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The Roles of Intellectual Pedigrees in Economic Science

By WILLIAM GUTHRIE*

ABSTRACT. Intellectual pedigrees, reviews of the intellectual history of a theory, perform important functions in *economic science*. The discipline of *economics* is comprised of numerous, competing *paradigm*-schools. Therefore, both 'normal' and 'revolutionary' science occur continuously in economics. In *normal science*, pedigrees place current work in the context of an on-going *research program*, demonstrate the "significance" of that work, influence the process of *theory appraisal*, and aid in establishing *professional consensus*. *J. M. Keynes'* use of pedigrees in his *General Theory* illustrates their revolutionary functions. During *revolutionary science*, pedigrees establish the identity, legitimacy, relevancy and *authority* of one school of economists and seek to persuade non-members to convert their allegiance to its *disciplinary* matrix.

I

Introduction

IT IS A CONVENTION among economists to include surveys of the intellectual history or pedigree of the theories, ideas or problems investigated in their scientific writings.¹ From a methodological perspective, however, this convention is something of an anomaly. The contemporary philosophy of science recognizes neither the pedigree of an idea nor the authority of previous contributors to its development as criteria for *establishing its validity*.² Nevertheless, the convention persists and is ubiquitous. This fact suggests that intellectual pedigrees must perform important functions in the conduct of economic science. The purpose of this paper is to identify these functions and clarify their roles in economic science.

For expositional convenience, I initially adopt Kuhn's dichotomy between "normal" and "revolutionary" science for my analytic approach. Then I examine the roles of intellectual pedigrees during normal science, and in revolutionary science. I illustrate the revolutionary function of pedigrees by examining Keynes' use of them in his *General Theory*. Then, I abandon the dichotomy device and study the functions of pedigrees in the modern economics discipline which

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encompasses, simultaneously, a number of competing methodological schools. Lastly, I discuss the implications of my findings.

II

Intellectual Pedigrees in Normal Science

NORMAL SCIENCE is a cumulative, incrementally progressive activity that occurs under the regime of a prevailing, disciplinary matrix.³ Such science encompasses both empirical and theoretical work. Empirical fact gathering is aimed at increasing the precision, accuracy and scope of facts; comparing facts with the predictions of theory so as to demonstrate their agreement (*i.e.*, testing hypotheses and estimating parameters); and resolving uncertainties about the structural parameters of theory. Similarly, theoretical work is directed toward using existing theory to predict future events, manipulating theories so that they may be tested against facts, and reformulating theories in order to clarify their meaning. Such activities involve solving puzzles, under the discipline of methodological guidelines that are accepted by all participants in the matrix-community's research program.⁴

During normal science, intellectual pedigrees document the importance of a particular issue or problem *to the community of practitioners*. They "place" the current work in the context of past and concurrent research. They acknowledge the contributions of predecessors. They inform readers of the current state of the literature. They clarify the new work's *contribution* to the community's ongoing research program. Thus, one normal science function of intellectual pedigrees is to acknowledge and maintain continuity with past research efforts; a second is to establish the significance of the current endeavor.

Furthermore, Tarascio and Caldwell suggest that, in a practical sense, pedigrees influence the process of theory choice.⁵ Papers containing intended contributions are submitted to scholarly journals where they are subjected to peer review. Pedigrees communicate important information to journal referees. They document the author's "grasp of the literature," and hence the extent to which he is "well-informed" about his subject matter. This indicates, in turn, whether the author is "well motivated" and (professionally) competent to make a contribution to the community's research. Also, pedigrees indicate the "significance" of the issue being addressed and, implicitly, suggest standards by which the freshness, novelty and importance of the (intended) contribution are to be judged. In short, to the extent that the article-selection process proxies theory choice, intellectual pedigrees play a role in theory evaluation, in practice if not in philosophy.

Finally, pedigrees indicate the degree of consensus surrounding a particular issue or theory. As Tarascio has suggested, consensus plays an important role in the production and validation of economic knowledge.⁶ This is necessary because the complexity and interdependence of (social and) economic phenomena render conclusive empirical tests of alternative hypotheses virtually non-existent. Accordingly, explicitly recorded pedigrees serve to reveal, and thereby constrain, eccentric or idiosyncratic approaches to, or solutions of, normal science puzzles.

