BUSINESS CYCLES, LONG WAVES, AND COMPANY LONGEVITY IN BIRMINGHAM AREA METAL INDUSTRIES 1780 - 1980

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SUMMARY

This doctoral thesis originates from an observational incongruence between the perennial aims and aspirations of economic endeavour and actually recorded outcomes, which frequently seem contrary to those intended and of a recurrent, cyclical type.

The research hypothesizes parallel movement between unstable business environments through time, as expressed by periodically fluctuating levels of economic activity, and the precipitation rates of industrial production companies.

A major problem arose from the need to provide theoretical and empirical cohesion from the conflicting, partial and fragmented interpretations of several hundred historians and economists, without which the research question would remain unanswerable.

An attempt to discover a master cycle, or superimposition theorem, failed, but was replaced by minute analysis of both the concept of cycles and their underlying data-bases. A novel technique of congregational analysis emerged, resulting in an integrated matrix of numerical history.

Two centuries of industrial revolution history in England and Wales was then explored and recomposed for the first time in a single account of change, thereby providing a factual basis for the matrix. The accompanying history of the Birmingham area provided the context of research into the failure rates and longevities of firms in the city's staple metal industries.

Sample specific results are obtained for company longevities in the Birmingham area. Some novel presentational forms are deployed for results of a postal questionnaire to surviving firms.

Practical demonstration of the new index of national economic activity (INEA) in relation to company insolvencies leads to conclusions and suggestions for further applications of research into the tempo of change, substantial Appendices support the thesis and provide a compendium of information covering immediately contiguous domains.

Aslib Key Words ECONOMIC FLUCTUATIONS • ACTIVITY INDEX • COMPANY LONGEVITY • METAL INDUSTRIES • BIRMINGHAM

DEDICATION

".... to the spirit of enquiry."

ACKNOWLEDGEMENTS

In preparing the questionnaire, both Yeomans and recent CBI Surveys proved helpful in distinctly different ways.

In particular, thanks and congratulations are due to **Alan Tsang** and his competent colleagues, who transcribed practically nine megabytes of information in my appalling handwriting into the immaculate format offered by their Macintosh Apple 'D' micro-processors. Without his high-level, project management skills, this thesis could not have been delivered.

Finally, if I have omitted mentioning by name - especially my family and lady friend - all who have benefitted me by their advice and indulgence, it is because they are too numerous to mention individually. As for the rest, the ideas, methods, compilation, sequence, presentation, interpretation and conclusions of this thesis remain entirely my own responsibility, howbeit encouraged and modified by reading a very extensive literature.

PREFACE

The idea that a longitudinal profile of the incidence of insolvency should be constructed and set against another index showing a general level of change in economic activities appears deceptively simple. In reality, the operationalised research investigation threw up an astonishing volume of historical fact entwined with theoretical exposition which was conveyed through a thousand and one primary and secondary sources.

Zealous pursuit of this literary enquiry was conducted first as a full-time and then a part-time student attached to the Doctoral Programme at the University of Aston in Birmingham between October 1982 and October 1987. This was chaired in bi-annual succession by Dr Jennifer Tann, Dr Gloria Lee and Dr Hugh Willmott, during a period when financial stringency, frequent reorganization and incessant disruption from building work were endemic around the University Management Centre at Gosta Green.

While it may not be essential for a thesis to have relevance to practical affairs, my hope and belief endures that not only will the subject matter and its treatment provide some interest to historians, economists and economic historians in a somewhat neglected corner of research, but that it possesses potentially considerable relevance to men of practical outlook engaged as strategic planners, financial directors, advisers and consultants to central and local government or in the direction and management of business organizations

Robin J S Kimmerling
October 1987

LIST OF CONTENTS

Sections	Page

INTRODUCTION

CHAPTER ONE

CHAPTER TWO
SECTION A

CHAPTER THREE

CHAPTER FOUR

CHAPTER FIVE

LIST OF CONTENTS

APPENDICES

CHAPTER ONE

CHAPTER TWO

LIST OF TABLES

LIST OF TABLES (APPENDIX)

LISTS OF DIAGRAMS

For your notes

INTRODUCTION

Impulsion and the conceptual environment

> "The history of a hundred years of alternate business activity and business depression suggests and suggests very convincingly that these influences are of a kind from which we have suffered many times before."

> F Lavington, Introduction to 'The Trade Cycle' (1922)

THIS particular thesis springs from ontological observation by the writer of what appears to be a universal paradox of economic endeavour.

On one hand, seemingly endemic to the natural aspirations of humanity in general, stands a desire for stability and order in economic life, with assumed outcomes of enhanced prospects for long survival and enjoyment of an improved quality of life for all, increasing levels of prosperity and steady accumulation of communal, corporate and personal wealth.

It is the utopian, Perennial vision of a well-governed, relatively static society in which the great majority of changes are seen as improvements and in which every effort earns its full and just reward.

On the other hand, apparently inseparable from other aspects of human nature, stands the tumultuous record of historic happenings and economic out-turns. These evidence the omni-prevalence of change and instability with precarious subsistence for the majority, often resulting in socio-political upheavals and largely unavailing struggles for long-term material advantage. Recurrent episodes of loss of prosperity and destruction of assets may be accompanied by sudden increases in the precipitation of bankruptcies.

Rational explanation for the cyclical appearance of this universal phenomenon have been sought over the centuries at varying levels of the economy. Published works written by economists form on evolutionary epistemology in retrospect, but are not leading to firm conclusions. Consequently, it is apparent at the level of political economy that Governments have generally failed to stabilize economic fluctuations by means of an appropriately flexible cyclical policy based on a firm prescription.

It is not the intention of this thesis to provide such a prescription, it is rather to research the possibility of a new approach to the integration of business cycles and long waves with the recorded history of the British economy so as to provide an overall perspective of the tempo of change: for it is supposed that both elements of the paradox of economic endeavour always are present together in the actual economy so as to produce dynamic outcomes.

The specific measure of change upon which numerous other economic variable measurements ultimately depend is the stock of companies in advanced industrial economies responsible for the production of material wealth in the national income. The rates at which companies form and dissolve clearly alters both the structural composition and the aggregated sum of other dependent variables.

Stability in the business environment is assumed to be synonymous with motion towards the vision of a 'golden age', and instability in the same as a motion towards its opposite. It follows that an increase of instability, as in the measurements of national economic activity, should accompany an increased precipitation of company failures. The converse also follows.

In order to test this hypothesis[1], it is necessary to set an insolvency index against an index of national economic activity. It is implied by this argument that the tempo of change is comprised of cycles in the apparent movements of economic variables combining to cause fluctuations in general economic activity including fluctuations in bankruptcies.

The causes of recurrent crises, and of alternate periods of prosperity and depression in cycles, and of long-term surges and declines in price levels, have been examined as stated by a succession of economists. Individually, they regarded cycles as peripheral to their main arguments: together, cyclical behaviour is the highest common factor of their works.

The incidence of cycles has occupied a central position in economic explanations, but one which has become neglected in recent decades. In this thesis, changes in the tempo of economic activity are seen as surrogate, accessible measures of dynamic outcomes arising from the continuous convergence between opposing forces of change and stability in economic life.

The hypothesis developed from this position tests whether there is co-variation between the level of economic activity and that of bankruptcies in a longitudinal perspective of dynamic change. Does the instability theorem match the historic evidence of change and bankruptcy? Can an appropriate method be forged for this purpose? How long do companies survive? What enables them to do so and how vulnerable are they?

Some major contributing economists

Classical economists were alive to cyclical situations:

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*1

denotes footnote number one

Ricardo, in his Essay of 1819, (Hollander 1979) began what is probably the longest-running continuous series of any modern explication; that of the cause of crises and the courses of patterns appearing repetitively in the development of economic activities.

Marx, (as re-stated by Rosenberg, 1986 p 197 - 213) viewed cycles and growth as part of the process of dynamic capitalism, imputing its impending demise to the recurrence of crises.

George (1879) and followers saw progress and poverty as concomitant rather than alternating conditions of humanity under a system of monopoly and privilege derived from ownership of land and control over access to natural resources.

Schumpeter, as re-formulated by Metcalfe (1982) proposed a theory of economic development involving alternating phases of entrepreneurial activity resulting in epidemic diffusion of innovations, with subsequent gales of 'creative destruction'.

Haberler (1934), contemporary with Keynes, synthesized many interactive elements of the economy diagnosed by previous cyclical theorists in his descriptions of the incidence of prosperity and depression in western industrial society.

Keynes (1936) and neo-Keynesians offered a model intended to promote financial and economic policy prescriptions for intervention by government during the depression phase (only) of the economic cycle, hoping thereby to control socially undesirable excesses due to its swings, and fine-tune the economy onto a stable growth path. The collapse of this system is described by Stewart (1978)

Kaldor (1954), Goodwin (1951), Harrod (1959) and Hicks (1950, 1974) viewed the 'business cycle' and economic growth as inextricably entwined, proposing various 'limit' models for economic development and the propagation of cycles.

Dahmén, (as reviewed by Eklund 1986), expounded that historical and institutional aspects, not fitting within the framework of deductive models, must be integrated into any analysis.

Mensch (1978) developed an explanatory hypothesis on the basis of a stalemate in technology recurring periodically; disparate international and intra-industrial growth cycles thus resulting from intermittent surges in scientific creativity and inertia in factor reallocations.

The cycles perspective was thus seen as tangential to that of the tempo of change, to which Akerman's (1947) 'causal analysis' seemed more appropriate, together with Ezekiel's (1938) theory that no automatic self-regulating mechanism exists which can provide full utilization of resources.[2]

The monetarist approach of Friedman-Schwarz (1963 and subsequently) denied the reality of cyclical phenomena, referring the cause of changes in national income to the level of money supply.

Whatever the theoretical validity, the 'unintended result' phenomena was remarked by Sherman (1983, p 204) in that "policies supposed to reduce inflation usually caused unemployment and policies that were supposed to reduce unemployment usually increased inflation."

My own investigation seemed impelled towards the historico inductive method dependent upon both an holistic and the

positivist approach! What alternative assumptions could be entertained concerning the nature of reality? On the one hand, an ideographic approach seemed appropriate and necessary; on the other hand one was dealing with economic behaviour in real historical time, not in a vacuum, and therefore a nomothetic approach was justifiable. One could view the course of events deterministically, or as the result of the injection of decisions by rationally inter-active groups of individuals, (as did Shackle (1961) p I - IV)

Dualism in economic cerebration

The external context within which the paradox of economic endeavour and these phenomenological interpretations occurred evidenced an equally dualistic mode wherever one chose to look: not only did one apprehend recent ideological conflicts between eastern collectivism and western individualism, or more deep-seated oppositions between materialism and religious belief, but roughly hemi-sphoidal division between advanced and more prosperous industrial nations in the north and poorer, primary-producer, developing nations in the South (see Brandt Report).

The seemingly spontaneous generation of the industrial revolution in countries which had slowly prepared themselves for such a far-reaching series of transformations in the means of production and the condition of society has been accompanied by almost incessant world-wide conflicts between opposing powers and also an accelerated rate of change experienced universally to differing degrees. (Toffler 1970, 1971)

The results of these developments have caused a turbulent environment for management (Drucker 1980) in which the inconstancy of change itself seems to have been the only invariant rule.

Although the denial of essential aspirations seems to have arisen by efforts made in order that they be achieved, the evidence of historians and economists, arising from opposed disciplines, are one divergent the other convergent in the character of their thinking.

They are both supplemented by the work of economic historians, indicating not unbounded uncertainty in a stochastic, ever-shifting phantasmorgia of happenings; nor a pre-destinate cosmos; but to a series of logical trajectories (Dosi 1982), recombining periodically to provide an appearance of cyclical recurrence,(probably due to both coexistence and interaction of external conditions and internal necessity.)

It would appear therefore that any study aimed into this epistemological area should be holistic in its paradigm, and dynamic due to its longitudinal dimensionality; for only the former may accommodate the multi-level complexity and only the latter the succession of evolutionary changes in the subject matter.

> "Human nature and action as a whole is the proper object of study, and philosopher, psychologist, economist and historian must work hand in hand." (Schackle (1969) Preface xiii)

Such an approach when operationalized enables organizational decision-takers, planners and investors to create eclectic models uniting the multi-faceted aspects of the total business environment into a comprehensible whole, into which complex components are integrated to provide differentiated inter-temporal scenarios. (Saunders, 1984) This evolutionism acknowledges that purposes and ideas form part of the web of technical and administrative injections into the time continuum, and co-condition the future (MacGregor 1934).

The division of the cerebral cortex into left hemisphere, a computer-like brain designed for programmes and schematics, and the right hemisphere concerned with emotional response, creativity and insightful understanding (Sachs (1985) p 16 - 19) both typifies the dualism reflected in innumerable theoretical dualisms (as between equilibrium, non-equilibrium; linear, non-linear; sinusoidal, sigmoid; exogenous, endogenous; objective, subjective; static; dynamic; pro-active, reactive; hypothetico-deductive, empirical-inductive; etc) but additionally creates an intense methodological problem:- in this study, the choice of one methodology automatically both invalidates the outcome in terms of the holistic paradigm, and in terms of the co-existent alternative methodologies.

Further methodological considerations

Whatever method is selected for a narrow field of enquiry is assumed to be that which appears most suitable. Broad fields of enquiry do not accommodate themselves to narrowly conceived methodologies: although research techniques may employ approved devices, the need for improvisation arises forcibly from the view taken of the subject matter.

An extreme example of an alternative view of history was presented in the following anonymous article 'A student's Pilgrimage'.

> "History as it condenses from the void of time to come is the mutual entangling of individual dreams; since business life lies near the heart of general history, it too must share the character of the textile fabric of imagined things, changing as they are actualised. This, then, is the phenomena that economists undertake to study." - Anonymous

(Banca Nazionale de Lavoro Quarterly Review, Summer 1983)

Contrast with the econometric view is strikingly apparent.

The underlying problem is the multi-level, multi-dimensional, multi-causal nature of movements in general economic activity, in relation to the specificity of techniques under given traditions of scholarship.

One needs to draw one's proposition from an established body of knowledge but at the same time to follow an inter-disciplinary process of investigation with logical consistency. One needs to be objective about one's subjectivity and vice-versa. One needs both finite numerical results for interpretation and fresh insights to assist processural understanding.

