of economics. But it will be argued that he was not representative in the way in which he professed his methodology.

THE CONCEPT OF TRADITION

The concept of intellectual tradition is not altogether straightforward. An attempt has been made in Dow et al (1995) to specify what is meant by it, in particular distinguishing the notion of tradition from other classifications of thought. Other possibilities include 'schools of thought', 'paradigms' and 'research programmes'. While all of these modes of classification, including tradition, entail some overlap, there are features of the concept of tradition which make it most satisfactory for capturing the characteristics of Scottish thought which were evident in the early Scottish economists and which can be identified in those influenced by them.

A 'school of thought' is generally used to refer to a collection of economists who are roughly contemporaries, as in the German historical school. This contemporaneity in turn entails direct communication among the participants. Given technological advance in communications, schools may now be more geographically dispersed than in Rae's time, when a school would tend to be identified with a particular geographical area. While it is clearly a matter of degree, *the concept of tradition refers rather to a lengthy period of time, where ideas are passed on*

from one generation to the next through a variety of means, of which direct communication is only one.

Thus the concept of tradition is a more diffuse than the concept of a school, referring to the conditions which lead economists in one generation to be subject to intellectual influences similar to those of their predecessors, and to absorb the ideas developed by their predecessors. *The concept of tradition thus entails the notion of continuity in the influences which nurture the tradition.* These influences include the educational, philosophical and cultural environment. This emphasis on a nurturing environment is evident in all of Macfie, Dow and Mair's discussions of the Scottish tradition. Further, continuities over the centuries in the cultural, religious, intellectual and educational environment in Scotland may serve to explain the continuation of aspects of the tradition to the present day which are identified by all three authors.

Where individuals carry the tradition elsewhere, as in Rae's case, there must be sufficient in the new environment in common with the old to nurture a continuation of the tradition. In considering Rae in relation to the Scottish tradition, therefore, we need to consider the scope of its influence before he left Scotland, and the degree to which the new environment in which he found himself nurtured the tradition. First, Rae was brought up in Scotland and therefore absorbed the style of reasoning, and types of concerns, which characterised all aspects of life in Scotland. A philosophical approach to questions addressing practical and moral concerns was most evident in the Scottish system of higher education. A Scottish Arts degree, such as Rae took at Marischal College in 1815 is described by Davie (1964, 11) as follows:

If we look more closely at the Scottish Arts course...its really distinctive factor, its unique peculiarity as compared with courses not merely in England but on the Continent would seem to be that, while classics and the exact sciences were taught in addition to philosophy, the standard attained in the philosophical side of the course was considerably higher than in the other two parts of it. This was the result of an arrangement whereby the student regularly got a double dose, each from a different point of view, of the central problems of the Theory of Knowledge, such as Perception, Universals and Causality. The student was first taken through this very difficult subject by the Professor of Logic, and then again the following year by the Professor of Moral Philosophy.

Further, as Davie demonstrates, the prominence of this approach to philosophy in the curriculum was reflected in the style and content of other disciplines. Thus, while Rae proceeded to study medicine at Edinburgh, medicine itself had a philosophical focus, and one which encouraged argument from first principles in order to address practical issues. Thus, for example, the major figure in Scottish medicine, Cullen, was primarily interested 'in finding a general theory of disease which would connect up with speculation about the nature of life, and its relations to mind and matter.' (Davie, 1964, 23-4). The social sciences too emerged under the influence of the Scottish philosophical tradition which had been institutionalised in the Scottish higher education tradition.

This was the set of influences which Rae carried with him when he emigrated from Scotland. It is evident from his prominent role in attempting to promote Scottish values in Canada that Rae was strongly conscious of the distinctiveness of his Scottish upbringing. Further, there was sufficient in common between the educational, religious and cultural environment in Canada

and that of Scotland (not least because of the influence of Scottish immigrants in a wide variety of fields) that Rae would have found a significant degree of continuity. Nevertheless, it is likely that his infrequent contact with other scholars must have allowed the influence of the Scottish tradition to dim somewhat.