III

Intellectual Pedigrees in Revolutionary Science

SCIENTIFIC REVOLUTIONS are non-cumulative episodes during which an established matrix is challenged by an incompatible and incommensurable rival matrix. The alternative matrix says different things about the behavior of the discipline's subject matter; it asks different questions. Furthermore, it presupposes a different methodology: distinct analytic methods, dissimilar criteria for theory evaluation and choice, and a revised scope of inquiry. In short, the rival matrix redefines the boundaries of a discipline and revises its subject matter.⁸

The lack of common methodological standards between two matrix-schools means that conflicts between those schools cannot be resolved by appeal to the logic of normal science. Each school asks the questions and applies the evaluative criteria of its *own* matrix. There are no commonly shared (that is, "objective," scientific) standards to which appeal can be made. Indeed, two schools may not even "speak the same language," because each defines and understands common terms in diverse ways. Rival schools are at cross-purposes and talk around one another.⁹ Instead, recourse must be to external values regarding which questions are "significant" (for the discipline to ask) and what standards should be applied to judge the validity of the answers that are offered. Accordingly, revolutionary science is an affair of persuasion, of conversion to a different point of view and an incommensurate set of methodological canons.¹⁰

Therefore, during revolutionary science intellectual pedigrees perform functions markedly different than those in normal science. Here they are deployed in a struggle for intellectual allegiance in order to foster the process of conversion. In this mode, pedigrees are often employed to resuscitate ideas from the past that have been "lost," neglected or ignored when first advanced, because they have been incompatible with the paradigmatic vision of earlier generations of practitioners. Thereby, pedigrees are persuasive in two ways: first, they demonstrate that a "new" theory has roots in earlier thought, that an apparent in-

novator does not stand alone; second, they implicitly appeal to the authority of important predecessors.

Lastly, pedigrees illuminate a revolutionary author's own path of conversion. This feature is useful to historians of thought who are attempting to reconstruct the development of a theory. (This is particularly true when the pedigree of a revolutionary work can be compared to that of a pre-revolutionary work by the same author.)

IV

Intellectual Pedigrees in the *General Theory*

KEYNES BELIEVED his *General Theory* to be a revolutionary shift away from the "classical" school's normal science research program, and employed intellectual pedigrees in the *General Theory*. The pedigrees he selected illuminate his own process of conversion from the (neo-) classical matrix to that manifested in the *General Theory*.

Keynes' Attitude Toward His 'General Theory'

Keynes plainly was aware that he was breaking away from the cumulative normal science research program of the earlier paradigm:

For a hundred years or longer English Political Economy has been dominated by an orthodoxy. That is not to say that an unchanging doctrine has prevailed. On the contrary. There has been a progressive evolution of the doctrine. But its presuppositions, its atmosphere, its method have remained surprisingly the same, and a remarkable continuity has been observable through all the changes. . . . But I . . . have felt myself to be breaking away from this orthodoxy, to be in strong reaction against it, to be escaping from something. . . .¹¹

The composition of this book has been for the author a long struggle of escape, and so must the reading of it to be for most readers if the author's assault upon them is to be successful,—a struggle of escape from habitual modes of thought and expression. . . . The difficulty lies, not in the new ideas, but in escaping from the old ones, which ramify, for those brought up as most of us have been, into every corner of our minds.¹²

Moreover, he was aware that he was offering a revolutionary change in theory and perspective to the community of economists.

To understand *my* state of mind, however, you have to know that I believe myself to be writing a book on economic theory which will largely revolutionize—not, I suppose at once, but in the course of the next ten years—the way the world thinks about economic problems.¹³

Also, Keynes understood that a new normal science tradition would articulate his fundamental paradigmatic ideas over time.

I am more attached to the comparatively simple ideas which underlie my theory than to the particular forms in which I have embodied them, and I have no desire that the latter would be crystallized at the present state of the debate. If the basic ideas can become familiar and acceptable, time and experience and the collaboration of a number of minds will discover the best way of expressing them.¹⁴

In short, Keynes offered a scientific revolution to professional economists.

