Time in History: The Evolution of Our General Awareness of Time and Temporal Perspective *by Gerald J. Whitrow*
(Oxford University Press, Oxford, 1988), pp. x + 217, $39.95, ISBN 0-19-215361-7.

This book has an interesting title. 'History' is a word that evokes an image of time flowing, so 'time' might be considered to be contained within history. The curious interplay of words that discussions of time generate is one of the main attractions to anyone interested in the nature of time and how it affects human and societal behaviour. Whitrow, however, steers clear of impending paradoxes and concentrates solely on society's perspectives in the context of an exploration of people's reflections on time's nature. As such, *Time In History* is about humanity's views of time throughout history.

The reader is not launched into history, however. The first few chapters are more concerned with some psychological, philosophical, technical and linguistic implications of our use and view of time. In a sense, these chapters are an attempt to draw together some universal aspects of humanity which have their common thread in our perception of time. For instance, Whitrow describes the way in which a child learns to appreciate time and related concepts such as lateness and the essentially artificial nature of time measurement. He also discusses the "universal connection between time and language" (p.11) and how differing languages reflect different views of time and cosmological knowledge. As such, nothing seems particularly novel in these chapters, although they may form a useful first reference point for those interested in pursuing such issues further.

The way in which time awareness in intertwined with natural events and religious interpretation becomes evident early as Whitrow journeys from country to country in ancient times and the middle ages (Part II). In Chapter Three, the considerable influence of geography and other natural phenomena are brought out. Ancient Egypt, perhaps unsurprisingly, incorporated a cyclical view of time into their culture because of that civilisation's intimate relationship with the periodic flooding of the Nile. This is in contrast to Ancient Sumeria and Babylonia which had to contend with far less predictable natural events. The only regularities seemed to be cosmological and thus time awareness in Mesopotamia was tied up in the heavens as was their idea, or lack of ideas, about the role of history. Of course, these differences did not prevent both cultures from developing calendars.

In Chapter Four, we are told that the view of time in Ancient Greece, Israel, and Rome came to be increasingly tied with human observation of their own world and the historical environment. The first historians emerged at this time as did a greater reliance on calendars to indicate the timing of human events (for example, religious festivals). It is, therefore, not unexpected that the great philosophers of the age found it important to speculate on the nature of time and its relation to human thought. A review of these evolving philosophical ideas forms a dominant part of this chapter.

Events such as the decline of the Roman Empire and the rise of Christendom invited the emergence of written chronologies of historical events and the dating of years from approximate birth of that religion. Chapter Five chronicles such developments in the middle ages in both Europe and the Islamic world. In fact, this period saw advances made by Islamic civilisation in this area due to the general expansion of their interest in learning and science. Part of this revival

was accounted for by an interest in the measurement of the paths of celestial objects. But Whitrow also discusses the interesting consideration of the relation of music and the philosophical division of time that formed part of the writings of Moses Maimonides. It is also significant how much the view of time in this era was dependent upon beliefs held regarding the future course of the world. Part II concludes with a Chapter on time beliefs in the Far East and West which generally support the hypothesis of the environmental influence on time perceptions.

The final part of *Time in History* is a more direct consideration of the evolution of time perception in the modern world. Technological progress is considered to be the primary influence on our view of time. With urbanisation and the rise of commerce there was an increased demand for time measurement as a co-ordinating device. At first this demand was felt only in the upper echelons of society but this was sufficient to stimulate the crucial invention of the mechanical clock. From then events seemed to take their own course with the increasing influence of time awareness on urban people's lives. Whitrow's review of such issues is however not as comprehensive as others have been. His discussion of the development of the mechanical clock and its social implications are very superficial and those who are interested in details would probably do best to look elsewhere.[1]

Nonetheless, Whitrow's discussion of the political and cultural issues surrounding the reform of the calendar to its present state is comprehensive. Chapter Eight discusses the importance of the scientific revolution of the 17th and 18th centuries on perceptions of time. He also ties these issues with modern institutions and standards. For instance, he discusses the development of the modern measurement of a year, the form of the modern calendar, and in Chapter Nine the important developments in marine timekeeping which were so significant at the time for international travel and trade.

Not to be ignored during these chapters is the idea of the 'clocklike universe' and the deterministic outlook of Classical science and Newton's view of time. Whitrow remains speculative, however, upon whether the mechanical and pendulum clocks influenced Newton in the development of his absolute view of time. Nonetheless, he devotes considerable discussion to the influence this view of time had on the outlook of Industrial Revolution Europe. Finally, in Chapter Ten the impact of evolutionary thought on time perception is reviewed. As such, many issues such as progress, historical perspective and time asymmetry are raised and outlined but they are not really discussed in any great depth. Whitrow delves further into the way in which developments in communication and transportation moulded the use of time and hence its perception by ordinary citizens. It is interesting to note the resistance that was felt then to changes in time standards. For example, when the railways lobbied for a national time in England many localties believed that their very existence and self-esteem were being violated. But time standards eventually won over the most powerful of resistances including those national, e.g., France (p.166) and astronomical (p.168-9).[2]