A tradition is distinctive in a third important aspect. In particular it differs from a paradigm or research programme in that these entail some fundamental agreement on foundations. In the case of a paradigm, there is agreement on world-view and choice of methods of enquiry (see Kuhn, 1974), such that normal science (representative of the paradigm) consists of addressing puzzles within the agreed framework. In the case of a research programme, there is agreement on a hard core set of assumptions, and on a negative and positive heuristic to direct lines of enquiry (see Lakatos, 1970). Again there is overlap with the concept of tradition in that a tradition entails some shared methodological principles. But *a tradition is a looser concept than paradigm or research programme, allowing for disagreements which spawn different theories based on different assumptions*. Thus, for example, both Marxian and Neo-Austrian economics can be seen to have had roots in the Scottish tradition.

This embracing of theoretical differences is important for any discussion of the Scottish political economy tradition, in that there were unquestionably differences among key figures in the tradition who were contemporaries, and even more so among those who were not. Certainly the content of Rae's economics differed from that of Smith, although it can be argued that Rae exaggerated these differences, and that there was a significant amount of content in common (see Hollander, this volume). We will consider in more detail below the particular differences between Rae and Smith on methodology, since it is at that level that a tradition is defined. It is important therefore to identify those elements which define the tradition in order to identify those differences which are compatible with the tradition and those which are not. In the next section, we consider in turn the various features which identify the Scottish tradition. Rae's work is considered in relation to each of these features.

THE SCOTTISH POLITICAL ECONOMY TRADITION

The Scottish political economy tradition can be identified in terms of a range of features (as outlined in Dow, 1987):

(1) A concern with practical issues.

Macfie regards this predilection as the result of the influence of an emphasis on Roman culture in Scottish classical education, rather than Greek culture. But it is in fact hard to disentangle cause from effect; all fields of Scottish life were approached in this manner (from religion to mathematics), which in turn must have encouraged the interest in Roman culture. Indeed the necessities of a poor nation must have forced a concern with practical issues. A consequence of particular interest was the development of Common Sense philosophy. Philosophy in turn, and in particular moral philosophy coloured the approach taken to all other disciplines, through the higher education system.

Rae clearly conforms to this feature in his evident concern with the practical issues posed by survival in the Canadian wilderness in particular, and of innovation and economic development in general.

(2) A consequent preference for breadth of understanding of the background to these issues, over depth of understanding of isolated aspects of issues.

The theory of knowledge most closely associated with the Scottish tradition arising from the Enlightenment period is represented in Thomas Reid's *Philosophy of Common Sense*. As Davie (1986, 187) puts it:

‘Common sense knowledge...is knowledge of bodies which we could not get from the senses when they are in isolation from one another but which can be got from the senses when they are employed in co-operation so as to enable us to compare them together. The importance of this common sense knowledge is that it gives us a knowledge of aspects of things which in a genuine way transcends the senses and which thus is rightly called intellectual knowledge.’

The emphasis then is on knowledge arising from a combination of sources, rather than linearly from single sources. As Macfie (1955, 84) puts it:

‘[T]he Scottish method is more concerned with giving a broad well balanced comprehensive picture seen from different points of view than with logical rigour. In fact, Smith was...a philosophic writer....His aim was to present all the relevant facts critically. Modern writers start from a totally different angle. They found on the law of non-contradiction. they aim at isolating one aspect of experience and breaking it down by analysis into its logical components.’

Rae's work conforms to this approach. In chapter 14 of the *New Principles of Political Economy*, Rae (1834, 320) provides a summary account ‘of the combined operation of the causes investigated in the preceding chapters’ with respect to the determination of ‘the nature and production of stock’. The causes are classified according to whether they are material, not material, and partly material, partly not material. Thus, the nature of man is investigated as well as the nature, level and productivity of factors of production. Further, Rae is explicit that social science, in taking account of the nature of man, must reflect the complexity of the interactions between causal forces. Thus, referring to his analysis of the causes of economic development, Rae (1834, 323) points out:

‘We have considered them separately, but they never appear so, always acting in combination. This circumstance would not of itself affect any conclusions concerning them, for it applies to phenomena of all sorts, the causes influencing every one being compound. But the peculiar nature of the human mind, rather excited to action by motives, than passively operated on by them, and moulding, therefore, its energies to suit the course it adopts, occasions a difference between phenomena influenced by it and all others. Hence, according to the preponderating motive, and the course of action followed, the same powers and principles take opposite directions, and the will is able to draw to its purposes and make allies of those which would seem naturally opposed to it.’