Keynes' Use of Intellectual Pedigrees

At the beginning of the *General Theory*, Keynes explicitly states that the purpose of his work is to provoke controversy in order to persuade his fellow economists to abandon the worn out "classical" orthodoxy and to adopt a new vision:

This book is chiefly addressed to my fellow economists. I hope that it will be intelligible to others. But its main purpose is to deal with difficult questions of theory. . . . For if orthodox economics is at fault, the error is to be found not in the superstructure, which has been erected with great care for logical consistency, but in a lack of clearness and of generality in the premises. Thus I cannot achieve my object of persuading economists to re-examine critically certain of their basic assumptions except by a highly abstract argument and also by much controversy. I wish there could have been less of the latter. But I thought it important, not only to explain my own point of view, but also to show in what respects it departs from the prevailing theory. . . . The matters at issue are of an importance which cannot be exaggerated. But if my explanations are right, it is my fellow economists, not the general public, whom I must first convince.¹⁵

The controversy to which Keynes refers was, of course, generated by his critical treatment—some would say, caricature—of "classical" economics and economists. Thus, one use that Keynes made of pedigrees was a rather negative one. He was attempting to persuade professional economists to abandon the classical paradigm, as well as to convince them to adopt his new one. (This theme of persuasion appears also in the German and French edition prefaces to the *General Theory*.)¹⁶

Secondly, Keynes was concerned with documenting the continuity of his ideas with those of past economists. As he struggled to express this notion of continuity in succeeding drafts of the *General Theory*, many of his colleagues and collaborators criticized his strident criticism of the "classicals" as unnecessarily harsh and caustic. In response to one such criticism from Harrod, Keynes replied,

What I want is to do justice to schools of thought which the classicals have treated as imbecile . . . and above all, to show that I am not really being so great an innovator, except as against the classical school, but have important predecessors and am returning to an age-long tradition of common sense.¹⁷

In the *General Theory* itself, we see that Keynes felt the weight of the past, and that he took pains to identify both the traditions that he was rebelling against and those to which he was returning. Regarding the rejected tradition, in his opening chapter he wrote that he intended:

. . . to contrast the character of my arguments and conclusions with those of the *classical* theory of the subject, upon which I was brought up and which dominates the economic thought, both practical and theoretical, of the governing and academic classes of this generation, as it has for a hundred years past.¹⁸

Moreover, he took care to identify the membership (of the “classical” school) whose theories he now found inadequate to the realities of the day. Specifically, he included, “. . . in the classical school the *followers* of Ricardo, those, that is to say, who adopted and perfected the theory of Ricardian economics, including (for example) J. S. Mill, Marshall, Edgeworth, and Prof. Pigou.”¹⁹ References to perceived inadequacies in the works of these classical economists appear throughout the body of the *General Theory*.²⁰

Later, in the twenty-third chapter of that book, Keynes traced the ancestry of *his* ideas. His forerunners are identified as those who believed that deficient spending (or an over-supply of goods) was a chronic economic problem. He divided this deficient-spending school into two branches. The Mercantilists, Scholastics and individuals such as Gesell proposed “under-investment” theories; and recommended usury laws, increases in the domestic money stock, stable-wage units, and, if necessary, devaluation of the currency, to hold down interest rates and thus stimulate aggregate spending.²¹ Members of the other branch of the school were said to hold “under-consumption” theories. Amongst the “under-consumptionists” Keynes numbered Laffemas, Petty, Mandeville, Malthus, Hobson, and Mummery;²² and their remedies included discouragement of thrift and redistribution of income. Responding to the severely depressed economic conditions of the 1930s, Keynes advocated all of these policy remedies, in addition to his central recommendation of deficit-financed, public works expenditures.