The final chapters contain some speculative comments on the effect changes in our view of the universe brought about by the theories of special and general relativity and quantum mechanics have altered the meaning of time. These changes are particularly strong with regard to our view of progress which has become more of a fact in our everyday lives.[3] As Whitrow says, "there is now no doubt that the continuing momentum of scientific, medical and technological

progress makes it impossible for our civilisation to be regarded as either static or cyclic" (p.181). Of interest towards the end of the book are Whitrow's comments on the implications of information technology for our view of time. He notes that the current practices of selling time on sophisticated computers bears considerable resemblance to the lending of money for interest, another form of time selling, which brought the ire of many religions (p.183). Also, the rapid developments in technology have contributed to a feeling of age and growing obsolescence in people. "Moreover, because the present differs so much from the past, it is becoming increasingly difficult to realise what the past was like" (p.183). This leads to a paradox for as technology shortens our temporal perspective we need to rely increasingly on the past for guidance in understanding the present. "Consequently, nowadays the past is simultaneously devalued and enhanced in value" (p.184).

According to Whitrow, our perception of time is dependent upon time. Our attitudes towards time related concepts such as change and history are a product of change and history. Stated like this the ironic philosophy of time leaps out before us but the use of irony is, surprisingly, *not* a feature of *Time In History.* The book is a descriptive rather than analytical review and a reminder to us of how our views of time have changed throughout ancient and modern history and how this change is intimately tied with our environment, both physical and cultural. Whitrow's motivation is a belief that history is important and that we cannot consider the dominance of time in today's world without examining its evolution as a concept. As he says, "we must put time itself into temporal perspective" (p.vii).

It may be best to view *Time in History* as a reference book rather than a provoking, unfolding voyage of intellectual discovery. Almost all aspects of time, whether it be philosophical, historical, cultural, technological or scientific are touched upon without any single factor being discussed in any comprehensive sense. Considering the diversity of dimensions to time only a historical overview could hope to adequately serve as a pointer for further study. As a review, the book seems to fulfil its modest objective to provide such an overview. And it does this with chronological precision tracing time perfections from very ancient times — even before the time of 'Creation' believed by Hevelius in the 17th Century to be at six p.m. on the 24 October, 3963 B.C. (p.131) — through the Middle Ages to the present day.

The coverage of *Time in History* is very wide. As such, there are few issues regarding developments which have influenced views of time throughout history which are dealt with in any depth. Then again, there seem to be few issues that are left out completely. Thus, Whitrow has managed to write a book which provides a concise introduction to, not only time philosophy, but developments in time measurement and technology. Consequently, the book is probably of most use as a starting point for those interested in pursuing time related issues in further depth.

NOTES AND REFERENCES

1. For example, see D. Landes, *Revolution in Time: Clocks and the Making of the Modern World,* Harvard University Press, Cambridge, Mass., 1983.
2. Our current standards of time are no longer precisely associated with the movements of the Earth around the sun or the turning of the Earth but on atomic oscillations at the quantum level which define the second. This standard, in turn, determines other measuring yardsticks such as those for distance which derive from the speed light travels in a second.

3. Once again, however, those wanting an in-depth discussion of such issues would probably wish to try elsewhere. For example, an excellent recent compilation is R. Flood and M. Lockwood (eds), *The Nature of Time,* Basil Blackwell, Oxford, 1986.

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Wage Justice: Comparable Worth and the Paradox of Technocratic Reform *by Sara M. Evans and Barbara J. Nelson*
(The University of Chicago Press, 1989), pp. xiv + 224, ISBN 0-226-22259-4.

This book will be of interest to a number of audiences, including those with an interest in the women's movement, in public policy formation and implementation and in labour markets. Evans and Nelson present the results of a case study on legislative intervention for a comparable worth pay policy for women employees of state and local government in Minnesota.

The authors provide, as a definition of comparable worth, "the principle that jobs dissimilar in nature can be compared in terms of knowledge, skill, effort, responsibility and working conditions and that jobs equivalent in value in these terms should be paid equally" (p. 7). This definition highlights an issue in the 'equal pay' movement which Australian industrial tribunals have been reluctant to grapple with. In implementing the 1972 Arbitration Commission decision relating to 'equal pay for work of equal value', for example, successive decisions have generally avoided being drawn into comparisons of 'jobs dissimilar in nature'.[1]

The Minnesotan experience of the introduction and implementation of a comparable worth pay policy, on the other hand, was based firmly on the use of job evaluation techniques to compare dissimilar (and similar) jobs. The authors demonstrate that the results of job evaluations underpinned the case made by the proponents of the legislative intervention. In implementing the determinations of comparable worth wage changes were based on job evaluations within each organisation. The story told by the authors does highlight some of the issues which are raised by use of this technique. However, one should not look in this book for an in-depth discussion of job evaluation itself or the various instruments for job evaluation.

The most obvious audience for the study is the women's movement and that section of trade union leadership which is pursuing pay equity. Pay equity is the major issue for the authors, although they relate this issue to more general issues such as women's opportunities for community participation and the life choices open to women. Comparable worth is related to these issues because of the link they identify between lack of opportunity and choices, poverty and those on low earned incomes. Segregation of women in occupations or occupational sub-groups has been identified as contributing to gender difference in earnings (p.52). A feature of these segmented labour markets is the relatively lower wage paid to employees in 'women's jobs'. In these case studies the authors identify a set of practical programmes for change in Minnesota directed at women's wages in segmented occupations and draw out lessons with an eye to