(3) A preference for drawing on several disciplines in an integrated manner to provide that breadth.

This approach to knowledge was embodied in the breadth of the education system. But there was further a cross-fertilisation between disciplines which may be explained in large part by their common philosophical underpinnings. Indeed the social sciences emerged first as teaching applications of logic and moral philosophy. In turn, since this knowledge was being applied to practical issues, the scope for isolating aspects of these issues was limited if the results were to be at all useful. Since the chain of reasoning was not allowed to diverge too much from the question at hand, the importance of understanding context was of great importance, as was the need to take account of the complexity of influences on that context.

Again, Rae conforms to this characterisation. He was concerned with questions which required attention to a wide range of disciplines. Thus, for example, he had planned at one stage to develop a natural history of man built on a philosophical conception of human society (see James, 1951, 143). In his work on innovation, Rae quite deliberately took into account a much wider range of factors than the strictly economic, drawing in particular on history and sociology. Indeed it was his innovative development of the sociological approach to economics which was emphasised in the retitling of his *New Principles* by Mixter as *The Sociological Theory of Capital*, when the book was reissued in 1905, and which inspired Irving Fisher's admiration (see James, 1951).

(4) A preference for arguing from first principles

In addressing practical issues, Scottish Enlightenment thought was addressing the challenge of new practical problems, requiring innovative chains of reasoning. While this required the creative combining of different approaches to knowledge as outlined in (2) and (3) above, some principles were required to provide a starting-point. In the social sciences these principles referred to the nature of man and of society. But the nature of man and of society were understood to be complex, and non-deterministic, reflecting the origin of the social sciences as applications of moral philosophy. Thus for example, Smith's use of the concept of self-interest was built on his understanding of man's social nature, as represented in his development of the concept of sympathy in the *Theory of Moral Sentiments*. The first principles of the Scottish tradition should therefore not be confused with the axioms of conventional modern economics, which provide a deterministic, reductionist account of man.

Rae again fits well into this aspect of the Scottish tradition. Rae explicitly sets out, in *The New Principles of Political Economy*, to develop his own set of first principles. In the process, he questions Smith's principle of the division of labour. He carefully builds up his principles from an enquiry into the nature of man, the nature of capital and the nature of wealth. But as the quotation in (3) above makes clear, his analysis of human behaviour is of something creative, pro-active and non-deterministic, allowing a range of chains of reasoning from his principles. Indeed, Rae (1834, 96) explicitly refers to man as 'an organic being', precluding the atomistic representation of economic man, as he was later represented by orthodox economics. Rae thus also embodied another important feature of the Scottish tradition, namely:

(5) A specification of first principles in terms of a non-individualistic representation of human nature, with a consequent emphasis on social or conventional behaviour.

(6) A preference for approaching a subject's first principles by discussing their historical development

This feature of the Scottish tradition again derives from the system of higher education and from its philosophical foundations. Because knowledge was not seen as an axiomatic system which could be parcelled up into discrete disciplines, each discipline was presented as an evolution of ideas drawing on a range of influences. The predominant teaching method was thus to impart first principles by means of teaching the historical evolution of the discipline through a variety of contexts. Mathematics, for example, was taught in this way, rather than as a closed axiomatic system. As Davie (1961, 11) puts it:

‘The Professors of Mathematics found, for example, that the best way to render their task of imparting the elements of geometry, algebra and arithmetic interesting to themselves and to their youthful pupils was to concentrate on the philosophy and the history of the branches of mathematics in question, and to treat the mathematics class as a cultural course, concerned with the relations of the subject to social life and to the plain man.’