Keynes' Own Path to Conversion

Furthermore, in presenting his pedigree, Keynes, in effect, unveiled his own process of conversion from the neoclassical paradigm to that of the *General Theory*.²³ That it was a “conversion” for him is evidenced by his allusions to a change of “religions” in the prefaces to foreign language editions of his book. In the German edition, for example, he wrote:

I taught these doctrines myself and it is only within the last decade that I have been conscious of their insufficiency. In my own thought and development, therefore, this book represents a reaction, a transition away from the English classical (or orthodox) tradition. My emphasis upon this in the following pages and upon the points of my divergence from received doctrines have been regarded in some quarters in England as unduly controversial.

But how can one brought up a Catholic in English economics, indeed a priest of that faith, avoid some controversial emphasis, when he first becomes a Protestant?²⁴

The strident, controversy-provoking attack on the classicals, and all of the associated reconstruction of a “classical” paradigm, was part and parcel of Keynes’ own “long struggle of escape” from that paradigm to his new one.

I have been much pre-occupied with the causation, so to speak, of my own progress of mind from the classical position to my present views,—with the order in which the problem developed in my mind. What some people treat as unnecessarily controversial is really due

to the importance in my own mind of what I used to believe, and of the moments of transition which were for me personally moments of illumination. . . . people are divided between the old ones whom nothing will shift and are merely amazed by my attempts to underline the points of transition so vital in my own progress, and the young ones who have not been properly brought up and believe nothing in particular. The particles of light seen in escaping from a tunnel are interesting neither to those who mean to stay there nor to those who have never been there!²⁵

The extent to which Keynes "broke" with his past is evident when we compare the intellectual pedigrees contained in the *General Theory* to that included in

Table 1
METHODOLOGY AND HISTORY OF ECONOMIC THOUGHT ARTICLES
IN ECONOMIC JOURNALS
(Number and Percent of Total)

Journal (Classification)	Number (Percent) of Methodology Articles ^a	Number (Percent) of Thought Articles ^b	Total Articles Published ^c
Amer. Eco. Rev.(0) ^d	25(0.84)	39(1.31)	2970
Economica(0)	4(0.81)	28(5.69)	492
Eco. Inquiry (0)	2(0.28)	24(3.31)	724
Eco. Journal (0)	4(0.47)	43(5.02)	857
J. of Economic Issues(H) ^d	86(10.25)	186(22.17)	839
J. of Political Economy(0)	6(0.46)	38(2.89)	1313
J. of Post-Keynesian Economics(H)	22(6.11)	57(15.83)	360
Quarterly J. of Economics(0)	0(0.00)	35(4.09)	855
Review of Economic Studies(0)	0(0.00)	3(0.34)	882
Review of Radical Political Economics(H)	1(0.39)	45(17.65)	255
Southern Economic Journal(0)	10(0.73)	34(2.49)	1371

Notes:

^a-Titles listed under category 036 (032 before September 1971) of the Journal of Economic Literature's (JEL'S) Subject Index of Articles (SIA).

^b-Titles listed under category 031 of the JEL'S SIA, but NOT under category 036.

^c-Total titles listed under the JEL'S Contents of Current Periodicals.

^d-(0) denotes orthodox and (H) denotes heterodox.

his earlier work, *A Treatise on Money*. In the latter work, Keynes presented certain parts of the orthodox (*i.e.*, classical), theoretical corpus as his intellectual ancestry. Then, after he underwent a shift in paradigmatic vision, he spurned further development of the classical research program and selected another tradition that was consistent with his new vision.

Specifically, Keynes' *Treatise* represented a refinement and extension of the Cambridge orthodoxy which traced its roots back to Ricardo, Mill and Marshall. It was, in short, a highly refined extension of Cambridge classical-neoclassical

monetary theory. As such, it was concerned with the reaction of prices to changes in the composition of real output, the allocation of resources, and the re-distribution of money income, under the assumptions that total output is fixed and all resources are fully employed. The scientific problem examined in the *Treatise* is how to establish and maintain a composition of output, allocation of resources, and distribution of income such that prices remain stable, because the maintenance of equilibrium prices insures that neither under-employment nor over-employment of resources will occur.

The *General Theory* on the other hand, represented a resurrection and extension of the non-classical, Mercantilist/Malthusian, "over-savings" body of theory which had been either ignored or labelled as heretical by the classical economists. The scientific problems investigated there are how the level of aggregate demand is determined and how to raise a "deficient" level to one at which all resources will be fully employed. Thus, different paradigmatic *visions* and different pedigrees are inherent in the *Treatise* and the *General Theory*.