The great gap identified in relation to the study of economic change is that of an integrated theory, not only of the cycle and the long-wave, but of the panorama of economic development as it has actually occurred at numerous levels.

This gap is that created artificially through fragmentation of the disciplines in the course of their own historic evolution: its effects are evident in the lack of cohesion between politics, economics, finance, industry and the educational system.

A study originating from a neutral, a-theoretic view (Donaldson, 1984) of the great changes affecting human society and the spasmodic and unsatisfactory character of its progress over the past two centuries, which drew from many disciplines, but followed its own reasoning, subject to none, appeared to present itself as a dynamic, realistic but problematical alternative.

If one took a 'grounded view', basing oneself on the empirical evidence and allowing themes and patterns to emerge in the course of one's review, no approach could be made to the causes underlying such manifestations. If one took the 'abstract',

rational approach, attempting to derive mathematical laws from happenstance events and relationships comprising the cycle, one risked to miss comprehension of historical reality altogether.

A third view, that of the instantaneous perception of the 'solitary moment of actuality' (Schackle 1969 pXII) by every economic agent or participant observer suggested itself as a cogent alternative uniting opposing disciplines and standpoints in their common ground of experiential existence.

This departure in its turn involved recognition that the cognitive framework bore equal validity to the recorded measurements of variables[3]: that changes in economic activity resulted from tides in mass psychology interacting with chains of external events. An inter-active process model of change suggested itself as a possible resultant.

The ancient method combining the numerical, psychological, empirical, ideographic, morphological, and experiential aspects into a single practical model is that of archetypes, or symbols constructed according to systemic philosophical knowledge.

An explication of the motion of the paradox of human endeavour in its sub-mode of cycles of both longer and shorter periodicities seemed to require development of an archetype. Could such a 'cyclograph' be formed from the fusion of reason and observation applied to history? The metatheoretical assumption remains that it could.

Would it be legitimate to apply what is essentially an ideogram to the purpose of increasing understanding of the cyclic phenomena in general, so transpositioning a meta-understanding within historical evidence? Under a holistic paradigm, such a manoevure seemed unobjectionable, but only positivistic tests could show whether the ideational phases of the 'cyclograph' illuminated the unfoldment of historical processes.[4]

Thus the technique also involved trans-paradigmatic displacement for its 'verification', without much certainty as to whether economic systems are fundamentally linear or that mechanistic measurement of time periods is relevant.

Endological methodologies of the so-called 'hard', physical sciences, and the 'soft-edged' emergent process ones of the social sciences, appeared complementary rather than confrontational under the holistic paradigm.

It seemed that an historical study of economic outcomes combined both observational and thematic, confirmatory and exploratory, cross-section analytical and evolutionary/ processural possibilities.

Descriptive accounts could be combined with quantitative records provided that a common framework could be originated to carry both types of information, both aimed at delineating the substantive research question in a manner which combined eternal validity with temporal precision.

There remained the further obstacle of reconciling the 'regularised' perception of patterns in history—from the ideational standpoint of a stylised cycle—with the irregular, unconforming observational phenomena of real records, prompting notions of randomness and unpredictability.

Resolution of this conundrum was inspired by timely reading of 'An introduction to quantitative methods for historians' (Floud 1973 ; Chapter 6). *Change could be described numerically, both events and time-series, in relation to their 'anchor dates' (my phrase), and these quantities entered into matrix form. This methodological solution appeared very attractive in terms of the enquiry.*

The possibility of calculating an a-theoretical, neutral, objective, fact-sensitive index of the tempo of change[5] divested from its cyclical entanglements seemed to provide just that unification methodology required. This was a vital step forward in resolving the dilemmas set up by fragmentary reductionism.

The beauty of this incremental numeric method was its inherent ability to accommodate changes of all types occurring in variables and trends from one interval to the next, subsuming longer movements into those actually recorded in the same time-span in which they were experienced. The same segmented data measured both short and long cycle movements.

By itself, however, this record might demonstrate the varying tempi of change without explaining anything extra: it was dynamics without a system,[6] the very inverse of equilibrium without cyclical fluctuations.

Such a composite technique does not obviate the same type of value judgments concerning the underlined significance of changes in the economic variables entered into this trans-temporal type of matrix - viz. Forrester's systems dynamics simulation model based on micro-economic behavioural patterns.

The proposed method involves both variable selection and weightings procedures, but does not otherwise intervene in the outcome. It is therefore applicable to economic systems under diverse ideological regimes and in differing time periods, as it accommodates distorting factors by specific choice of variable, index, starting date, and time-span.

This conception of an investigatory tool therefore needed to be tested operationally by means of a research question which would both be relevant to the paradox of human endeavour, topical in terms of interest to a academic researchers, and salient perhaps, to the heuristic needs of practicing organizational management.

Justification for this form of presentation of numerical history is set out in greater detail in Chapters Two and Three.

Genesis and clarification of the research question

The holistic paradigm as a vehicle for the understanding of complex systems in their entirety, and devising a suitable representational model, has long been established in anthropology, sociology, history, cybernetics, dynamic systems, politics, corporate management, biotechnology, quantum physics, and space exploration (applications of electronic control and thermo-dynamic propulsion etc.)

33

The genesis of my own interest in cycles and the paradox of economic endeavour arises from both a long-standing witness of world development and my previous studies at the University of Nottingham, where I graduated in Economics and Social History under Professors Parkinson, Tew and Coates and Doctors Whynes and Chapman.

The gap between these disciplines was apparent, and to my mind could be closed by means of studies in the history of economic thought and of the then almost totally ignored phenomena of cycles and longwaves, the effects of which interpenetrated organizational structures and could influence their collapse.

The twin assumptions of equilibrium and a steady growth path seemed to be untenable in practice. Rational expectations behaviour seemed most significant in a world of routine and repetition of similar events, not in dynamic, profit-centred, inter-active, world-trading, competitive economies.[7] In reality, both coexisted in varying amounts.

Contemporary socio-economic conditions at the time when the research question became formulated were those of an obvious major recession with many firms collapsing and hard-won social welfare improvements coming under threat of withdrawal due to the declines in output and tax revenues. Conditions encouraged broad questions à la Kuhn rather than propositions of a more cameralist provenance à la Lakatos.

At the start of the project, (1981 - 2) the use of the term cycle or cyclical was practically banned from the pages of financial newspapers and journals, despite glaring evidence of a recession in industry. The hitherto more prosperous and fully-employed West Midlands Region, with its metal industries concentrated in the Birmingham area, began to experience unemployment and hardship as the economic situation worsened.

Accordingly, the idea of taking the bankruptcy record, if such could be found, of both national, regional and local lists of companies in the metal industries, and comparing this with my proposed index of national economy activity over the period of the industrial revolution, seemed at once both topical, challenging and interesting.

Within a short while of commencing the research (based on the proposition that human economic activity took a similar cyclical form to phenomena observed in the natural world, and therefore each firm went through evolutionary stages of internal development until, inevitably, the cycle turned and it became defunct), a spate of current comment and new literature about economic cycles began to appear.

The idea arose to attach the measurement of company longevities to a stage-model of the development of a company on one hand and to the phases of a yet-to-be-defined model of the cycle on the other. Changes hypothesized for economic activity would influence companies in their growth and development, strategies, structures, learning curves, and particularly lengthen or curtail their life-spans.

After some months of what proved to be abortive research effort into a few dozen company histories and the enormous organizational research literature which had accumulated, it became apparent that *insufficient data was available in any accessible form to enable a complete account to be made for any one year*, let alone for two centuries, during the earlier parts of which few records of any kind had been made.

Thus the alternative expedient of utilising the Hoffmann (1955) Index of Bankruptcies together with other long-run statistical series at the national level of aggregation was substituted, on the explicit understanding that local and

regional performances formed varying, differentiated proportions of fluctuation in the whole.

If it were assumed that economic fluctuations were stochastic in nature, no matter which profile the curve of company precipitations (formations and failures) took, no further utility could be derived from the comparison of the two time-series.

Even if the two series of bankruptcy and change in the rate of economic activity entirely coincided, yet no periodicity prevailed, the utility to decision-makers would also be nil. No 'learning curve' could be established (Marchetti 1980)

> Similarly, "a purely *exogenous* theory would have only a historical and no satisfactory explanatory value; but a purely *endogenous* theory would not explain actual cycles. *Therefore we must have both.* Economic history never repeats itself and there is no normal cycle." (Goodwin 1951)

The assumption made in this thesis is that economic fluctuations do show8 some trans-temporal recurrence (Kendal 1946) and that the variables considered endogenous, autonomous or economic *together with* those considered exogenous, random or natural, are both kinds found to fluctuate with both apparent and measurable periodicities, for which, one admits, pedantic precision is 'hors de combat'.

(There remains some doubt as to whether the selected variables are identical with 'random shocks' as conceived exogenously in equilibrium models of the cycle and thus made responsible for co-movement of the variables). The research question then became of an exploratory 'genre': *did changes in one time-series co-vary with changes in the other? The answer could only derive from examination of the history of the industrial revolution as conveyed in secondary sources of all types.*

However, the same problems confronting purely historic research confront historical economics, perhaps even more so. While historical 'facts' rely heavily on documentary evidence on to which the trained imagination and sensibilities of the historian have been poured[9] according to each individual's current predispositions, the 'facts' of economic history often entail much guess work, infilling, and extrapolation for which techniques exist, but absolutely no licence to practice.

Under these circumstances, the application of strict statistical tests to most, if not all, historical data seems absurd: there is always both more evidence, missing and destroyed evidence, false evidence, misreported and misunderstood evidence, in addition to the above matters of presentation and interpretation.

However, the available evidence, however scant or unreliable, may also be altered by addition or falsification. A numeric system of history based on factual evidence of events and changes in economic variables possesses the same limitations as its database, its researcher, and the cross-disciplinary method employed.

In view of the artistic nature of both history and economics as scholarly involvements, the hypothesis was presented in negative nul form: "<u>the index of company bankruptcies does not co-vary with that of national economic activity over the study period</u>" - If the results did show co-variation, the instability theorem would be (partially) confirmed.

In discarding the cyclical model and proposing the hypothesis in terms of changes in the tempo of economic activity, one abandoned also a number of other potential avenues of enquiry. These had included the proposal to trace the effects of cycles on the stage development of companies, an idea arising from my (unpublished) local history projects.[10]

A further fascinating subject to engage one's attention had been to attempt to discover whether cyclical manifestations were an expression of Natural Law, reducible to an equation, which operated by means of force encountering resistance at a hierarchy of existential levels, therefore appearing inevitably, but quasi-regularly, as cycles in a longitudinal perspective.

> *"the first task of the econometric historian is to check that he introduces no equation whose behavioural implications go contrary to history . . . one has to postulate the <u>right kind</u> of relationship before calculations begin."* (Parry Lewis, Introduction, 1965)

All such detached attempts at sustained observation of dynamic processes were abandoned in this thesis in favour of a-causal descriptions of successions of associated events as they occurred in their chronological data order. As Shackle (p 4) so aptly remarked:

> *"History can be thought of, we would say, as a sequence of instantaneous states of affairs."*

The record itself demonstrated the rate of change, and one left aside topics such as the necessity for growth in order for cycles to become manifest.

Likewise, verbal accounts of historic events tend to be non-narrative and largely free from comment of extraneous origin. Criticism of the realist assumption that 'truth comes from facts' is accepted: both are seen by the writer as *complementary* aspects of the same multi-level creation, all of which is held in Mind. Theory does appear to 'plant some of the facts'. (Tinker, Merino and Neimark, 1982).

Having established the approach to be undertaken in order to discover whether the tempo of change hypothesis of the paradox of economic endeavour was accompanied by bankruptcy frequencies, it was important to clarify which variables were to be selected for this first attempt at numeric history as a composite, or congregational, form of analysis.

The approach, described in Chapters One and Two, is essentially pragmatic: what is important is what authors have claimed is important: those, in the event, became the selected variables upon which attention was focused. (Industries peculiarly vulnerable to economic fluctuations are three: construction, heavy engineering, consumer durables, each utilising metals to a high degree.)

Their year on year, cross-sectional figures ignored the longitudinal trends which these figures may have indicated in long duration, together with any linkages beyond the horizon of data collection11: they were considered as only two-dimensional - numeric and momentary [But see also Appendix 3.A.5 , Mellor (1983) and Parry Lewis]

It was understood, but dismissed as irrelevant for the purpose, that the forces and framework giving rise to the events and statistics evolved ﹣ varied in influence, composition, and efficiency over time.

It was thought sufficient to register each change as an event on the date upon which it first took place. The processes of diffusion, accumulation and decline were all summated in the annual totals, and the rate of change by the percentage changes year on year between totals in the same series.

Since company fortunes are supposedly linked with the ability to proact to changing circumstances and react suitably to commercial threats and opportunities12, indications of the tempo of change and the rates of precipitation may become of greater interest the larger a firm grows and the more it becomes involved in the business environment.

A thought such as this underlay many of the questions put to surviving firms and analysis of response in Chapter Four, following examination of longevity data and vulnerability to failure techniques in Chapter Three. These Chapters in the enquiry were of a more confirmatory character than exploratory.

Notes on Forms of Presentation.

[The use of a pentagram, modified from the ancient symbol, is perhaps novel in its simultaneous visual presentation of the profile of five distinct variable averages derived from the Questionnaire results.

The use of a 'leaf' diagram was made by James Bellini of the Hudson Institute, Paris, in a presentation to Tyne and Wear County Council Economic Development Committee and invited interested parties at the Europa Hotel, Newcastle upon Tyne, in March 1974.

Whereas Bellini drew the breadth of 'leaves' as an aesthetic *proportion* of their length, I have adopted his idea to show query response ranges as a *proportion* of their length. (It will be noted that an inverse scale it required along one axis in order to complete this figure.)

The range of levels of aggregation between which the enquiry was pursued has as its 'floor' a group of companies comprising a sub-sector of an industry and as its 'ceiling' the national summary values of a single economic variable.

Considerable thought was also given to the disconnective time-spans utilised for all forms of presentation [(Gort and Klepper (1982), Clark (1982)]; the shortest held to be viable was a decade divided into annual intervals, and the longest necessary, two centuries, (to accord with the study period) ie: into 'logical time' (Moss 1981). All types of cycles could manifest within these limits, and their combined effect was registered in the tempo of change in economic activities.[13]

The remaining methodological considerations are dealt with Chapter by Chapter, as appropriate.