This approach is clearly evident in the extensive historical reference in *The Wealth of Nations*. It is also manifest in Rae’s *New Principles*. In the chapter concerned with ‘the causes of the progress of invention, and of the effects arising from it’ (chapter 10), Rae displays an extensive knowledge of a wide range of ancient societies in order to develop his principles.

(7) An acceptance of the limitations of theory

and

(8) A recognition of the sociological and psychological aspects of theory appraisal

While the Enlightenment project in political economy can be understood as an attempt to specify a socio-economic system, along the lines of the systems being developed in the natural sciences, it was a particular feature of the Scottish enlightenment that no claim was made as to the absolute truth value of the system. In particular, in *The History of Astronomy*, Smith outlined a psychological theory of the development of knowledge which suggested that knowledge progressed by means of providing psychological satisfaction rather than by demonstrably approaching absolute truth.

Rae on the other hand does appear to see his task as establishing absolute truth. He was concerned about limitations to knowledge in terms of the difficulty of prediction (given the problem of induction) and the difficulty in identifying true causes as opposed to surface appearances of cause (see Hamouda, this volume). But he explicitly challenges Smith’s view of science as being opposed to the principle of induction:

‘Now, I apprehend, that the spirit of the philosophy of the author of the *Wealth of Nations* was completely opposed to the inductive philosophy - the philosophy of Bacon, and that he never intended that that work should be received as if established on it.’

(Rae, 1834, 328)

(see further Rae, 1834, 331-2). Rae then argues instead for the Baconian approach of induction as the best means for discovering truth; theory appraisal then proceeds according to the principle of falsification. Rae here would appear to be at odds with the Scottish tradition.

Since these are the two areas in which Rae appears to be at odds with the Scottish tradition, we shall make this the focus of attention of the next section. There we explore in more detail these last two aspects of the Scottish tradition, and Rae's stance on them. Since Rae expressed his views on methodology in direct opposition to those of Smith, we will use this apparent opposition as a basis for discussing how far Rae did in fact depart from the Scottish tradition in these two aspects.

RAE'S METHODOLOGICAL CRITIQUE OF SMITH

In order better to understand the philosophical background to Smith and to Rae, Coleman's (1996) analysis of Enlightenment rationalism is helpful. There he discusses the tensions between the rationalists, who see uniformity in nature (including human nature) and the anti-rationalists who see diversity in nature. The former are drawn towards deductivism, based on self-evident axioms. The latter are drawn towards empirical work in an attempt to identify regularities. But, Coleman argues that the two may come together in theorising, where the former build theories on self-evident truths and the latter on empirically-established axioms. Coleman argues that the Scottish Enlightenment represented a complex combination of rationalism and anti-rationalism. Indeed, Hume (1975; 1751) denied the validity of the distinction between *a priori* axioms and observed regularities, on the grounds that ultimately the former were based on observation. Thus in Stewart (1867) we find an emphasis on the importance of general principles, along with inductivism; this was justified on the grounds that the general principles arose from experience.

But both Stewart and Reid, whom he greatly influenced, explicitly objected to the instrumentalist aspect of Smith's epistemology evident in the *History of Astronomy*, where he argued that speculative hypotheses may help us to identify underlying causes which mere observation cannot reveal. Certainly Smith pointed out that only those principles which accorded with already-understood knowledge would gain acceptance, in accordance with the philosophy of common sense. But his greater willingness to contemplate hypothetical knowledge raises the question as to whether he is in fact atypical of the Scottish tradition. This is of importance if we are to regard Smith as the archetypal Scottish political economist. It is also significant in understanding the subsequent, deductivist, developments in economics. Our concern here is to consider Rae's methodological position, expressed as it is in counterpoint to Smith.