Table 2
RELATIVE INTEREST IN METHODOLOGY
AND
HISTORY OF ECONOMIC THOUGHT IN ECONOMICS JOURNALS

Category of Journal	Percent of Methodology Articles	Percent of History of Thought Articles	Number of Journals (Articles)
All	1.47	4.87	11(10918)
Orthodox	0.54	2.58	8(9464)
Heterodox	7.50	19.81	3(1454)

Now, if the *Treatise* had been a contribution to the "deficient-demand" tradition, one would expect to find in it similar, salutary references to "non-classical" economists. However, one does not. In the *Treatise*, only the name of one, Hobson, appears at all. There he is identified as being a member of the "over-saving" or "under-consumption" school; and Keynes of the *Treatise* perceived such ideas as having *little* to do with his ideas then.

Insofar as these theories are capable of any reconciliation with mine, it is a latter stage in the course of events; for in certain cases a tendency for the rate of investment to lag behind the rate of savings might come about as the result of a reaction from over-investment in the above sense. Insofar, however, as these theories maintain that the existing distribution of wealth tends to a large volume of saving, which leads in turn to over-investment, which leads to too large a production of consumption-goods, they are occupying an entirely different *terrain* from my theory. . .²⁶

When Keynes' vision changed, he selected a new intellectual ancestry.²⁷

V

Intellectual Pedigrees in Economic Science

EMPIRICALLY, THE MODERN DISCIPLINE of economics is a peculiar one, comprised of numerous, competing matrix-schools: neo-Keynesians, neoclassical Monetarists, Socialists, neo-Marxist Radicals, “new” Classical economists, Evolutionary neo-Institutionalists, Post-Keynesians, and neo-Austrians, to name a few. Each of these schools has its own (cumulative) normal science research program in which it addresses its peculiar “puzzles” by means of a distinctive methodological approach.²⁸ The more germane normal science research findings are typically reported in scholarly journals.

In scholarly articles devoted to normal science reporting, intellectual pedigrees fulfill the function of informing other practitioners of the state of the literature, identifying sources of non-original ideas, clarifying the significance of the current contribution, etc. Also, pedigrees (implicitly) supply standards of evaluation to journal referees who are the executors of peer review and criticism. In short, intellectual pedigrees play important roles in economics, in part because normal science research is continuously being conducted.

Furthermore, the different schools are rivals for the allegiance of the discipline’s practitioners. Therefore, revolutionary science too occurs continuously among economists, and pedigrees also play revolutionary roles. They are used to persuade rivals that one school is “true” to a tradition which has been perverted by other schools, or represents a tradition which environmental and cultural changes have rendered more relevant than competing ones.²⁹ Often, too, pedigrees attempt to establish that one school is the “true” successor to the mantle of a universally or widely respected predecessor.³⁰ Indeed, as shown in Tables 1 and 2, (relatively) small, heterodox schools devote a significantly larger proportion of their journal space to methodological issues and investigations of historical ancestry than do orthodox schools with a large number of adherents.³¹ In short, in revolutionary campaigns, pedigrees seek to establish the legitimacy, identity, relevancy and authority of one school and to persuade non-members to accept its disciplinary matrix.

VI

Summary and Implications

TO CONCLUDE, the presentation of intellectual pedigrees is a convention in economics because of the structure of the economics discipline. This structure is one in which numerous matrix-schools comprise a single discipline. Within

each school, normal science research is conducted continuously. At the same time, revolutionary science is occurring and campaigns of conversion are being waged between adherents to rival disciplinary matrices. Since intellectual pedigrees fulfill important functions in both types of science, and both types occur continuously within the discipline, it is understandable that the convention exists and is ubiquitous. In practice, if not in philosophy, pedigrees perform useful functions in such an environment.

These findings have two important implications. The first is that highly subjective factors influence the conduct of scientific economics. Disciplinary matrices are selected, as Kuhn has suggested, on bases other than those of the positivistic philosophy of (normal) science.³² Consensus and authority (of predecessors) play important roles; so do extrascientific values when questions of “significance” and “relevance” arise between members of competing matrix-schools.