Synopsis of Operational Imperatives

The scope of enquiry was temporally constrained within a duration of two centuries, starting with the 'take-off' of the first industrial revolution around 1780 - ending with the economic 'watershed' of 1980, symptomised by 'stagflation' and the onset of another depression period. It was centred on the fluctuation - prone metal industries located principally in the area of the present Birmingham conurbation: It utilised all available primary and secondary sources to obtain descriptions of events and estimates of the rates of changes between selected variables.

The three residual questions were formulated as 'what life-span can companies be expected on average to enjoy, and what will their rates of failure become?' and 'Will the overall rate of company failure reinforce the instability theorem, that excessive change disfavours survival?' There were no constraints placed upon the extent of information utilised, since so many diverse elements were involved in the historic actuality of every on-going situation.

The grouping of subject matter and the extent of information carried in the Appendices was arranged as the various areas surfaced in the textual passages during exposition. Together, they comprise a reference work ancillary to the thesis itself: an assembly of contiguous territories.

Statistical techniques such as cluster analysis, utilised to discover patterns between groups of events, were inappropriate because of the difficulty of obtaining *comparable* spreads of sample data about company precipitations at a standard level of aggregation.

A poisson distribution of longevities using kai-tests would have been useful if one had *sufficient* evidence to provide (or probability of some) constancy of generation over successive time-periods; but this proved not to be the case.

Had one been engaged in *testing* the evidence for cycles, Gompetz curves (modified exponential curves) could have been utilised to attempt close 'fits' with historical curves from real data. The various existing datasets were characterized by partiality, exclusivity and fragility, rendering them unsuitable.

None of these techniques, or others explored such as discriminant analysis and multi-variate analysis, fitted the intended purpose[14], so operating techniques had to be improvised: (Which are explained in Chapter Two (p%).

Parameters of Context as 'Root Metaphor'

The reader should certainly not consider that what is proposed is that numeric data are the <u>only</u> reliable form of information about the real world (even if reliable at all). Such an hypothesis about the ultimate structure of the world and the place of everything in it may well be substantiated by a mass of collaboration, but such an exercise lies outside of scope.

This enquiry may be described in terms of four world conspecti*: (Pepper 1942, reviewed Pettigrew 1983).

Formism, in that its root metaphor is *similarity* and its truth theory is correspondence;

Mechanism, in that economic variables are seen as (partial) cause and effect to each other in a machine-like loop, and proof is that *it works*;

Contextualism is concerned with the *event in its setting*, with root metaphor the historic event;

Organicism, where time is unimportant in the understanding of an historical event, but patterns and the coherence of conceptual structure are - truth in this hypothesis is a product of *magnitude of fact*, and the root metaphor is harmonious unity.

This thesis utilises each hypothesis in turn for appropriate purposes within its necessary pragmatic holism. From the treatment accorded to each chapter there emerges the requisite kind of truth, itself a product of the organisation of argument and information, the pursuit of a coping method, and the practice of attempts to reason to an initially unknown conclusion.

It is quite probable that the generalisability of the outcome is limited by the types of data as much as made specific by the locality, date of enquiry, salience of the subject matter, accessibility of information, time available, and circumstantial pressures upon the researcher. The specific result may be non-transferable, but the methodology could be adaptable and is amenable to computerised treatment.

Other parameters of the enquiry are that it concerns itself with <u>producing</u> companies and excludes merchanting, wholesale, ironmongers, and retailing as well as consultancy, advice, design and testing services attached to the metal industries. These exclusions were made so that better homogeneity could be achieved between sample firms[15] responding to the questionnaires and facing similar circumstances.

Among difficulties unresolved in this presentation were those connected with:

a)   the invariable impact of the weightings of economic factors upon each other in successive time periods regardless of developmental, structural, technical or social changes unrecorded by the System

b)   the issue of whether 'typicality' could be imputed to responses to a postal enquiry

c)   the treatment of the literature in a constructive and supportive and/or counter-theistic rôle rather than by means of theoretical features or through literary criticism

d)   the antiquarian approach accorded to historical narrative as a part of an a-theoretic, variable-dominated, structured approach to events seen as potential numeric entries to the INEA matrix

e)   validity of INEA-type interpretation vis à vis other perspectives.

The regimental plan of the thesis

The regimental plan of the thesis followed the logic of its inception, with Chapter One devoted to a full exploration of the cyclical pasture in the attempt to discover or assemble a reference cycle against which minor cycles could be matched, and in default of success, to bring forward a substitute.

Chapter Two continues a methodological approach in its development of the steps needed to ensure sensible implementation of the grid-form model for the measurement of the tempo of change. At the same time it contextualises the study, and in so doing brings together compartmentalised schedules of information.

Chapter Three logically follows with the computation of longitudinal data deriving directly from contextualisation of change in history, and examines average longevities for groups of companies calculated for a number of specific samples taken intermittently between differing dates.

Chapter Four introduces the micro-level and presents attitude profiles of contemporary Company Secretaries responding to the direct mail enquiry and its range of questions. It directly asks extant local firms for explanations re their continuance and culminates in tracking and assessing 'live' management perceptions and stances in relation to the changing environment of their firms and to those factors most vital to company survival.

The above sequence gives rises to many incidental insights and understandings in oblique relationships to the central argument. The theme is not forced upon the reader but presented serially from groupings of facts and arguments so that uncajoled conviction may grow[16]. The thesis stops short of policy prescriptions or recommendations, content instead to outline preliminary findings and to indicate areas for further research: it proffers nevertheless, a triad of conceptual, instrumental and persuasive uses.

ADDENDUM

Quantitative Approach to History

Some support for a numerical approach under certain circumstances is provided by Floud (1973), in his introduction to the rationale of the quantitative approach to historical evidence. The following summary is an abstract from his reductionist - type argument:

1   In principle, the phenomenological significance (or truth) of qualitative and impressionistic descriptions of historical events and their behavioural categories can only be explicitly established by quantitative measurements.

2   These can only follow a deliberate value - classification of data sources and their degree of reliability, in turn involving critical analysis of the data patterns under observation and their suitability for whatever purpose.

3   Ordering of material and postulating relationships are therefore both expressions of judgment in the initial selection of methodology and of conformity to its inherent system of rules.

4   Different statistical methods all require that data should be arranged coherently and in different ways as appropriate to secure clarity and consistency.

5   An insurmountable problem facing economic historians in the use of secondary material and multiple datasets compiled by others is that latent methodological choices are diverse, purpose-related, and most likely largely unexplained.

6   In addition, the information itself may be imperfect, discontinuous, uncertain, inconsistent, or originally divulged for some particular motive, thus requiring experience, judgment, imagination, synthesis and intuition in its interpretation.

7   Moreover, there exists an underlying assumption that a logically understandable process is at work, rather than chaos and randomness, even though what is comprehensible may vary with changing fashions and attitudes.

8   Thus a mechanical interpretation of history would not only be invalid but is in principle impossible. One has always to use evaluation, discrimination and reason as well as statistical ingenuity, thus affording to the mind an otherwise unobtainable overall objective comprehension together with a simultaneous differentiation of particular flavours.

R Floud, 'An Introduction to Quantitative Methods for Historians', Methuen London 1973

Introduction

Footnote 1

"What gives an hypothesis the entrée to the counsels of the mind is not the being believed in, but the not being disbelieved in" . . . "what the historian must do, on the basis of his knowledge, is to construct a theory which links together the questions he wants to ask with the evidence he will try to collect" . . . "one has to postulate the right kinds of relationship before calculations begin." [Parry Lewis (1965), Introduction]

"It is the predicament of mankind that Man can perceive the problematique yet, despite his considerable knowledge and skills, he does not understand the origins, significance and interrelationships of its many components and thus is unable to devise effective responses. This failure occurs in large part because we continue to examine single items in the problematique without understanding that the whole is more than the sum of its parts, that change in one element means change in the others" (my emphasis) (Meadows et al (1978), p14).

Footnote 2

Origins of the positivist approach and methodology are retraced by several authors to Madame de Stael (Giddens 1974), Saint-Simon (Hayek 1972) and Auguste Comte (Christensen 1981). See also discussion in J L Zimmerman's paper 'Positive Research in Accounting' (1980) following Friedman (1953) and Popper (1959)

Footnote 3

Possibility existed for sociologists to operate within an interpretive paradigm based upon Weberian 'verstehen' and Shultzian 'interpretation of observed behaviour'. This approach involved accepting the world as both an objective reality and an inter-subjective experience, and led to the assertion that there exist 'multiple realities' from which one could select a 'predominant tapestry of relevance', thus posing an 'essentially descriptive task' for the social scientist seeking to find and communicate 'perceived typicalities of experience'.

In this view 'particulars are situated', and statements about them must therefore change with changing contexts. 'Realities are always realities becoming and 'experience is indexical', it is claimed. But since one requires language to express meanings, and language is underpinned by roles and 'second-order meanings', observers must always become separated from their subjects, universalism is impossible, and dualism is inevitable "if the aim to extend knowledge is to be realised." (Newman-Price (unpublished PhD thesis Aston 1986)

Footnote 4

"An economic system, or any other kind of system, can remain stable in a static equilibrium only as long as its boundaries are stable (or the intrusions are highly predictable) which is to say, only as long as it is not subject to significant outside unpredictable influences." (Klein 1983, p 154)

Footnote 5

Until this idea dawned, a demand for exploration of the short cycle before the nature of long waves could be understood (Haberler Op Cit p 274 - 5),could have conflicted with inverse demands, (Sterman 1985 p 105 - 129) also the imperatives of holistic approaches; although models relating micro behaviour to macro performance had partially obviated this problem. (Eliasson 1977)

Footnote 6

Mathematics is familiar with equations used to describe morphological effects, especially wave-effects. Modular arithmetic comprises a succession of prime numbers which, when divided consecutively into each other, result in neat cyclic patterns. Fibonnaci series numbers, if calculated forward then in reverse, produce a sine-wave. Discrete dynamics maps non-linear systems by means of 'shapes' or visual patterns arising spontaneously from the graphic presentation of large quantities of computerised input numbers. **It appears that order belongs to a certain level of aggregation of isolated events.**

Footnote 7

Reference to "cascade spectra of complex atomistic systems" in relation to historical development has been examined at length (Modelski 1987)

Footnote 8

Recognition of cycles presupposes a participant observer whose cognitive framework has been conditioned to perceive that type of pattern. Long experience of cycles in natural phenomena and social patterns may have set up such a psychological predisposition. There appears to occur "omnipresence of time-patterning in the natural world" (Modelski 1987)

Footnote 9

The task of the historian cannot be circumscribed by any prescriptive system: *"The task of the historian is to invent an approach which is appropriate to the problem and for this historical imagination is required."* (Tribe 1987, p 4)

Footnote 10

'The Development of Oil Engines in Lincolnshire 1880 - 1920' and 'The Mechanization of British Agriculture 1860 - 1900', (Kimmerling 1980, 1981)

Footnote 11

For example, the role played by conditions of competition forcing firms away from internal 'equilibrium'.

Footnote 12

It is recognizable that a number of constraints continuously operating on the economy may have greater impeding effect at some periods in contradistinction to others. Such impediments include limitations upon resources available for production; changes in the current state of technology caused by 'bottlenecks'; changes in the effectiveness of competition; altered terms of trade; political uncertainties; altered fashions and consumer tastes; changed interest rates etc.

Footnote 13

Statistical evidence consisting of economic time-series relates to five categories of periodic interval: long waves; long-term trend; cyclical fluctuation; irregular oscillations (often presumed due to external 'shocks'); and sudden, extreme movements (unpredicted).

Footnote 14

One argument ran (Wrigley 1972) that it may not have been possible for historians faced with incomplete real data sets to do otherwise that knowingly violate statistical theory based on normal distribution and random sampling methods. The 'inaccurate' results so obtained might have been considered 'worthwhile' provided that both historian and reader were aware of the effects of departures from methodological purity on those results.

Footnote 15

Among many definitions of the firm, (including Penrose , Cyert and March , Nelson and Winter,Kay , the preferred is that of May (1986), p 204 "Collections of productive resources distinguishable by organisational structures".

Footnote 16

A shift in paradigm from analysis toeards emergent form (Litton 1975), with emphasis on the one and many paradigms in human affairs (Bioinian 1974), is strikingly phrased by Smuts (1961)

"A whole, which is more than the sum of its parts, has something internal, some inwardness of structure and function, some specific inner relation, some internality of character or nature than constitutes that more."

This idea of a general system, wholeness, a world society and dynamic, gives rise to many sub-systems, revealing the complexities and the boundaries of human policy making: (Strombach (1983), Battista (1977), Muses and Young (1974), Luhmann (1982), Lazlo (1972), Bunge (1977) and Waller (1982) make a persuasive case for holism.

CHAPTER ONE

1.1 Business Cycles and Long Waves: the Co-ordination of Complexity

1.1.1 Nature of the Organising Problem

"To understand any phenomenon, you cannot dissect it into component parts; you must try to understand it as a whole."

David Feinstein (1983)

Not everywhere in the economic and historical records of the past two centuries reveals, even to a patient and persistent enquirer, recognizable cycles of activity or patterns of events. The field of enquiry is not blessed with continuous and reliable records covering the whole time-span. The spread of historical information is uneven from period to period, deriving mostly from specialist studies within short time-frames.

It is therefore difficult to obtain answers to questions embracing the whole turbulent duration of the industrial revolution between 1780 - 1980.

The concept of business cycles having recurrent phases and of long waves having a repeating undulatory trend necessarily involves taking a longitudinal perspective of dynamic changes. Inter-temporal variations in the strengths of recorded economic variable factors appear wherever one chooses to look.[1] It is the analysis and interpretation of those changes which has preoccupied so many researchers; and given rise to so much controversy as to the attribution of their causes.

The research question - 'Do the historical records of economic activity show co-movement with the historical records of

bankruptcy throughout the study period?' - involves comparisons between general and particular rates of change, for both of which the evidence is incomplete; as also comparisons between appearances of cyclical ups and downs in both of these curiously under-researched categories.

It is possible that fluctuating rates of change may coincide between two long-run time-series of an economic variable factor without a cycle or long-wave manifestion at any period. Empirical studies of the economic history of records of employment , output, trade, and gross domestic capital formation have shown, whenever the records have become available, apparently distinct cycles of change in these variables. Likewise, prices and interest rates and the value of consols have been traced in support of a theory of long-cycles extending for over a dozen decades.