Coleman's schema, employing the traditional dualistic categories of deduction and induction, rationalism and anti-rationalism, is useful here because Rae himself expressed his methodology dualistically. Certainly dualism was a feature of the Enlightenment period in general. But the problem in applying this schema to the Scottish tradition, even in arguing that the Scottish approach entailed a combination of opposites, is that that tradition is non-dualistic. The moral philosophical foundations of knowledge, the openness to different disciplines, the consciousness of the importance of history and context, and above all the social conception of human nature,

embracing creativity and active agency, and the driving force of addressing practical problems all preclude a focus on duals (see Dow, 1990). The rationalism of the Scottish Enlightenment was not the rationalism of the English Enlightenment. Certainly Smith was a system builder, which requires a belief in some underlying order. But that system was not deterministic, given his (typically Scottish) conception of human nature. Certainly Smith introduced the notion of a psychological theory of the development of knowledge. But that did not mean that he saw theory as developing independently of observation; a glance through *The Wealth of Nations* is sufficient to establish that argument.

For all Reid's own objections to Smith, we would argue that his philosophy of Common Sense represents the balance struck within the Scottish theory of knowledge between observation and theory. Observation is necessary, but intellectual knowledge, based on wide-ranging observation, has its own legitimacy (see Davie, 1986, chapter 10). Reid's argument with Smith is an argument over the source of intellectual knowledge. But the Scottish philosophic tradition grounds intellectual knowledge in observation while giving it its own legitimacy. Smith had gone further by probing the motivation for and process of generating intellectual knowledge, which in no way undermines realist philosophy unless it involves a dualistic dichotomisation between observation and theory. Both Reid and Smith had a (rationalist) belief in the existence of underlying forces which generated an ordered system. Observation of surface phenomena could be misleading. But the order was not a deterministic order, so that a retreat into deductivism with the aid of some universal self-evident axioms was not feasible. For Smith, the division of labour and the operation of self-interest were governing principles, but what these actually meant in practice required detailed observation of the social, political, historical etc context, so that theory could never depart significantly from observation if it were to be useful in addressing practical questions.

Rae presented his *New Principles* as a critique of Smith, at the level of content (notably with respect to the distinction between individual and national wealth) but also at the level of methodology. In chapter 15 of the *New Principles*, Rae challenges the understanding of Smith as engaging in induction, arguing rather that he engages in 'explanation'. The difference in content is purported by Rae to follow from the difference in method; he criticises Smith for confusing effects with causes. He suggests that Smith has taken phenomena to be principles, rather than investigating further in order to find the real principles; thus he adopts the common man's confusion between individual wealth and national wealth, presuming rather than investigating the causal relations between the two. On the face of it it would seem that Rae took a quite different approach to Smith and thus cannot be thought to be representative of the Scottish tradition.

Rae's methodological argument with Smith concerns the source of intellectual knowledge. Like Smith, Rae too seeks to identify underlying forces which are not apparent from simple observation. By criticising Smith for relying unduly on surface appearances, ie on popular common sense knowledge, Rae is arguing that Smith is not trying hard enough to develop intellectual knowledge of the underlying system. What Smith identifies as cause (the division of labour), Rae identifies as the effect of innovation. Rae's argument therefore seems to be that Smith is not taking a particular methodology far enough, not that he is employing a different (less-preferred) methodology. Their differences over general principles may then be treated as differences in theoretical content rather than methodological differences.

But Rae goes further in arguing that Smith does not go far enough because he does not employ the method of induction:

‘To me it appears that [Smith’s] philosophy is that of explanation and system, and that his speculations are not to be considered as inductive investigations and expositions of the real principles guiding the successions of phenomena, but as successful efforts to arrange with regularity, according to common and preconceived notions, a multiplicity of known facts.’ (Rae, 1834, 331)

Following Francis Bacon, Rae sets out the position of falsification as the means for establishing true knowledge:

‘The whole inductive philosophy may, indeed, be said to rest on the impossibility of the occurrence of exceptions to real laws. Hence the extensive use of *negative instances*, determining, at last, what is a principle by pointing out what is not.’ (Rae, 1834, .344)

He proceeds to illustrate the principle by pointing out counter-examples to Smith’s argument that the wealth of nations is promoted by the seeking of individual wealth. (His reference here to gamblers is apposite to modern discussions about the activities of financial markets.)