Secondly, the current revival of interest in the history of economic thought may represent something more concrete than a “sense of crisis” in macroeconomics. It may reflect the emergence of new matrix-schools, and their sponsorship of their own professional journals.³³ Such journals contain a relatively high proportion of methodological and history of thought articles. If “interest” in a field is measured by the relative amount of journal space devoted to its topics, one would expect to observe a surge of interest in these fields, at least temporarily, as such journals proliferate.

Notes

1. The term “intellectual pedigree” refers to an author’s review of the literature, statement of the intellectual ancestry of his theory or analytic approach, or critical survey of the histories of ideas related or opposed to his. At times, of course, a pedigree is more than a convention, as when, for example, the history of a problem or idea is presented because its development is crucial to its understanding.

2. By the term “authority” I mean adopting a belief of predecessors without reference to the rational or empirical grounds on which that belief rests. Perhaps then, it would be more accurate to say that contemporary philosophers of science have not *explored* the role of authority in the *validation* of knowledge. Sociologists of science, on the other hand, have recognized that authority, in my sense, does play a role in *establishing professional consensus*. See, for example, A. W. Coats, “The Role of Authority in the Development of British Economics,” *Journal of Law and Economics*, Vol. 7, (October, 1964), pp. 85–106, and Section II of this paper.

3. Thomas Kuhn proposed the term “disciplinary matrix” to replace his ambiguous “paradigm.” The matrix is comprised of: a fundamental metaphysical vision, basic theoretical concepts and generalizations, a methodology, and concrete, model puzzle-solutions or “exemplars.” See Thomas Kuhn, *The Structure of Scientific Revolutions*, 2nd ed., (Chicago: Univ. of Chicago Press, 1970), pp. 174–75, 182–87. Throughout this paper the terms “disciplinary matrix,” “matrix” and “paradigm” are used interchangeably to refer to the set of fundamental elements that determines the structure of a research program.

4. *Ibid.*, pp. 23–42.
5. See Vincent Tarascio and Bruce Caldwell, "Theory Choice in Economics: Philosophy and Practice," *Journal of Economic Issues*, Vol. 13, No. 4 (December, 1979), pp. 995–1001.
6. See Vincent Tarascio, "Some Recent Developments in the History of Economic Thought in the United States," *History of Political Economy*, Vol. 3, No. 2 (Fall, 1971), pp. 427–28.
7. Pedigrees influence conference selection committees and publishers' editors in a similar fashion.
8. Kuhn, *op. cit.*, pp. 92–110.
9. *Ibid.*, pp. 103, 109–10, 181–87.
10. *Ibid.*, pp. 198–210.
11. John M. Keynes, *The General Theory of Employment, Interest and Money*, Vol VII: *The Collected Writings of John Maynard Keynes* (Cambridge: Cambridge Univ. Press, 1971), p. xxxi.
12. *Ibid.*, p. xxiii.
13. Donald Moggridge, ed., *The General Theory and After, Part I: Preparation*, Vol. XIII: *The Collected Writings of John Maynard Keynes* (Cambridge: Cambridge Univ. Press, 1973), p. 492.
14. Donald Moggridge, ed., *The General Theory and After, Part II: Defense and Development*, Vol. XIV: *The Collected Writings of John Maynard Keynes*, (Cambridge: Cambridge Univ. Press, 1973), p. 111.
15. Keynes, *op. cit.*, p. xxi.
16. *Ibid.*, pp. xxv–xxvi, xxxi–xxxv.
17. Moggridge, *op. cit.*, Vol. XIII, p. 552.
18. Keynes, *op. cit.*, p. 3.
19. *Ibid.*, p. 3n.
20. *Ibid.*, pp. 3, 4–22, 29, 32–4, 93, 112, 139–41, 165–6, 174–93, 257–60, 284, 304, 333–5, 339, 348–9, 351, 356, 366, 374.
21. *Ibid.*, p. 340.
22. *Ibid.*, pp. 324–6, 358–71.
23. A synopsis of the stimuli that prodded Keynes toward a change of view is found in his *Collected Writings*; see *Ibid.*, pp. xv–xvi. More detailed treatments that include the influence of contemporary events are offered in William Guthrie, "Cultural Influences, Methodological Judgments and the Evolution of Economic Theory," *Mid-South Journal of Economics*, Vol. 6, No. 1, (May, 1982), pp. 71–83, and in Donald Moggridge, *John Maynard Keynes* (New York: Penguin Books, 1976).
24. Keynes, *op. cit.*, p. xxv.
25. Moggridge, *General Theory and After*, Vol. XIV, pp. 84–5.
26. John M. Keynes, *A Treatise on Money: The Pure Theory of Money*, Vol. V: *The Collected Writings of John Maynard Keynes*, pp. 159–61.
27. Further evidence of revised pedigrees may be found in a 1932 draft chapter titled "Historical Retrospect" and in a 1934 BBC broadcast, "Is the Economic System Self-Adjusting;" see Moggridge, *The General Theory and After*, Vol. XIII, pp. 406–7, 485–92.
28. The neo-Austrians are a possible exception. Edwin Dolan claims that neo-Austrians are engaged, almost exclusively, in extraordinary (*i.e.*, revolutionary) science; see Edwin Dolan, ed., *The Foundations of Modern Austrian Economics* (Mission, KS: Sheed & Ward, Inc., 1976), pp. 3–15.
29. See Vincent Tarascio, "Value Judgments and Economic Science," *Journal of Economic Issues*, Vol. 5, No. 1, (March, 1971), pp. 98–102, and Guthrie, *op. cit.*, for discussions of the relationships between cultural factors, methodological judgments and economic theory.