However, although gross domestic product has been used as a surrogate for *economic activity, no separate index of the latter has been previously prepared to cover the study-period.* Such an index would require the composition of numerous partial indices developed by many authors for varying purposes, and subject to considerable numbers of reservations by each of them. The fluctuations portrayed by these indices seldom coincide; some conflict; some are lagged in relation to each other; some are the inverse of others; some bear no evident relationship.[1a]

Another difficult aspect of the evidence - even if taken as 'given' - is that this grounded approach to research unavoidably plunges one into the theoretical aspects surrounding presentation of the data. The evidence, and the author, both belong to a limited historical context, the exponents often having a purpose, not necessarily disclosed by the existence and format of the data-set, arising from beliefs then current about economics and about history.

1.1.2   Need for an a-theoretical reference model

This study could not avoid the attempt to build a series of bridges between political economy, economics, economic history, and statistics - all of which had become fragmented into specialist disciplines over the past century.[2] Simply to try to integrate the information arising from divergent methodological stances posed a serious problem, especially since no single, acceptable, validated theory of economic cycles yet exists. (Lissner 1984)

Since a through-going theoretical explanation of the phenomena under investigation appeared to be lacking; since the empirical evidence sometimes took on the appearance of fluctuation in the long-run; since the research question implied the proposition of regularity, or at least shared periodicity in the event of manifest co-movement; and since the economics discipline is fragmented into a multiplicity of specialist branches, each using different methods to resolve different and variously identified problems, the onus lay upon the humble research worker to provide his own schematic reference model.

The research question was plainly unanswerable without a method by which the field of enquiry became re-unified under a singular observer. Yet if a theory was super-imposed upon the evidence, the empirical nature of the enquiry would be betrayed. Thus an a-theoretical reference model devoid of normative assumptions suggested itself, involving an opaque but constructive treatment, in this review, of both facts and findings in the literature.

Further fragmentation arose from contemporary echoes of defunct and inappropriate economic theories belonging to byegone scenarios, and outmoded perceptual and cognitive structures. The vocabulary of economics, even more than verbal

descriptions of historical process, carried with it resonances and dissonances relating to previous eras and to sometimes discarded (but by no means valueless) patterns of thought. (Pribram 1986)

The extent of this multiple fracture went a great deal further than that stage of decomposition. Most authors, especially the proponents of cycles theory, heavily criticized, under-mined and attacked each other with an arsenal of technical and literary arguments, none of which led to an agreed conclusion. *A further review of this type would clearly have been counter-productive in relation to the main aim of this thesis.*

On the other hand, the various theorists could be grouped into proponents of particular viewpoints and value-systems common to several. It seemed futile to heighten controversy still further, so a comparative critique was ruled out of practical consideration.[3]

One common thread was nevertheless discernible: despite the great volume and disparity of the literature and the arguments, whether theoretically or empirically based, it appeared that identification and appraisal of economic change (manifest as fluctuation and recurrent types of events) occupied the **main-stream** of the history of economic thought, and had often been directed to prescriptive ends involving policy decisions.

1.2.1 Definition of the Haptical Character of a Cycle

Diverse paradigms and modes of understanding had led to marked conceptual disorder and antithetical sets of methodology in the field of cyclic research. Not only historiographic problems but the bulk and complexity of the written material further reduced the possibilities for integrating a unified view.

Since awareness of cyclical propensities in the runs of longitudinal data appeared to be inseparable from any generalised and temporally extended view of the research question (when operationalised in its historical context) it seemed imperative to set out one's own definitions in order to clarify the position, and so reduce the chaos to more tolerable levels.

Economic time-series could not be accepted as simple givens' because their presentation often involved some degree of manipulation of the raw data upon which they were based. (Anderson 1977). They were as much representing processes of production as they were a summary of recorded happenings. Their character as described by the profile of their curves thereby became an important element in the interpretation of their significance.[3a]

Natural cycles, relating to physical, biological, astronomical, and other phenomena form part of the cognitive apparatus of mankind (see Appendix 1.A.1). A common, possibly in-built, reference framework exists for the ordinary observation of natural cycles, but the observation of economic cycles requires a more refined, perhaps artificial, recognition set.

Any data sequence consisting of counts of a variable factor over a number of intervals of time may show changes in the total from one measurement to the next. Such ups and downs are common place, and incite no further comment. (Fisher 1933)

When juxtaposed upon a graph, these individual readings at once take on a visually induced relationship to each other, affording an impression of greater or lesser height of one to the other. When seen in groups (eg: annual totals over a succession of decades) some lateral perspective also enters, inferring further dimensional relativities.

If these 'dots' are then deliberately conjoined in sequence from one to the other, an impression of movement through time is created by this linear treatment.[4] The angle and extent of this idea of motion lends to it colourings of gentleness and sharpness, amplitude and intensity, in addition to the mechanical measurement of duration.

The overall perception of this induced impression of movement - in fact nothing necessarily connects the 'dots', which have no further significance (Reichman 1961) - may provoke the use of descriptive phrases or adjectival nouns, such as oscillation, undulation, trend and cyclical fluctuation, each requiring further definition.

Oscillation is generally taken to indicate alternating irregular appearances of motion at random intervals without discernible top and bottom numerical limits, sometimes referred to as 'noise in the system'. By undulation one refers to the appearance of some tendency for the curve to both rise and fall more uniformly more than once through several successions of time intervals. A mathematical wave equation (Laver 1951) may describe any regular 'sinusoidal' movements of this type. (see also Freeman 1983)

Conjoining the dots of numerous factor totals over extended time periods may result in the perspective (Wall 1978) of more irregular, but repeating, 'sigmoid trajectories (Mensch 1978), linked by 'plateaux', and divided by 'falls', (as if gravity was at work). Swift calculation by the least squares method might then provide an averaged 'line of best fit' between this extended series of maxima and minima observations.

The points in time where the calculations took place would naturally alter this trend, since zero would be calibrated a/new at differing values.[5] This general impression of tendency to lateral movement would be crystallized and enhanced by the trend-line, which then appears to have a direction. Extrapolation of the trend may appear to have predictive possibilities, but theoretically it has none (Stewart 1981).

Defined as a 'canalised path of deseasonalised behaviour' (Yeomans 1968) the trend however may also be loosely referred to in the sense of upward, static or declining lateral trajectories implied by the data from measurement to measurement, with the arriére-pensée that alterations in the strength of some underlying cause must be responsible for this effect.

Fluctuations imply a semi-regular appearance of motion about a mean, or trend; economic fluctuations consist of those series of outcomes expressed in money terms about which fairly reliable data has been carefully and consistently collected by qualified professionals, officials and researchers over lengthy periods. The Financial Press currently carries increasing quantities of such data presented in graphic and tabular form.

Cyclical fluctuations, and particularly economic cycles, may likewise consist of linear presentation of the year on year differences in totals of the raw data under observation, although most frequently a more elaborate form of treatment is involved. Usually, an economic cycle is one which appears as a recurrent, fairly regular deviation from a trend.

Since the successive annual totals comprising the general trend vary consistently by virtue of being considered as a trend, the inconsistent deviations from the trend of proportions of particular annual totals are expressed in uniform terms as a percentage of each total. *The curve of which these delineations consists is therefore one of percentage differences.*

As both 'isolated' trend and its deviations depend on the same collection of variable totals in the same historical sequence, the averaging device of the trend can be incorporated into initial treatment of the raw data to provide an exponential time-series (comprised of three, five, seven, nine etc year moving averages). While this treatment remains inappropriate for most historians, it provides cycles economists and econometricians with the *appearance* of cycles due to both transposed values (the 'smoothing effect', Lewis 1979) and the choice of interval (Adelman 1981). The two methods do produce somewhat differing trends.

An economic cycle with 'rhythmical' appearance, and regularity of 'beat' in amplitude and duration over a prolonged period, which can withstand the tests of auto-correlation and spectral analysis[6] is a rarity. It's propagation would imply a determining recombination of events and influences in repeatedly similar proportional effects: its persistence would imply the existence of some cyclical force or law capable of ensuring such a result within discernible numerical limits (Harrod - Hicks 1961). Two cycles of similar strength occurring in overlapping time-frames

may have mutually distorting effects on each other's rhythms.

Exhaustive mathematical and descriptive analysis of the contemporaneous linear effect of linking observations relating to a succession of time-periods has been carried out (Tinbergen 1942) resulting in further aids to discrimination.

Periodicity was capable of measurement between top turning points at the peak of cycles or between bottom turning points at the bottom of cycles, or between mid-points, each providing a slightly differing measurement. (Mullineux 1984)

Intensity of any cycle was measurable by its duration multiplied by its amplitude. Stylised presentation of theoretic cycles (Zimmermann 1978, Beckman 1983) took certain dates between which changes or deviations from trend or events had been noted and then produced curves which represented average periodicity and average intensity. *Obviously, these constructions bear little relation to empirical reality.* Average periodicities were also calculated by the analogous 'frequency' with which a cycle had completed its 'movement' within a selected span of years.

Regularity need not imply a pattern of cyclical fluctuations with constant periodicity between peaks and troughs, but rather the occurrence of regularity in oscillatory behaviour and in the amplitudes of fluctuations, all crucial in the description of cyclical behaviour in a particular series.

The overall 'severity' of a type of cycle may be measured by the total difference of successive peaks and troughs from the trend, according to the degree of 'explosiveness' or 'dampening' which is observed. A Gaussian bell-shaped curve of normal distribution, with its implications of symmetry, is frequently accepted in these linear models of persistent patterns of statistical 'movement'.[7]

The above-mentioned dampening factor describes the extent to which a cycle maintains energy: one with zero dampening factor repeats itself for ever, (a 'conservative' cycle); with positive dampening factor, it dissipitates force and gradually dies away; (the 'echo' effect); with negative dampening factor, it increases in amplitude (perhaps also in period) producing a 'whiplash' effect. (Kendal 1946) 'Pendulum' movement is self-explanatory.

When analysis extends to more than one cycle, the statistical phenomena to be explained . . . "are the serial correlation in the deviation of (a variable) from its trend and the serial correlation in the number of other economic series[8] which exhibit co-movements, be they pro or anti-cyclical, and with or without lags" (Mullieneux 1984) Distinction between real and stylised cycles hereby assumes greater importance, and many authors find interest in fine differences of the former rather than the facile impression given by the latter.

Research involving auto-correlation of 50 industrial and economic sector indices over 70 periods resulted in confirmation of only one 'robust' and consistent cycle, currently of 4.3 years, having above 95 per cent probability and 0.15 confidence level. Use of this method did not allow for variability in cyclic periodicity: some major national economic indices displayed reciprocity and synchronous turning points, and were connected by strong economic rationale. The statistics of OECD member countries showed close co-movement over decades. (Whaley 1982)

In some cycles there appears indeed a more regularly recurrent periodicity and uniform amplitude than in many others, both natural and economic, and why this should be so has been investigated by several authors without striking success. (Burns 1969 Strigel 1980)

The immediate relevance of the above definitions is that they enable one to distinguish between those authors discussing cyclical economic fluctuations and those utilising other forms of statistical evidence and presentation. They also *point the way forward to discovery of a means whereby the various types of cycle described in the foregoing section may be assimilated into a neutral model for presenting a theoretical model of the cycle itself,* together with a novel presentation of aggregate national economic activity.

1.2.2 Typology of the Empirical Cycle

Well-researched empirical cycles of economic variables remain few in number and are generally typified and categorised by the name of the author and by the duration or periodicity of the discovered cycle. The limitation upon both the apparent cycles and their presentation in tabular form is that each author tended to present findings from his research into those historical time-spans immediately preceding date of publication, and according to the evidence then available.

A comprehensive perspective of the study period within which the whole range of cycles appear and recur several times over suggests that the empirical data supports the contention that some cycles are more definite during some decades rather than during others. The evidence available and the interest of the researcher in that evidence thus represent a second order of fortuitous conjuncture.

Furthermore, it has been suggested in some quarters that cycles could be seen as forces which shape events (Dewey and Mandino, 1963) or even as a single law finding so many manifestations in diverse media of expression. Had they all a common starting date and were their average periodicities constant, it would be quite possible to calculate an elaborate dynamic system both recording the past, explaining the present and forecasting the future, à la Nostradamus.

This possibility is contradicted by the *entirely dissynchronous appearance of specific cycles in empirical reality*, and reduced to fantasy by the irregular ranges between which individual cycles repeat. Equally absurd are those econometricians insisting upon total precision in the periodicity of cyclic manifestations under their investigation. (Haustein and Neuwirth 1982)[9]

It is arguable that the appearance of cyclic movement in economic variables over time is not an explanation in itself but simply a way of both seeing and comprehending the import of a selected series of events, the record of which is compiled, held and analysed at one particular level of aggregation.[9a]

In the same way that apparent historical discontinuity is overcome by a downward shift in the level of aggregation of a time-series (eg: that of major discoveries and inventions to that of minor antecedent, contributory and derived discoveries and inventions), so a shift in the level of aggregation applied to cyclic data-sets re-introduces the raw information, a new treatment of which helps one to understand the previous super-imposition model in a different perspective.

It indeed seems a paradox that *one obtains a wider view from closer attention to detail,* and that longitudinal patterns beyond the bounds of rationality may underpin cross-sectional observations.

TABLE 1.1A[10]

TAXONOMY OF ECONOMIC CYCLES

Source: writer, as presented

AUTHOR	Date	CYCLE	Periodic Range
ROTHSCHILD	1815	Financial (Price Of Consols)	40-68 months (av. 52 months)
KITCHIN	1923	Business (Investment)	3.25-3.75 years (av. 3.5 years)
LOMAX	1980-2	Oil/Finance (Cartel Effect)	3-5 years
WILLIAMS	1979	Mathematical* (Metal Industries)	5.3 years (av. of all cycles)
JUGLAR	1860	Trade (Volume)	7-11 years (av. 8.5 years)
JEVONS	1870 1909-10	Commercial Crises (Sunspots)	8-14 years (av. 9.5 years)
DEWEY	1964	War	17.7 years
HOFFMANN	1959	Trendzyklen (Output)	20 years
KUZNETS	1930	Construction (Long-swings)	16-21 years (av. 18.5 years
SHERMAN	1983	Atlantic Community (Development)	20 - 25 years
JUDAIC	Ancient	Land Tenure (Law Of Reversion)	39 years
KONDRATIEFF	1924-6	Long Wave (Prices)	48-60 years (av. 54 years)
MANDEL	1975	Long Cycle (Of Capitalism)	54-70 years
SOLOMOU	1985	Development (Eras)	55-80 years
BRAUDEL	1977	Cultural (Epoch)	180-210 years

The economic record of historical reality is thus comprised of numerous cycles of differing periodicity concerned with selected aspects of national economic activity which act together, interweave in time, but only inter-react at a disaggregated level.[11 & 11a]

1.2.3. Theoretical Excursions Concerning Equilibrium

The explication of endogenous and exogenous influences giving rise to appearances of various cycles in the recorded data has occupied the attention of a host of economists. Most of these theories have been systematised and classified by a series of eclecticists and commentators,[12] each with a different taxonomy and a different set of references.