The impression is created by Rae that Smith is deductivist and Rae inductivist. This impression is created partly by Rae’s imposition of the dualistic categories (deduction and induction) employed by Bacon. This dualistic approach is uncharacteristic of the Scottish epistemological tradition, reflecting more diverse influences on Rae. It belies the complex interrelationship between observation and theory intrinsic to the Scottish approach. In particular, while Smith may have focused more than most on the role of conjecture in theory-building, the driving force behind theory-building for him was in fact falsificationism. In the *History of Astronomy*, Smith provided an account of theorising which centred theory development on the response to surprise, ie to contrary observations. The dualistic approach also belies both Smith and Rae’s actual methodological practice. Both, consistent with the Scottish tradition, intertwine extensive observation with an attempt to build up intellectual knowledge of underlying forces; they intertwine in the sense that observation provides the material for conjecture, and also the test of conjecture. The *New Principles* is best understood as setting out a system of economic development based on the principle of innovation, just as the *Wealth of Nations* is best seen as a system of economic development based on the principle of the division of labour. But it is important that it be borne in mind that, in line with the Scottish tradition, these systems are open systems, and cannot therefore be thought of in deductivist terms.

As far as the limitations to theory are concerned, both Smith and Rae had been influenced by Hume’s scepticism about inductive knowledge, and were therefore conscious of the limitations on the scope for establishing arguments. This scepticism was reinforced by their understanding of the necessary openness of theorising about evolving social systems; while it might be possible to agree on general principles, the meaning and applicability of those principles in particular contexts required detailed observation and exercise of judgement. Nevertheless, the goal was to identify underlying forces; for all the limitations to theory, there was a belief in the existence of real forces which it was the purpose of science to identify.

The conclusion emerges that Smith and Rae were much closer than Rae's statement of their methodological differences would imply. Indeed, Rae later acknowledges that his criticisms are directed more at Smith's followers than Smith himself:

I shall conclude these remarks, by observing, that in my opinion the disciples and followers of Smith, in claiming for the speculations contained in the *Wealth of Nations*, and for the doctrines they have founded on them, the rank of an experimental science, the conclusions of which are entitled to the same credence with other experimental sciences act injudiciously, and by insisting on pretensions which are unfounded, injure the cause of that philosopher and conceal his real merits'. (Rae, 1834; 1964, p.350).

But the *History of Astronomy* remains as a potential bone of contention, constituting as it did the focus of expressions of methodological differences between Smith and other key figures in the Scottish tradition. We devote the next section to a consideration of the *History of Astronomy* in relation to the *New Principles*, and again find much in common between the two.

A MISSED CONNECTION BETWEEN RAE AND SMITH

The *History of Astronomy* was concerned with understanding the sentiments 'surprise', 'wonder' and 'admiration' which provide the stimulus for the development of knowledge:

'It is the design of this Essay to consider particularly the nature and causes of each of these sentiments, whose influence is of far wider extent than we should be apt upon a careless view to imagine.' (Smith, 1980, 34)

Philosophers are motivated in their theorising by the need to dispel the sense of wonder, or discomfort, caused by surprising observations, ie those which do not accord with currently-held theories, and by the admiration inspired by new theories which accommodate these observations.

'Wonder, therefore, and not any expectation of advantage from its discoveries, is the first principle which prompts mankind to the study of Philosophy, of that science which pretends to lay open the concealed connections which unite the various appearances of nature; and they pursue this study for its own sake, as an original pleasure or good in itself, without regarding its tendency to procure them the means of many other pleasures.'

(Smith, 1980, 51)

There are interesting parallels between the *History of Astronomy* and chapter 10 of the *New Principles*, where Rae investigates 'the causes of the progress of invention' (as well as its effects). Rae too distinguishes between inventors and other members of society, and seeks to explain what motivates them. Inventors are not motivated by the prospect of gaining wealth, since the outcomes of invention are subject to considerable uncertainty, and thus do not attract certain reward. Indeed Rae goes to some length to outline the hardships and lack of recognition which are the customary lot of inventors:

‘We in vain search for any sufficient motive exciting to this course of action, unless the good arising from communicating good, and the consequent desire to be a benefactor in the most extended possible manner.’ (Rae, 1834, 210)

It is notable for our purposes that Rae explicitly refers to Bacon’s parallel argument about the motivation for the advance of science (Rae, 1834, 216-7). Indeed the conflation of Rae’s use of the concept ‘invention’ with the concept of ‘science’ is encouraged, not only by his reference in both contexts to ‘men of genius’, but also by the reader’s perception that Rae’s account of the lot of the inventor arises from his perceptions of his own situation as someone developing knowledge about the role of invention in economic development.