30. For example, see Abba Lerner, "The Scramble for Keynes' Mantle." *Journal of Post-Keynesian Economics*, Vol. 1, No. 1 (Fall, 1978), pp. 115–23.

31. As a crude indicator of the plausibility and relevance of the hypothesis that heterodox matrix-schools have more interest in the history of economic thought and methodology than do orthodox communities of economists, I have compared the frequencies with which such articles have appeared in eleven journals. These journals were selected to give a balanced representation to journals dedicated to the conventional wisdom, on the one hand, and to those representing divergent views, on the other. This (non-random) method of selection may introduce an element of bias; but the bias is not believed large enough to affect the apparent results. Only the orders of magnitude, and not the precise values, of the relative frequencies are relevant.

Table 1 lists the absolute and relative frequencies for both types of articles in each of the eleven journals. Table 2 presents the mean proportions of each type of article in journals of orthodox versus heterodox communities. The data were collected from the *Journal of Economic Literature*, Volumes 7 through 22 (March, 1969–December, 1984). The able assistance of Ms. Judith Holbert, Graduate Assistant, is gratefully acknowledged.

32. Kuhn, *op. cit.*, pp. 100, 192–210.

33. Obviously, "crises" and the emergence of new matrix-schools are related phenomena. New paradigms, theories and methodologies are offered to resolve the anomalies which generate crises. Also, a sense of crisis creates the opportunity to win converts to alternative matrices.

Changes at Journal of Forecasting

NOW IN ITS 5TH YEAR, the *Journal of Forecasting*, which seeks to be the international forum for objective discussion of key issues and advances in all areas of forecasting, has reconstituted its editorial structure to emphasize its multi-disciplinary model building interests in that subject. The quarterly journal, a British-American collaboration with associates in various countries of the world, is published by John Wiley & Sons Ltd., Baffins Lane, Chichester, Sussex PO19, England and now edited by Derek Bunn of the London Business School. Subscriptions: UK £39.50; US and elsewhere \$74.50, with special rates for personal subscribers.

W.L.

Statistics: Weapon Against Discrimination

THE LEGAL CONCEPTS and methodological difficulties vital to proving or rebutting claims of discrimination with statistical evidence are covered in *Statistical Methods in Discrimination Litigation* edited by D. H. Kaye and Mikel Aickin and published by Marcel Dekker, Inc. (New York, NY 10016: \$49.75). It is a useful reference for expert consultants.

W.L.