Arising from the notion of 'invisible hand' (vide Smith 1786), classical economics rested upon the assumption of the homeostatic principle;[13] a stable equilibrium or central tendency to which all deviant movements eventually return. One natural outcome of this belief was the widely-held view that a) cycles would correct themselves in the course of time, b) they formed endogenously from proportionate changes in underlying relationships, c) they persisted by dint of random exogenous 'shocks', or disequilibrating impulses exerting their contingent effects only at top and bottom turning points.

Having previously read a definition of the formative characteristics of economic cycles, the reader will appreciate that reification of the cycle and a mechanistic interpretation did not accord with the research aims of integration, overview, and detailed association of particular changes with noted historical occurrences.

One type of theory, based on micro-economic assumptions of a static equilibrium and rational expectations model, sought to identify causal mechanisms for linear sine wave cycles appearing to recur at fairly regular intervals, despite changing developmental conditions, and did so through a combination of endogenous mechanisms and external, random impulses. 'Limit cycles' and idealized patterns of cyclic 'behaviour' were two disparate results.

It is the modelling of the impulse generating mechanism that is perhaps the most crucial aspect of cycles theory: one has to explain the persistence of the shock and its propagation into a cycle; or else how growth meets resistance and overcomes it inconsistently and spasmodically, so that cycles ensue.

Business cycles can be modelled by either linear or non-linear equations, and analysed in both cases either deterministically (without shocks, or with leads and lags endogenized) or stochastically (with shocks, usually exogenous, but if technology is included, also endogenous).

Indeed, the differences between models depend in part upon their scope and timespan, as to whether impulse or shocks are included or excluded, and in part upon the propagation and dampening of the shocks once received.

In linear modelling, the explanation of the movement over time of the stable equilibrium point may be consider separately from fluctuations. Non-linear models, particularly those with stable limit cycle solutions, also tend to ignore growth. The equilibrium point, although unstable, is assumed to move over time and to trace out a stable growth path.

Another type of theory based on perception of unstable or non-existent equilibrium, (alternatively of parcels of partial equilibria which did not - except accidentally - form general equilibrium),

involved an incremental, irregular dynamic system where impulses were seen as endogenous and giving rise to sigmoid development blocks and only accidentally to hybrid types of cycle. 'Dynamic systems models' (closed) and stochastic games theory (open) approaches were two disparate results.

Although theoretically polarized, both types of explanation sought to deal with the same sets of economic phenomena, but held differing perspectives, so emphasizing the role of those factors which seemed most conducive to their arguments. These perspectives were heavily over-influenced by two obsessive, complementary ideologies: those of 'free-market' and 'command' economy political systems.[14]

A corollary of the equilibrium model is that development follows a generally steady growth path; and that identified, about which cycles deviate, does not alter much in the short-run. A number of factors[15] may nevertheless lead to a sustained departure, and these have been incorporated in sundry theories of economic development revolving round entrepreneurship (Schumpeter 1912, 1934, 1939) and technological innovation.

Reference to the historical context (van Schmoller, 1886, Marx 1884) involved a shift in paradigm from deductive to inductive approaches, from abstract reasoning to empirical particularities. Pursuit of statistical methods (Mitchell 1927) in turn involved the research and compilation of indexes of percentage change in long-run economic variables.

Differences in calibration, estimation and assumptions led to publication of sets of indices concerning similar variables (ie: Hoffmann, Lomax, Mitchell and Deane, and Feinstein on 'Industrial Production') where the *differences in index values given by individual authors exceeded the extent of the cyclical change to be noted.*

67

Compromise values might also have given a cyclic appearance to their linear depiction, but turning points and periodicities then would vary from those of the contributing indices and again bear only slight association with their historic reality. Of what use then would become the sophisticated test procedures? *One had to abandon any idea of synthesizing or coordinating existing time-series into a new composite time-series.*

1.2.4 Spectroscopy of Longitudinal Undulations

An obvious opportunity presented itself to replace the lost legions of short-cycles with those long cycles purported to run throughout the study period (at least in extrapolated form), thus achieving the desired cohesion across the uneveness of historical development periods.

Equilibrium theory and restrictions of 'tunnel vision' arising from 'ceteris paribus' do not properly apply to long-run aggregate phenomena (Stone and Stone 1938) as traced in long-waves. The latter describe the outcomes of phases of development as reflected in linked financial series (eg: commodity prices, interest rates, government stock, trade balances and so on).

The possible existence of a long cycle with a 54 year period[16] was calculated mathematically on the basis of limited span observations of economic history (Hyde Clark 1838, 1847) and followed by similar work to detect surges in activity [eg: Alexander Helphand pseudonym Parvùs (1912) de Wolff (1908), van Gelderen (1913)] - who referred to 'spring-tides' in economic affairs, a descriptive phrase which has stuck.]

It was not until the mid-1920s that a major work on the possible existence of a long-wave in prices was produced, and a further decade before it was translated into English. (Kondratieff 1924 - 26, 1935, 1978). The author, professor of economics at the Moscow Academy, died in a Siberian salt-mine, victim of Stalin's early purges of unorthodox 'party' thinking. The work remains both topical and controversial.

At first sight, the diagram of co-movements of index numbers[17] of wholesale commodity prices in the United States, England and France appeared strikingly irregular. There exist massive peaks around the exceptional war periods 1793 - 1820 and 1913 - 1920, between which a fluctuation culminating in the late 1870's leads to a long decline in prices until 1895. Starting points of successive 'upswings' (interspersed by 'downwaves') were approximately 1783, 1842, 1897, (by extension - 1948, 1996).

Kondratieff's empirical observations rested on the performance of eight indices, including consols, interest rates, agricultural and textile workers' wages, levels of foreign trade, coal production, pig iron output, and lead production. The choice of these variables (instead of others available at that time) supported the explication of the long-wave hypothesis.

Critics of the theory maintained that 'long-waves' are conditioned by causal, exogenous and extra-economic combinations of circumstances and events expressly excluded from Kondratieff's analysis (although all his figures were adjusted for changes in population, which itself had a varying tempo of change over this period).

Peaks and troughs in Kondratieff's selected variables showed the international 'long-wave' to have been irregularly spaced and incongruent with a number of other better established short-period cycles' turning points. Inconstant amplitudes were also noted (Cole 1948). The 'smoothing effect' of nine-year moving averages was also anti-historical, and indices of output, output prices and particularly those of metals and minerals did not support a 'long-wave'. (Fellner 1982)

Later apologists for Kondratieff's theory have utilised technological innovation, wars and revolutions, fluctuations in gold production, and assimilation of 'new' countries into the world economy as part of a polemic of on-going socio-economic revolution aimed at the eventual socialization of the capitalist system of production, the coming overthrow of which was heralded by its periodic financial crises.[18]

Kondratieff himself replied to his contemporary critics:

> "Their weakness lies in the fact that they reverse the causal connections and take the consequence to be the cause, or see an accident where we have really to deal with a law governing the events." (1978, p 35)

However, if 'zero-calibrated' starting dates other than those so carefully picked by Kondratieff are chosen the resultant movements and periodicities become so different from the original ones that, in order to respect the work done, one can only refer to the 'long-wave effect', not to the Kondratieff Long Wave.

By selecting historic events as those determining the hypothetical turning points, and other specific changes and contiguous events as somehow supportive of this contentious segmentation of time, other authors (notably Beckman following Shuman and Rosenau and Zimmermann) have produced stylised representations of the long-wave effect. Their procedure is basically a form of tautology, or covert circular argument.

> "Perhaps the only assertion which can be confidently made about economic movements is that they are irregular." (Brittan 1983)

On this basis, it would make no difference as to how many cycles this time-series covered - (two and a half or twelve and a half, 140 years or 700 years -) it would remain controversial and open to diverse interpretations and perspectives.

> Kondratieff admitted "A strict periodicity in social[19] and economic phenomena does not exist at all - neither in the long nor in the intermediate waves." *(The lengths of their fluctuations varied by 25 per cent and 57 per cent respectively-sic!)*

Annual percentage changes, when averaged over the alleged upswing and downwave periods of the long-wave effect, did not conform to the imposed periodicity when the index of growth in world industrial production was examined (Beenstock 1982).

TABLE 1.1.B

Wave	Upswing	Change %	Downwave	Change %
A	1785 - 1820	2.4	1820 - 1840	2.9
B	1840 - 1870	3.2	1870 - 1894	3.2
C	1894 - 1913	4.6	(1913 - 1939)	(3.8)

Could long wave effects in the economies of advanced industrial countries, if they were valid, be attributed to these world-wide tendencies of growth and development over several decades? Marked trans-national conjunctures may have been induced[20] by 'bunched' technological diffusion occurring at periods when the trends of commodity prices had in any case altered, as much improved communications foreshortened the customary 'lags' in trade and other transactions.

It seemed to stand to reason that the long-wave effect 'contained' the combined ripple effects of many shorter cycles, and was actually composed of these short-run trajectories, just as the short-cycles comprised fluctuating changes in interval data which had been linearly conjoined following statistical treatment.

The common denominators of both long and short cycles were the untreated raw data and historic events associated by the time continuum which they punctuated. It seemed to be the psychological perception superimposed upon these statistical artifacts which lent them a 'vrai-semblance'.

The 'movements' of any aggregate index of economic variable factors are necessarily the outcome of multitudinous sub-movements, both complementary and contrary, of its components.

Aggregation of regional series into national series might lead to a sequence of peaks and troughs that is true for none of the individual regions. Clearly, to rely on the sequence of peaks at a national level in order to explain a regional phenomenon may sometimes be to invite trouble. (J Parry Lewis 1965)

Yet it appears, paradoxically, that even mathematically constant relationships between variables may produce an endogenous fluctuating process[21] having periodic characteristics (Tinbergen Op Cit), all derived from an initial (exogenously induced?) change in equilibrium.

Several authors Phelps-Brown ($\wedge$) 1952, Aldcroft and Fearon ($\blacktriangle$ p246) 1972, Solomou (1986) have referred in general and in specific terms to differential rates of development between countries, and the varying levels of retardation and possibilities of acceleration (Gerschrenkon 1962), (Wallerstein 1979).

The pattern of the atlantic economy had derived from dividing a communal fund of incremental energies. (Sherman 1981) There had occurred unique changes in the structure of the world economy, resulting in differentiated growth paths between countries at varying stages of industrial development. So uneven growth rates were the causes of long-wave effects in national price levels.

> One crucial, unresolved question . . . "is whether these long-term variations are more than the outcome of a summation of random events, and further, whether they exhibit recurrent temporal regularities that are sufficiently well-behaved to call them 'long waves'." (Rosenberg and Frischtak 1983)

A most comprehensive work on the long-wave effect has recently been published which reviews the evidence and, party due to its typicality after a period of sharp economic recession, renews the controversy in seminal style. Van Duijn (1983) study of the history of economic thought reinforces the view that cycles have long been experienced by those engaged in practical affairs and commented upon by economic writers (see Appendix 1.A.5).

One commentator declared that, ostensibly,

> Van Duijn's thesis ignored a vital structural perspective: "Relative backwardness and differential growth rates across nations figure centrally in my account of the world growth path. G-waves are historical waves of irregular length and amplitude."

[S Solomou, Non-Balanced Growth and Kondratieff, Waves in the World Economy, Journal of Economic History Vol XLII NoI March 1986. p 167].

1.2.5 Non-linear dynamic systems model

The idea that cycles and long-waves may be generated by a closed dynamic system with feed- back 'loops' encapsulated in a computerised , simulation , non-linear model of the national economy (in this case, the American economy), stems from input-output models, (pioneered in the Russian economy by Leontief (1937), and developed at the Massacheussetts Institute of Technology. (Forrester 1947, 1976, 1981, 1983).

Based on simultaneous equations (Ickmura)(1984) representing observed patterns of micro-economic behaviour at the level of firms, and incorporating the (Kahn - Samuelson - Kalecki) capital goods ordering, accelerator - multiplier hypothesis, the model was fed with current information. Its output clearly demonstrated 'spontaneous', endogenously generated short and long cycles.[22]

The same model, supplied with historic data inputs, replicated accurately historic appearance of both business cycles and the long-wave effect. It thus replicated the policies and structure that cause the unfolding progression of economic change (Allport 1961).

A virtue of Forrester's System was its separation from the process of trial and error, replacing these with an empirically verified range of successive reactions ,or observable behaviour, by actual economic agents (Eliasson 1977). This enabled discernment of exactly what was cause and effect at each stage.

Seemingly, this model approached the 'ultimate objective' (Kaldor 1950, 1952) of capacity to explain actual and past events, forecast future developments, and 'provide a guide to policy outcomes' (Tinbergen 1942). Such also is the intended purpose of the (revised) Treasury model for short-term forecasting (see

Appendix 1.A.4).

A further defect of the MIT Systems dynamic model is its rigidity as a closed system. It does not, (and cannot) accommodate changing internal structures or external circumstances, the result of which are *changes* in the strength and frequency of inputs, *and* alternation of the internal relationships of the model. Significant effects of exogenous cyclical change do not appear to be incorporated into a model producing endogenous cyclical change.

The Frisch-Slutsky (1933) analysis had shown linear stochastic models to be capable of generating cycles if the economy were stable, (Lucas 1975 and Sargent 1978) and led naturally to the separation of growth from cycles modelling. The NSDM non-linear modelling reunited both aspects, but has been criticised on several counts.

In the first instance, the simulation was held to reproduce the appearance of historical cycles without the substance of an underlying economic rationale of a composite, multi-causal type, including technical change,[23] evolving attitudes, developing structures, and the enlarged role of Government, as had been required by earlier writers (Adams 1923), (Mitchell 1923), (Haberler 1937).