Rae’s account of the ‘man of genius’ does not accord well with a purist inductivist position. Referring to the isolation of men of genius from society, Rae continues:

‘Abstract and scientific truth can only be discovered, by deep and absorbing meditation; imperfectly at first discerned, through the medium of its dull capacities, the intellect slowly, and cautiously, not without much of doubt, and many unsuccessful essays, succeeds in lifting the veil that hides it.’ (Rae, 1834, 213-4)

Rae identifies the motive of accumulation (the selfish motive of practical men) as encouraging invention along with the (selfless) motivation of the inventor to discovery. But the two motivations may act contrarily when the social order is disrupted, eg by war. While such disturbances make the prospect of accumulation subject to greater uncertainty, thus weakening the accumulation motive, they actively encourage the inventive faculty. In making this argument, Rae comes close to the Smith of the *History of Astronomy*:

‘Whatever, therefore, breaks the wonted order of events, and exposes the necessity, or the possibility, of connecting them by some other means, strongly stimulates invention.’ (Rae, 1834, 223)

But Rae does not give any sign of recognising common ground between himself and Smith in this regard. For all the discussion of the motivation for invention appears to apply equally to knowledge in general as well as to solutions to practical problems, the extensive examples of invention refer exclusively to the latter. Further, the emphasis in the examples is on the accumulation motive, with inventions being stimulated by resource shortages, requiring new technology applied to existing resources, or the development of alternative resources. The connection is not taken further between the practical man wishing to overcome constraints and the man of genius who invents the mechanism for doing so from the much wider range of knowledge he has developed, being uncertain of the outcome of his enquiries.

It seems unfortunate that, having himself been so innovative in developing the concept of invention and between his discussion of invention and his discussion of scientific methodology. His use of the word ‘speculation’ to describe the activities of the inventor holds echoes of Smith’s discussion of scientific enquiry; there are strong parallels in the motivations of pursuing knowledge for its own sake, and seeking connecting principles from discordant observations. It was left to the neo-Austrians to develop in tandem the nature and origins of knowledge in economic theory and of knowledge in the economy.

CONCLUSION

We have defined the concept of tradition as referring to a continuity over generations in epistemological and methodological approach, allowing for accommodation of theoretical differences. We have argued that Rae conforms to most aspects of the Scottish political economy tradition.

The two areas of potential conflict are differences over perceptions of the limitations of theory, and a recognition of the sociological and psychological aspects of theory development. Rae pits himself against Smith by taking an avowedly purist inductivist position, following Bacon. The dualistic way in which he expresses this position is at odds with the Scottish tradition; further, it seems to entail an understanding of science as revealing truth. But the practice of Rae's enquiries are in the mainstream of Scottish methodology, emphasising the importance of general principles, which have their origin in experience, but which have their own legitimacy as intellectual knowledge. Further, these principles are developed and applied in the full consciousness of the importance of context, so that their discussion never departs far from detailed contextual accounts. His principles are different from Smith's, and thus have important differences of implications. But the methodology is very similar.

Rae joins with others in rejecting Smith's psychological account of theory development, as if it were counterposed to the principle of induction. But Rae's own account of the motivation for science is very similar to Smith's. In fact he could have benefited considerably from paying more attention to the *History of Astronomy*, since contrary evidence (or falsification) is a primary motive for Smith in theory development. It is unfortunate that Rae seems to have conflated his opposition to the content of Smith's economics with an opposition to his philosophy of science, when in fact the latter was not too far away from that of Rae. Indeed, given the centrality of knowledge to Rae's economics, it is unfortunate that he did not use Smith's ideas for his own purposes.

