Epistemetrics

Epistemetrics is a scholarly discipline waiting to be born. With regard to scientific information there is the discipline of scientometrics, represented by a journal of that name. Science, however, does not have a monopoly on knowledge; although it is one of our most important cognitive resources, it is not our only one. While scientometrics is a centerpiece of epistemetrics, it is far from being the whole of it. Nicholas Rescher's endeavor to quantify knowledge is not only of interest in itself, but it is also instructive in bringing into sharper relief the nature of and the explanatory rationale for the limits that unavoidably confront our efforts to advance the frontiers of knowledge. In pursuing this objective, Rescher's book takes the measure of both the vast extent and the ultimate limitations of human knowledge.

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To James R. Wible

Contents

Preface

> When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of *science*.
>
> – William Thomson, Lord Kelvin (1824–1907), English Physicist

This book develops the theory of knowledge from a quantitative perspective that serves to throw light on the scope and limits of human knowledge. It seeks to provide theorists of knowledge in philosophy, information theory, cognitive studies, communication theory, and cognate disciplines with the conceptual tools required for a quantitative treatment of the products of inquiry.

Kelvin's dictum is an exaggeration that takes things too far. I have never thought for a moment that if you cannot say it with numbers that it just is not worth saying. But all the same, I do firmly believe that where you cannot put numbers to work you will understand the matter better and more clearly for being able to explain why. So it seems well worthwhile to see what a qualitative approach to knowledge can do for us.

The discipline represented by the domain of inquiry to which the present book is addressed does not as yet exist. *Epistemetrics* is not yet a scholarly specialty. To be sure, as regards scientific information in specific there is the discipline of scientometrics, represented by a journal of that name. But while this book too will keep scientific knowledge in

the foreground, various of its key principles – for example Duhem's Law of Chapter 1, or the Principle of Quality Retardation of Chapter 6 – hold every bit as much for our knowledge of everyday-life matters as they do for the natural and human sciences. After all, science does not have a monopoly on knowledge: while it is doubtless our most important cognitive resource it is not our *only* one. And so while scientometrics is a centerpiece of epistemetrics, it is not the whole of it.[1]

Again the measurement of *intelligence* is a large and flourishing industry. But intelligence is no more than the *capacity* for producing and handling knowledge and does not as such address the product itself. Then too there are all sorts of tests and quiz shows and even games (on the order of Trivial Pursuit) that compare the knowledge of different individuals. But of course such comparisons do not address the epistemetric issue of cognitive measurement at large. And so, seeing that epistemetrics is not as yet an established field of inquiry, the present discussion can do no more than offer a preliminary glimpse into the nature of such a discipline.

Autobiographically speaking, I now believe that my brief time of service at the RAND Corporation some 50 years ago convinced me of the power and utility of the quantitative point of view. And I am persuaded that it affords us the basis for a deeper understanding of the nature and prospects of the processes at issue with the accession and development of knowledge.

To be sure, many factors conspire to make the measurement of knowledge into a vexed and complicated enterprise. A head count of particular items of information is of course pointless because one item can informatively encompass many others. Thus someone who knows a general truth is in a position to infer all of its potentially innumerable instances. One generalization can encompass a zillion particularities. And this points to the further issue that information is not created equal – some items deal with large and important matters, some with trivialities.

Given such complications it may seem unexpected that anything instructive can be accomplished in the epistemetric project of quantifying knowledge. But something can indeed be done, and the

[1] My personal effort in the domain of scientometrics is represented by my *Scientific Progress* (Oxford: Blackwell, 1978). It will be obvious to anyone who knows that book that the present work is heavily indebted to it.

present discussion will endeavor to synthesize and coordinate some of the useful suggestions that have been offered along these lines over the years.

Rather surprisingly, epistemology, that is, the theory of *knowledge*, has generally not made much of the distinction between various modes of cognitively available material – between reasonable conjecture and plausible supposition, for example, or between reliable information and actual knowledge. But it is this latter distinction – between mere information and genuine knowledge – that is pivotal for the present deliberations, which will seek to address the qualitative issue of knowledge versus information in a quantitative perspective.

The book's venture into the quantification of knowledge will proceed by a series of principles which, for reasons of mnemonic vividness can be indicated by association with various scientists and philosophers. Sometimes their work suggests rather than formulates what is at issue. But no matter! For what matters more than historical piety is that the pieces all fit together to make up a coherent and cohesive story regarding the limitations of inquiry and the limits of knowledge.

Ironically, the business of cognitive quantification is so problematic that one could say with some justice that the present treatment of quantities is qualitative in nature, and that rather than providing a properly quantitative assessment of our knowledge it only offers a qualitative perspective on it. But even if that were so, such an exercise is instructive in bringing into sharper relief the nature of and the explanatory rationale for the limits that unavoidably confront our ongoing efforts to advance the frontiers of knowledge. And the quantitative perspective developed here – in however rough and sketchy a way – affords some instructive insights into the nature of cognition that no merely qualitative deliberations would make available. In particular, the project manages to throw some vivid light on the unavoidable limitations of human knowledge.

Erik Angner and C. J. Thomas read my manuscript and spotted various corrigenda. And I am grateful to Estelle Burris for her highly competent assistance in seeing the book through the process of getting into print.

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