However, *the context for analysis not only should include institutional factors, but world-wide influences*, and thus transcend the fixed parameters of an inward-looking national model. Even at the micro level, firms were deeply affected by foreign trade contacts, transactions, and the exchange rate (Viner 1937), (Salent 1941).

"a multi-sector dynamic process involving both lags and cumulants is almost certain to produce cyclical movements in the variables if it is once disturbed from its equilibrium path", (Duesenberry 1949) . . . "even if its parameters were fixed" (Metzler 1950)

An alternative model (Goodwin 1967) (Samuelson 1965, 1967, 1981) involved augmentation by technical progress and resulted in repeating limit cycles about a <u>moving</u> equilibrium: this utilised a Volterra-Lotka model converted from biological science, and appeared to fit the historical process more convincingly.

The role of shocks in the limit — cycle model is to impart the observed irregularity. *Thus specific historical occurrences can be related to a continuous economic progression.* The dynamic path of the shocked economy will eventually return to the path traced by the stable limit cycle (Klein and Preston 1969) (Kosabud and O'Neill 1970).

Non-linear modelling allows the cycle to be considered as a natural, endogenous outcome of the economic system, instead of being the response to exogenous shocks which 'prevent' the economy from travelling its stable equilibrium path: but it robs participant observers of confirmation of their practical, psychological experience and so it is resisted.[24]

1.3.1 Psychological genesis for an ideal cyclic model

The unwary reader may find that this next step along the road to finding a means of integrating cycle and long-wave into a relatively problem-free model of economic activity somewhat of a 'molotov coctail'; for the language of emotional 'seeing' is unlike that of cerebral appraisal, although both are necessary aspects of the mind of man (Humboldt 1742) (Dostoevski 1873) (Vgyotsky 1982)

The story of beauty and the beast - the Jekyll and Hyde in every man - is common ground among medical psychologists and psychoanalysts following the work of James, Freud, Alder, Jung and their modern successors. It is discernible - and sometimes one simply suspects it - that even the most brilliant and abstract theories, including those of the cycle and long-wave, are subtly propelled by obscure, socially discreditable and occasionally almost manic undercurrents of vanity, insecurity, egotism grievance, peevishness, etc.

Equally, one occasionally becomes aware of the psychological fact that, behind the cool institutionalised masks of the market and the bureaucracy, there lurks a lavish emotional jungle extravagantly over-peopled by clones of the seven deadly sins. Philosophers, poets, novelists and economists down the ages, from Aristotle, Aurelius and Aquinas to Ricardo, Mill and Keynes have been aware of the nature of speculation in traded commodities and financial instruments, and of the psychological tensions and 'animal spirits' displayed as the cycle turns.

Whatever retrospective theorists can prove, *the real economic agents engaged in transactions for gain experience very vividly their 'bounded rationality'*, (Simon 1982) as economic conditions alter and the business environment is modified by actions, regulations and interventions. For them, the cycle is

compelling, whole, immediate, rife with alternating emotion, and irrefutable.

Merchants at all times since Joseph in Egypt have been aware of natural fluctuations affecting the supply, demand and price of commodities, and the dangers of 'force majeure' in resolving difficulties of trade, money supply, or claims to natural resources.

Commercial panics and crises, wars and revolutions, riots and strikes which have persistently deranged the stable growth path to prosperity of every national economy are seen by some writers (eg: Hobsbawm 1979) to stem from the unequal distribution of wealth resulting from private monopoly of land and its derived privileges (George 1882 - 3).

Cycles - the word is used as an adjectival noun-possess no existence without the participation and observation of economic agents. The latter perceive that concept of the cycle, which best matches their experience and recollection, as a strategic signpost and prescriptive tool, useful in guiding their practical responses to short-term signals. Transactors may view the appearance of cycles in real economic factor prices and quantities as representing recognizable patterns of aggregate demand, (or mass psychology,) facilitating adaptation to changing circumstance.

Retrospective views of cycles have under examination what amount to fossilised intentions, judgments, decisions, anticipations and expectations of yesteryear. Current views of cycles feel all these possibilities as contemporary dilemmas[25] and future potential, about which irreversible decisions must be made, inevitably under unequal degrees of rationality, freedom and uncertainty. (Knight 1921 Bernanke 1983)

It seems reasonable to postulate that human behaviour displays constant characteristics in the face of uncertainty, only slightly

modified by rule-based institutional structures. Lord Overstone, Governor of the Bank of England during the period when Peel introduced the momentous 1844 Bank Charter Act, commented in 1837 as follows, upon a pamphlet that had been circulated by a journalist:

> "The history of what we are in the habit of calling 'the state of trade' is an instructive lesson. We find it subject to various conditions which are periodically returning: it revolves apparently in an established cycle."

> "First, we find it in a state of quiesence - next, improvement - growing confidence - prosperity - excitement - overtrading - convulsion - pressure - stagnation - distress - ending again in quiescence."

Further comments of a similar kind soon followed:

> "Periodic collapses are really mental in their nature, depending upon variations of despondency, hopefulness, excitement, disappointment and caution. But it seems to be very probable that the moods of the commercial mind, while constituting the principal part of the phenomena, may be controlled by outward events, especially the condition of the harvests." (Jevons 1909, p 184)

And after this, Marshall (1923) and many subsequent economists set down descriptions of the course of a cycle. (See Appendix 1.A.3)[26]

In recent years, psychological factors have reasserted their importance through development of more satisfactory means of measuring levels of business confidence and profit expectations etc (Lavington 1922). These stem from the Munich - based IFO Institute[27] and have been taken up by the Confederation of British Industry since 1967, who now issue regular quarterly surveys. The Government economic and statistical services also deploy sets of cyclical indicators as an adjunct to the Treasury Model (Appendix 1.A.4)

Psychiatric evidence (Baden - Daintree 1982), derived from clinical case-studies of hospital patients suffering from inexplicable manic-depressive illnesses, testifies to the strength of cyclical tendencies in that 'essential consciousness from which all human sanity and intelligence originates.'

Some confirmatory opinion of a connection with economic cycles is contained in the following meta-understanding:

> "Doctors say that the human organism is stimulated by stress factors. If a positive influence is exerted, they speak of eustress, and if the influence is negative, of distress. Distress factors may manifest themselves as psycho-somatic illnesses. But eustress and distress may also cause changes in human behaviour, and here I see the connection with the theory of the business cycle: psychosocial stress factors can affect the behaviour of entrepreneurs and of consumers, and under certain circumstances initiate waves of optimism and pessimism which may reinforce the fluctuations of the economy." (Strigel 1949)
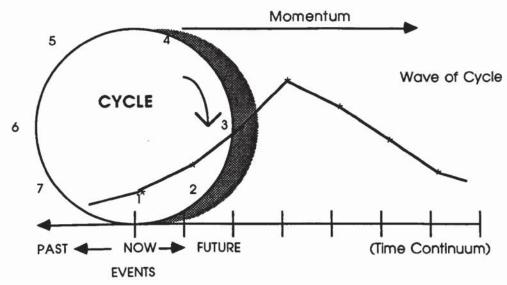
It seems that, by using intelligent anticipation to proact, economic agents as decision-takers may either reinforce or moderate endogenous cycles, but as in the case of the Delphi oracle, the foreseen outcome remains broadly unchanged. Perception of major cycles by political leaders may influence economic policy either side of an election,[28] giving rise to marginal antipodal changes in expenditure on armaments, health, education, infrastructure and regional aid, among many other headings.

Dynamic processes are seen also as complex and erratic, providing unanticipated shocks and unexpected changes in economic variables in relation to previous estimates. Substantial periods of time are required to work off excess capacity and readjust resources, as all sectors of the economy are affected by changes in major variables. (Steinherr (1983))

These observations are not intended to imply powerless absorption of economic agents into the anonomie of mass momentum. leaders of opinion in national economic policy, entrepreneurs in pursuit of excellence in industry and commerce, and common labour with its range of skills may proact, act or react to any given situation.

The changing contexts in which all decide and operate, together with the psychological factors, may well interact amid reversible tidal flows in both physical and noumenal settings: *it is clear that a multi-level, multi-causal model will be required to accommodate all these influences upon actual and recorded performance.*

1.3.2 Cyclograph - an ideal archetype

(Fibonacci Numbers: 3, 5, 8, 13, then 11, 7, 4)

1.3.2 Delineation of an ideal cycle model

Whatever the theoretical complications and empirical irregularities, psychologically, the course of a cycle is known and recognizable from the current condition and climate of business. It appears that a cycle consists of a number of distinguishable phases which repeat periodically and revive memories of the previous occurrence. It therefore can be graphed in ideal form, using an archetypal sine-wave to represent its 'movement'.

A wave of this shape is produced by the forward rolling motion of a point upon the circumference of a circle. At any moment, limitless radii of possibilities exist (Ouspensky 1934) at each conjuncture in time of a cyclic phase and the present 'now', as registered along a continuum. In practice, the past choices largely regulate the future possibilities, so that repetitive combinations of circumstance reproduce similar, 'felt' results at each phase.

The progression of a cycle may thus be represented as a horizontal spiral, the phases recurring in the same 'place' (ie: with identical co-ordinates) with every repetition or reenactment of its possibilities. Historical events and developments, creating their own rhythms and timespans in the space-time formed from their active existence, are embedded in this cyclical process. (Sorokin (1966), (Gurvitch and Moore (1976). One needs to hold wide time horizons in order to appreciate this theoretical mechanism. (Weigart 1981)

Both duration and amplitude of each phase may vary from one recurrence to the next, and although empirical analysis does not confirm regularity, theoretically each phase recurs in the same sequence. In fact, some phases are eclipsed (possibly by the inverse effect of the 'rhythmic beat' caused by two overlapping cycles).

As long as the conditions, relationships and forces giving rise to the cycle persist, so long will its appearance recur. The archetype of the cycle applies also to depiction of the long-wave effect, when similar influences act upon the broad range of economic variables to create a pattern through history.

The ostensible depiction of this argument is as follows:

The course of a cycle

Each current phase of the cycle is always 'now'; the future is a new enactment of the past; present events contain all possibilities. In the case of cycles and long-waves, how does the sequence of phases appear to run? Perusal of all the literature confirms the following:[29]

The easiest, most readily recognized point at which to begin a sequential description of the cycle is the condition of stagnation or inertia when little change is perceptible during a period.

In order for a recovery in the tempo of activity to occur, some impetus must be given, either external or inner, or a 'sea-change' induced, thus raising entrepreneurial expectations of better profits and encouraging an increase in real investment, or better use of existing capacity to increase the volume of output at lower unit costs.

These improved conditions have to be sustained in order for the recovery to bear fruit in a stage of relative prosperity, rising demand, higher wages, and increasing output. A speculative spurt in which excitement about the boom may sway sober judgment may then occur. Accelerator-multiplier effects would take place, and optimism would dominate the feed-back 'loop' of encouraging information.

Soon, however, over-production may saturate markets and over-extension of credit lead to higher interest rates and a squeeze. Under these conditions apprehension sets in, leading to rapid loss of confidence and the cancellation or 'drying-up' of buying orders. If large organizations or banks fail, a crisis may ensue, especially among companies expecting exponential rather than cyclical growth.

Recession soon bites, and new product markets consolidate under conditions of high costs and wages and increased competition to cut prices. Labour's temporary advantage over capital is rapidly eroded by increased unemployment. Rents remain at previous levels, but interest rates begin to fall.

If international conditions remain such that no new opportunities occur and the existing dynamism of domestic industries becomes unwound, a much deeper depression ensues, descending in terms of prices, output and employment until a new, lower platform is reached.

Continuation of this condition comprises the stagnation phase again, containing within itself the seed of the next cycle in the form of low costs, wages and interest rates and underexploited technical and product market opportunities.

[This somewhat mechanical description has been applied to a predominantly manufacturing economy, and the element of anticipation was largely omitted]

Long cycle effects are seen somewhat differently, as would the life-cycle effects of firms, industries, phases of economic development and stages of social evolution. The template remains the same: distinct characteristics experienced over longish time-periods, and accompanied by certain types and qualities of historical events, recurring at long intervals.

Uneven but slowly rising economic activity and rates of change, with rising prices, interest rates, and wages and clusters of technological innovations and investments, accumulate to a sustained high plateau before an abrupt descent to a lower plateau, then subsiding more slowly to another base.

This stage process model suggested theoretical explanations of capital accumulation, (Ashley 1902) new technological commitment (Rosenberg and Frischtak 1984), competitive shake-out as entrepreneurial profits decline (Schumpeter 1939) and retirement of the capital stock, coupled with saturation of product markets, leading once more to 'stalemate' (Kalecki 1933),

Mueller (1972), Mensch (1978), Abernathy (1983).

A lull tensioned by necessity invites entrepreneurs to implement improvements and to re-equip in order to overcome 'bottlenecks' in operations (Jones 1965), or exploit fresh fields of endeavour, and slowly, the process begins to repeat.

This view produces a number of stages: stagnation, tension, accumulation, commitment, exploitation, concentration and depreciation, mainly centred on capital investment but also entraining changes in the socio-political culture.

In both cycle and long-wave, the outcomes reflect the conflict between energetic vision and impulse, habitual resistance and past-loadedness, and the conditioning effects of the institutional structures. *It is the evolution of the institutional structures which distinguishes periods in history.* (Perez 1983)

The effects of phases in both short and long cycles is to overprint the model of a sine wave with a multiple matrix of cross-sectional values, in which both short cycle and long-wave effects are combined.

CHAPTER TWO

SECTION A

2 THE HISTORICAL SETTING-LOCAL AND NATIONAL

"There is as yet no comprehensive study of business cycles in a historical setting."

Aldcroft and Fearon 1972

2.1 Need for a Broad View

2.1.1 Problem and Aims

The argument so far has been conducted in abstract review terms almost devoid of historical context, and certainly far removed from the actuality of events. In fact, the effects of real events upon the economic variables reflecting business activity, and giving rise to the appearance of cyclical fluctuations, seem to be largely ignored at the theoretical level of understanding. In consequence, one detects there a 'missing link' of some consequence: the rôle of combinations of events in producing conjunctural effects.