How then does Rae stand in relation to the Scottish tradition as we have defined it? Mair (1991) distinguishes between 'legitimate' and 'bastard' lines in the tradition running from Smith, where Rae is identified with the bastard tradition. But Pesciareli (1994) argues that the diversity represented by Smith and Rae is compatible with a single tradition. Clearly there are differences; it is a matter of judgement how much importance is given to these differences. In our judgement, if we ignore Rae's statement of his methodology and focus rather on his practice, he sits squarely in the Scottish political economy tradition.

REFERENCES

- Coleman, W O (1996). How Theory Came to English Classical Economics. *Scottish Journal of Political Economy*, 43(2), 207-28.
- Davie, G E (1964). *The Democratic Intellect*. Edinburgh: Edinburgh University Press.
- Davie, G E (1986). *The Crisis of the Democratic Intellect*. Edinburgh: Polygon.
- Dow, A C, Dow, S C, Hutton, A and Keaney, M (1995). Traditions in Economics: The Case of Scottish Political Economy. Glasgow Caledonian University mimeo.
- Dow, S C (1987). The Scottish Political Economy Tradition. *Scottish Journal of Political Economy*, 34(4), 335-48.
- Dow, S C (1990). Beyond Dualism. *Cambridge Journal of Economics*, 14, 143-57.
- Edgell, S and Tilman, R (1991). John Rae and Thorstein Veblen on Conspicuous Consumption: A Neglected Intellectual Relationship. *History of Political Economy*, 23(4), 731-44.
- Elliott, J E (1983). Schumpeter and the Theory of Capitalist Economic Development. *Journal of Economic Behavior and Organisation*, 4, 277-308.
- Hume, D (1975). *Enquiries Concerning Human Understanding and Concerning the Principles of Morals*. L A Selby-Bigge and P H Nidditch (eds). Oxford: Clarendon.
- James, R W (1951). The Life and Work of John Rae. *Canadian Journal of Economics and Political Science*, 17(2), 141-63.
- Kuhn, T S (1974). Second Thoughts on Paradigms. In F Suppe (ed.), *The Structure of Scientific Theories*. Urbana: University of Illinois Press, 459-82.
- Lakatos, I (1970). Falsification and the Methodology of Scientific Research Programmes. In I Lakatos and A Musgrave (eds), *Criticism and the Growth of Knowledge*. Cambridge: Cambridge University Press, 91-196.
- Macfie A L (1955). The Scottish Tradition in Economic Thought. *Scottish Journal of Political Economy*, 2(2), 81-103.
- Mair, D (1990). John Rae: Ugly Duckling or Black Swan? *Scottish Journal of Political Economy*, 37(3), 275-87.
- Mair, D (1991). Introduction. D Mair (ed.), *The Scottish Contribution to Modern Economic Thought*. Aberdeen: Aberdeen University Press.
- Pesciarelli, E (1994). Is There a Scottish Tradition in the Economics of Innovation?'. In M Albertone and A Masoero (eds), *Political Economy and Natural Realities*. Torino: Fondazione Luigi Einaudi, 269-88.

- Prychitko, D L 1995. Methodological Individualism and the Austrian School. In D L Prychitko (ed.), *Individuals, Institutions, Interpretations: Hermeneutics Applied to Economics*. Aldershot: Avebury.
- Rae, J (1834; 1964). *Of Some New Principles on the Subject of Political Economy*. New York: Augustus M Kelley.
- Skinner, A S (1990). The Shaping of Political Economy in the Enlightenment. *Scottish Journal of Political Economy*, 37(2), 145-65.
- Smith, A (1759; 1976). *The Theory of Moral Sentiments*. Ed. by D D Raphael and A L Macfie. Oxford: Clarendon.
- Smith, A (1776; 1976). *An Inquiry into the Nature and Causes of the Wealth of Nations*. Ed. by R H Campbell and A S Skinner. Oxford: Clarendon.
- Smith, A (1795/1980). History of Astronomy. In W P D Wightman (ed.) *Essays on Philosophical Subjects*. Oxford: Clarendon.