It may not be denied that many technical difficulties have been encountered in attempts to identify, measure, and put into a regularised perspective the semi-recurrent patterns of change in aggregates recording fluctuating levels of economic activity. Many spurious cycles (some now discarded) may have arisen simply from smoothing processes involved in time-series treatment of the raw data (NBER 1956) (Adelman 1965). Transposition of happenings to dates when they did not occur remains unacceptable to historians.

Among several prominent economists seeking joint explanation for both cyclical fluctuations and economic growth by means of a theory of economic development have been those of otherwise antithetical views: Marx (1867), Schumpeter (1912), Kaldor (1954), Goodwin (1952) and Sherman (1984).

Like Keynes' (so-called) general theory, the resultant propositions did not allow for the recurrence of cyclical prosperity and depression over both periods of growth and development and over periods of stagnation and decay. Each theory in its way was centred on one or two phases of the economic cycle, rather than its entirety, and none appeared to take into account how a long-cycle switch in trend may either neutralize or exaggerate the effects of shorter cycles.

Need for such a superimposition theory is not always paramount. For example, the National Dynamic Systems Model, promulgated at the Massacheussets Institute of Technology, USA, (under the guidance of Professor C W Forrester since 1967), gave spontaneous rise to both short, medium, and long period cycles. This sporadic effect was derived from inputs to a computerised simulation model of the American economy extracted from the real historical record of micro-economic behaviour.

These results were not theory-free, since the paramaters of the model and the selection of variables were derived from the traditional neo-marxian view of cycles in capital investment. The unnoticed cyclical character of the combined input data became manifest in the output of an interactive dynamic model: the data having been selected from areas of micro-economic enterprise known to display cyclical propensities in price, output, and investment, the feed-back loops of the model, duplicating reality, (also symbolising a circular argument) naturally generated cycles.

Multi-causal explanations of retrospectively evident economic fluctuations seem endemic to any serious attempt to adopt a broad, spectroscopic view of business activity. Yet most theorists of repute seem to have selected only one narrow aspect as the cornerstone of their proposition ('ceteris paribus' taking care of everything else in the economic panorama).

The aim of this Chapter is to link cycles with history at the data-base without the superimposition of theory, in place of which an extended grouping, interlinking, and interaction of economic variables is envisaged. The problem is to devise a numerically-based method which will facilitate both the enumeration of qualitative and quantitative events as they occurred, and the summation of their changes in a matrix.

2.1.2 Objects of Study

The objects of study for this Chapter are expressed by its contextualization in its historical setting between 1780 - 1980; it's periodization by subdividing the changing scenario of actual events within that setting (so that economic fluctuation could be matched against reference framework) and by it eventually focussing on the quantification of change itself, as seen in both statistical out-turns, changes in the business environment, changes in the level of business confidence, and in a chronology of significant historical events.

If, over a number of years, a single trend line can be taken as a delineation of many inter-temporal changes in the quantity of any given economic variable (and the deviations from central tendency of those changes to represent cyclical movement) so the juxtaposition of several trend lines over an identical time-span will represent the co-movement through time of several variables, and their cycles.

At any discrete interval, the conjunctural values of the trend-lines represent what the economic agent or decision-taker experiences or knows as his picture of the business environment at that date. The coincidence of the relevant data and their combined effect, together with his own reactions, strategies and expectations, comprise that situation, having for him no past, no future, only present existence.

A series of such 'pictures', or numerical summations, of a range of economic activities, comprise the changing profile of the economy and the part played by the participant observer. If the component variables of this picture change from year to year, decade to decade, generation to generation, so in some composite manner will the annual summations of those changes also change.

In this approach, the noted changes consist of year on year differences expressed neutrally as a percentage of the original values, thus enabling objective comparisons and unbiased additions to be made between the values of change attributable to co-existent but very dissimilar factors.

There are no lags, cumulants, evolutions, transferred effects or continuities involved in this method, since all these are subsumed in the annual changes. One places no reliance on the weak memories of individuals for events occurring within the period of a cycle, especially not of a long-cycle, but relies entirely on creditable secondary sources to supply data of all types necessary to fill the grid of an ideal matrix.

No conventional attempt is made to reconstruct the past by means of inference or historical imagination: one does not seek the causes of outcomes, nor their interpretation. It is the general movement of the economy as portrayed by groupings of economic variables that becomes the central interest. Historical narrative is replaced by both numbers and by verbal entries indicating change differences and/or events.

Precedent for presentational style

Quesnay, the French Physiocrat, probably set the first precedent for this cross-sectional approach to longitudinal occurrences (in his 'Tableau Economique', 1795). Others, since, have followed this example, [notably Cole (1932), Aldcroft and Fearon (1972)], with a view to providing synopses of change between selected years.

My present proposition involves the vertical aggregation of a long succession of changes and subsequently their representation as a new horizontal graph of national economic activity. The verbal historical descriptions, or overviews, become unavoidably somewhat disjointed, but nevertheless follow strictly the order of groupings of economic variables forming my Matrix.

Further support comes from Court (1965) (pp867) who wrote:

> "In their rough and untidy actuality, where the long period was merely the sum of many short and few men looked five years ahead, economic decisions were taken by particular persons in specific situations, accepting and rejecting alternatives under the influence of arguments or habits of mind which remain often obscure to us. To take only an 'ex post' view of such decisions and of the consequent action taken is to be half way towards misunderstanding the process by which industries and firms grow and decay. They need also and first to be seen 'ex ante', at the point of time when calculations were still

being made and expectations formed, when error and contingency entered in without being recognized for what they were, when the future was uncertain and information was imperfect, before results were known, when the outcome was a matter of probability or possibility only, not disclosed fact. Such is the nature of economic decision, and it is precisely that nature which eludes us in much of the surviving documentation of industry and in a great deal of industrial history as it is written."

A broadly similar and unconventional view was expressed by Shackle (1961): it is decidedly the view adopted in this thesis.

One thus withdraws from the socio-historical behavioural paradigm and its accreted assumptions, and adopts a holistic approach where many components and their interwoven relationships meld and merge numerically to project, like life itself, the unified field outcome of many cycles at many levels.

Development of operational concept

Rationale for an 'Ideal Matrix'

Whereas conventional explanations of cycles in economic variables - even of such aggregates as gross domestic product, the index of retail prices, interest rates, or the money supply - often sought a rationale involving only a few factors, the approach adopted here is to utilise all the main factors bearing upon a situation.

Those factors selected are deemed important because they are those which have emerged as important during the course of the previous chapter, and are therefore those variables already researched and utilised by renowned writers over the study period.

In the matrix from which an index of first differences in changes in national economic activity may derive, the selected main variables are grouped in a sequence which is believed first to reflect their relative weighting as an influence upon changes in economic activity year on year, and second, to form a logical interactive chain.

Some of these variable factors are more often considered as exogenous in classical models of the economy, but as the previous chapter has shown, longitudinal studies require dynamic models and invite extension of these constricting limits to include as endogenous some basic factors often excluded. No pretension is made that any economic variable exists in isolation; a principle of co-existence is upheld.

Rationale for a Matrix - a shift in perspective

<u>Cycles</u>   Complex appearances dissolve into single cognitive mental framework, annihilating exogenous/endogenous duality. (Index the disaggregated, interacting variables.)

<u>Change</u>   Multi-facetted processural view yields to indexial stand-point of participant observer. (Irregular raw data used to calculate periodic percentage differences.)

<u>History</u>   Superficial patterns and rhythms surplanted by solitary moment of actuality in current state of affairs for each selected economic variable.

<u>Method</u>   Adopt broad approach using observation and reason to discriminate hierachical cascade weightings. Relating the above to a time-frame justifies the use of a matrix presentation.

2.3.3 Allocation of number to rates of change

Each grouping of economic variables in the matrix of change comprising differences in national economic activity was treated identically in its registration of change. Each event was accorded the value of its place in the scalar sequence. Each blank space was also accorded a value depending on its row. Thus the matrix - a pioneering prototype - consisted of annual percentage changes and weightings for all factors in every year.

2.3.4 SAMPLE MATRIX AS BASIS FOR INEA

Weight-ing	Years	Differences In Percentage Change (Random Numbers)									
	1230 - 1239	0	1	2	3	4	5	6	7	8	9
0	A Climate & Harvest	0.0	3.0	4.0	0.0	4.0	3.0	0.0	3.0	0.0	6.0
1	B Porpulation & Employment	3.1	6.1	0.1	6.1	4.1	0.1	3.1	6.1	6.1	1.1
2	C Land & Building	4.2	6.2	0.2	6.2	3.2	0.2	6.2	2.2	3.2	3.2
3	D Innovation & Investment	2.3	6.3	1.3	6.3	0.3	4.3	5.3	6.3	0.3	1.3
4	E Legal & Cultural	1.4	1.4	4.4	1.4	0.4	0.4	5.4	0.4	0.4	0.4
5	F Trade & Confidence	0.5	4.5	2.5	4.5	6.5	0.5	6.5	2.5	4.5	1.5
6	G Output & Production	1.6	1.6	4.6	5.6	0.6	2.6	0.6	4.6	2.6	5.6
7	H Price & Interest Rate	3.7	3.7	2.7	3.7	0.7	3.7	2.7	2.7	0.7	3.7
8	I Credit & Clearings	6.8	0.8	0.8	5.8	1.8	2.8	4.8	5.8	1.8	0.8
9	J Wars, Panics, Crises	0.9	0.9	3.9	1.9	6.9	0.9	6.9	6.9	2.9	0.9
	K Total of A - J	24.5	34.4	24.5	41.5	28.5	18.5	41.5	40.3	22.5	22.5
	L Dividing by Ten	2.45	3.44	2.45	4.15	2.85	1.85	4.15	4.03	2.25	2.25

The above matrix is filled with random numbers from a random number table for the major scale and by regular weightings for the minor scale. The sums of change are seen in row K and are divided by ten in row L. The final change value is 298.7. It would be possible, if desired, to add across rows for each variable A - J, and thus calculate a percentage of the sum of each in relation to the decennial value. (eg D, Innovation and Investment 34.1 / 298.7 = 11.4 per cent, signifying that this percentage of the change in national economic activity was probably due to these factors in this decade.

The 'cascade' effect

Thus in this haptical, eclectic model not only do all groupings of economic variables influence each other according to their order in the hierarchy - a 'cascade' effect - but they conduct that impetus which produces an on-going pattern of change across time-periods: what may loosely he described as 'cyclical force', or a propensity to quasi-rhythmic unfoldment.

The weightings given to each grouping of variables are admittedly arbitrary, but arguably justified by their causal linkages. The model cannot readily be assessed by conventional analytical tools derived from an atomistic or mechanical approach. However, a rationalisation of the 'cascade' and of its weightings may be attempted:

The principal economic significance of climate was held to be a basic variable affecting principally harvests but also the ease or difficulty of carrying on other activities. The season and timing of rainfall and wind and temperature changes would obviously be as important as the mere fact of change, but since the minimum time-scale was one year, aggregate figures alone were compared with each other.

The outcome of work upon land subject to the above conditions would result in crops, and enhanced fertility of the soil would enable populations to be better supported: other natural resources offered materials for building and construction.

Thus a link between climate, harvest, nuptuality, population, building and land values is readily established, and as these variables changed, so a fluctuating impulse is transmitted from one economic variable grouping to another.

Technology, in the form of innovations, and the accompanying capital formation necessary to make its application effective, links backward to increasing land values and building, and forward to the legal and institutional framework providing patents, monopolies and the opportunity for licences.

A difficulty in weighting this variable arose from the often long gap between recorded invention and widespread commercial application. Figures for new capital formation were seen as a supplementary indicator in this respect, and a compromise weighting was accorded change by means of normative evaluation.

The numerical values given to changes in legal, cultural and institutional factors were simply arranged according to an assessment of their contemporary importance rather than their long-term effects. The values given to changes in business confidence were made on a scale of intensity which provide a numerical score ranging from depression to exuberance, and although based on reports, were equally subjective.

In the cases of quantifying changes in output, prices, credit, money supply, bank clearings, interest rates, etc the statistical evidence and quantitative calculations provided nearly all that was required. In some time series, indexes needed reconversion into annual percentage changes of actual quantities. As the 'cascade' unfolded, so weightings increased at every step.

A causal link and complementarity was held to exist between these variables; their symbiotic fluctuations sometimes reinforcing and sometimes cancelling each other probably provided a semi-dynamic model approximating sufficiently well to reality to yield a crude general impression of overall change in the tempo of economic activity, and possibly of rhythmic patterns of change also.[1]

The intention behind allocating numerical values to changes in quantitative and in qualitative data-sets hierarchically arranged in a 'cascade' was to derive measures of affinity between the character of each decade as a whole. Decade could then be compared with decade, generation period by generation period, and the graphed summaries of economic activity matched with those of Hoffman's index of bankruptcies covering the same time-spans. (See Chapter Five)

The psychologist Boring also commented (1948) in like vein: "Strange as it may seem, the present changes the past, and as the forces and range of psychology shift in the present, new parts of the past enter into history, and other parts drop out."

History could be revised because our ideas of what it was changed as we ourselves changed.

Synthesis of Disparate Periodicities

An option considered for measuring the time in which events are embedded, and the intervals between events, was to replace the mechanical Newtonian concept of time as a uniform excresence calibrated, as it were, upon an external zero, with time based upon the periodicity of the economic cycle.

Quite apart from the irregularity of any individual cycle appearing over a duration and then perhaps altering or disappearing altogether, this proposal raised the question 'which cycle?' Therein lay its baffling complications and upon account of these, as described below, it was rejected.

A long-range examination of history revealed the probable existence of numerous cycles of greatly varying periodicities appearing at many levels of creation, all co-existing. One might conceive of some mechanical contraption which, combined (like

cartoonist Emmett's mobiles or the outmoded geocentric models of the solar system at the Planetarium in Madame Tussauds) all cycles in a universal system of relative motion. As Samuel Brittan remarked in the Financial Times 'that way madness lies'. Nevertheless, the need to put historical cycles into perspective remained; for the simple expedient of charting all the cycles identified by various authors and theorists showed that very few periodicities coincided and peaks, mid-points and troughs often clashed.

In English history, it was conceivable that a Braudelian epoch, during which there occurred a thorough transformation of every aspect of thought, custom and economic activity, had occurred once every two hundred years; with some type of productive revolution every century; and a major change in entrepreneurial setting every biblical generation of 40 years; within which were two 20-year major changes in trend, six trade cycles and ten business cycles.

Rostow (1965) suggested four stages of economic growth and development - gestation, take-off, sustained growth, and mass production defined these stages in the 'first' industrial revolution - occurring between 1720, 1785, 1815 and 1920. Kondratieff's (1926) scheme of long waves in prices proposed periodizations between 1785 - 1869, 1840 - 1895, and (extrapolations by Zimmermann 1982: Beckman 1984) from 1896 - 1942, 1943 - 1996.

Sherman (1982) found that the Atlantic Community displayed a reciprocal development pulse of 20 - 25 years, strongly influenced during the 19th century by waves of European emigration to the United States of America.

Hoffmann's massive study (1955) evidenced annual percentage rates of growth of UK industrial economy (including building)

1701 - 1935, among a host of other variables, including patents sealed and bankruptcies. Low annual growth, between 0 - 2 per cent, occurred 1701 - 1779 and 1877 - 1935; medium growth of 2 - 3 per cent per annum occurred 1793 - 1817, 1856 - 1876; and high growth, 3 - 4 per cent 1780 - 1792, 1818 - 1855. Had this series continued, low to medium growth would have been registered in the 1960's and 1970's , and relatively higher growth in the 1940's, early 1950's and middle 1980's.

The following table (Hoffmann's Table 53) differentiates specific changes in growth into periods of rises, falls and absolute decline in output.

TABLE 2.1.A

HOFFMANN'S GROWTH PERIODS

Table	Rise	Fall	Decline
Total Industrial Output	1701 - 1830	1831 - 1933	(1978 - 82)
Output Of Consumer Goods	1701 - 1830	1831 - 1933	
Output Of Producer Goods	1701 - 1847	1848 - 1933	
Shipping Traffic	1714 - 1847	1848 - 1933	
Railways (Passengers)		1850 - 1913	1913 - 1932
Railways (Freight)	1857 - 1860	1861 - 1930	1930 - 1932
Letter Post		1841 - 1933	
Population Of The UK	1711 - 1819	1820 - 1924	
Total Agricultural Product	1701 - 1885	1886 - 1911	1912 - 1921
Net National Income	1701 - 1889	1890 - 1917	
(At Constant Prices)	1918 - 1938		

Although the extensive Hoffmann Index was heavily criticised by Lomax, and later improved by Feinstein, its general movement and the periodization of growth was marginally affected, if at all, by these Anglo-German hostilities. (Appendix 2.A.1 lists the starting dates after which indices were calculable)

Aldcroft and Richardson/likewise discerned alternate periods of (1966) inflation cum capital-widening and deflation cum capital-deepening traversing 1790 - 1914 and resuming 1920 - 1959. Their sequence of periods was 1790 - 1816, 1817 - 1849, 1850 - 1872, 1873 - 1895, 1896 - 1914, 1919 - 1936, 1936 - 1959. The range of these intervals was 18 to 33 years duration (mean, 24 years slightly longer than the 18 - 23 year Kuznets construction cycle.

However an average duration has no historical validity, but only the actual time intervals have empirical significance - as Mandel implicitly recognized this as an 'S-curve' of capitalist industrial development. Various other authors (including Beveridge, Tinbergen, Aldcroft and Fearon, Mensch and Freeman) have calculated average periodicity of cycles between certain dates:

TABLE 2.1.B

DURATION OF TRADE CYCLE

Interval Dates	Average Periodicity
1792-1818	8.7 years
1819-1845	9.0 years
1846-1873	9.3 years
1874-1900	9.0 years

However, the same data can be viewed quite differently when other starting dates and turning points are taken - viz: Between 1785 - 1836 there occurred twelve cycles (trough to trough) each averaging 4.25 years. Between 1795 - 1913, there occurred 24 cycles (midpoint to midpoint) each averaging 5.33 years in a range from 3.76 to 6 - 2 years. Between 1836 - 1913, there occurred 11 cycles (peak to peak) each averaging 7 years. This manifested a clear need for agreement upon what is measured, how, when, and for what purpose.

Accordingly, a composite historical chart, or chronogram, depicting all the main theoretical <u>and</u> observed cycles and their periodicities was drawn up and at once it became clear that there was little temporal coincidence between any of them. It seemed impossible to sustain a holistic view by this method; nor could common ground be established through trends of development, since each index or time series was affected differently at every stage.

Some new method of coordinating complexity in a meaningful way had to be invented to cope with this fragmentation of what was after all a complete, unified, fully integrated historical process.

As Einstein said of the universal cosmogeny in relation to his theory of relativity, and the extreme complexity of its accompanying calculations and equations, 'in creating the Universe, God proceeded by whole numbers'. It is proposed to adopt the same method to quantify change in the Matrix, omitting altogether any form of diffusion index to measure relativities of change.

By this strategem, it is possible to unite all time-series on a common basis; to computate the change in value of each at every date; then summate these values to show an aggregate value of change. This can now be related to every other aggregate value of change over two centuries. By this method, all cyclical information is disaggregated longitudinally and horizontally, only to be reconstituted vertically and contextually, thereby achieving unity.

2.2.4 Experimental concomitance

Hoffmann's (unchallenged?) index of bankruptcies 1740 - 1935, extended by myself to 1980, showed on inspection a close co-movement with his more controversial graphed index of industrial output. Although bankruptcies covered every sub-division of the economy, and industrial output, only with those of the main productive and manufacturing industries of the secondary sector, the rates of positive and negative change of the two indexes appeared to synchronize quite closely throughout this long time-span, although those of bankruptcy were far more volatile.

The technique involved was simply to treat all change as a positive effect: the stronger the difference between one year and the next, the higher the score it produced, regardless of whether the change was itself an increase or a reduction.

The assumption that 'one man's meat was another poison' was implemented, backed by the rational justification that every change marked an opportunity to the individual business.

Also, a change in any selected economic variable may affect different sectoral interests unevenly or in opposite manner. (eg: a change in price or technology or weather might benefit some industries, enterprises and consumers but disadvantage others). **The marked visible correlation between changes in output and changes in bankruptcy persisting over 240 years seemed worth further investigation. It indicated that change itself may have been the unsettling factor.**

Although changes produced the appearance of co-movement, sometimes this was due to positive and sometimes to negative correlations and sometimes to opposing changes. If it had been hypothesized that speculative price surge and relapses, or

reversible trends in profitability or credit availability had been the cause of bankruptcies, perhaps the extra volalitility of that index over the output index could have been explained away.

Any such attempts would perforce have alluded to other economic factors and events, and involved some particular theory or another. By setting out a schedule of ten main factors, this study aimed to encompass all these probabilities within a single matrix of change, demonstrating a varying tempo.

2.3   Mechanics of Matrix Formulation

2.3.1   Periodization of history

The conventional measurement of calendar time having been adopted as a matter of convenience, but original raw-data year-on year percentage changes having been preferred to either of their statistical derivatives (trends or cycles) the next problem to be overcome presented itself as subdivision of 200 years into manageable portions for purposes of calculation comparison, sequencing and grouping. It was thought preferable that, while the smallest sub-division remained one year - (a unit large enough to accommodate petty differences between researchers as to the precise month of cyclical turning points) - other partitions of time should be large enough to contain information relating to the various cycle periodicities.

A measure of subdivision which seemed to meet this criterion and accommodate the shortest cycle was the quinquenium, multiples of which readily accommodated all known cycles. However, taking note of the range often observed in the periodicity of each cycle about its (assumed) average duration, it became necessary to double this timespan to decennial intervals.

In order to accommodate longer cycles and especially long waves - and to incorporate sectionalized growth periods researched by

other authors - development blocs of 40 years, the same as a biblical generation period, recommended themselves as the most suitable segmentation. The emergent descriptive segments offered new transtemporal perspectives (Van Roon 1983).

2.3.2 Criteria for database selection

As aforementioned, the economic variable groupings had presented themselves from the deliberation in Chapter One; but before acceptance, each had to conform to more rigorous selection criteria, belonging as they did to a 'posse' of 156 alternative database candidates (Appendix 2.A.1.).

During a long time-span, not only did socio-economic structures, ideologies, customs and beliefs in British society undergo rapid evolution, but the first industrial revolution itself, arising from

"the simultaneous congruence of deep-rooted national tendencies" (Ashworth 1959) led on to the second and now the third industrial revolution (chemicals and electronics represent their dominant technological modes).

The time-series data selected for illustrating trends in successive annual entries in a matrix therefore had to perform a long-run bridging function in relation to a gradual but repeating process of large-scale transformations. It had to be accepted that both cycles and trends of development crossed the artificial curtiledges set up by convenient periodizations such as the decade and the generation period. This need for consistent long-run data eliminated many candidates for selection, including some short-lived 'hybrid' cycles.

The periodization scheme deliberately made no allowance in its sub-divisions for extra-phasic effects such as lagged long-term technological diffusion, shifts in the terms of trade, or strategic

governmental and industrial policies having cumulative 'knock-on' effects: all these may have traversed both decades and cycles, particularly if they were found to be closely associated with long-waves or other mega-stages of development.

The exclusion by selection of other possibly significant groupings of economic variables and of other processions of historical facts and events also represented a perceived limitation. The choice of specific variables by so many authors may also have been influenced by cyclically changing or fashionable considerations; the evolution of economic and historiographic ideas apparently formed a parellel undulating escalator to that of socio-economic evolution.
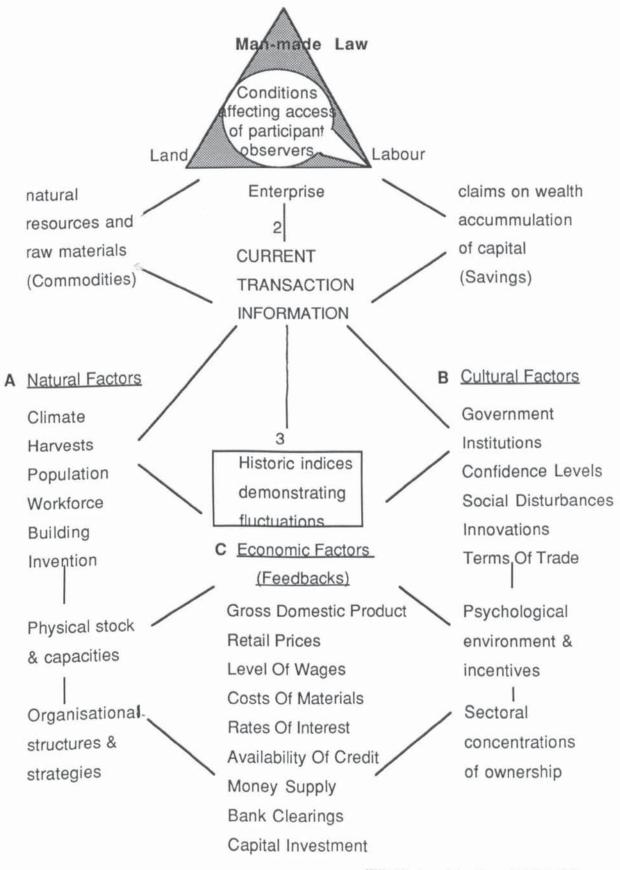
Developmental, processural and deterministic 'explanations' of economic history usually employed long-run trends of data, either viewing these as endological or comprised of stochastic events ('random shocks') acting, as it were, upon a 'normal' state of equilibrium. <u>It is a view wherein past determines future through a reactive rather than a proactive present attitude.</u> In the proposed viewpoint, the long-run is totally absorbed in its component short-runs.

The following were, ideally, the main criteria for admission of a time-series: It should be

1 well-researched by a cited author of sound reputation
2 consistent (or adjusted) as an index
3 quoted as important by cycles theorists (whether or not customarily considered 'endogenous')
4 extensive enough to cover a very long time-span
5 capable of up-dating through use of recent official statistics (see Appendix 3∧3)
6 capable of a 'fuzzy set' type modelling of change through use of complementary or surrogate time-series when deficient in some aspect of its coverage.

1 Preconditions

Man-made Law

Conditions affecting access of participant observers.

Land

Labour

Enterprise

2

CURRENT
TRANSACTION
INFORMATION

natural
resources and
raw materials
(Commodities)

claims on wealth
accummulation
of capital
(Savings)

A Natural Factors

Climate
Harvests
Population
Workforce
Building
Invention

Physical stock
& capacities

Organisational
structures &
strategies

3

Historic indices
demonstrating
fluctuations

B Cultural Factors

Government
Institutions
Confidence Levels
Social Disturbances
Innovations
Terms Of Trade

Psychological
environment &
incentives

Sectoral
concentrations
of ownership

C Economic Factors
(Feedbacks)

Gross Domestic Product
Retail Prices
Level Of Wages
Costs Of Materials
Rates Of Interest
Availability Of Credit
Money Supply
Bank Clearings
Capital Investment

ITEMS A + B + C = INDEX OF
NATIONAL ECONOMIC ACTIVITY

2.4.1 Group one variables: Climate and harvest

Climate is seen as a major influence upon both disposition, mentality and activity of human beings, equally upon the rest of organic life, and thus upon harvests. Some of the multitudinous connections between climatic conditions varying according to glaciation and ecology, agriculture, human populations and health were outlined by Ütterstrom (1955). The connections with psychology, mental characteristics and artistic expression were described by Bril (1982).

The climatic and economic causes of famines were researched by Sasson (1982), who hypothesised how short-term changes in solar corpuscular radiation could increase the production of ozone from oxygen in the earth's atmosphere, and how magnetic storms could release protons, thereby increasing ultra-violet light and heating the atmosphere, so giving rise to fluctuating weather and thus to varying harvest.

This provides some support for Jevons' sun-spot theory (1909) in that, as observed by the astronomer Humboldt one century earlier, the numbers of solar flares varied periodically. Research by Williams 1920 - 1980 confirmed that surges in electro-magnetism periodically permeate the planet. Trends in warmth and precipitation were studied exhaustively by Wheeler in America, who devised a 'drought clock' to demonstrate the periodicity of both short-term and long-term cycles in climatic conditions, giving rise to a sequence: warm and dry; warm and wet; cool and wet; cool and dry, each lasting 26 - 28 years.

Swings in wholesale British wheat prices averaging 54 years between peaks (Beveridge 1944) were also detected in those of European grain prices. A good harvest would stimulate the demand for housing when credit was abundant, while a bad harvest would reduce building markedly when credit was scarce (Parry Lewis).

Harvests from 1856 onwards were recorded as a series of annual quantities of major crops such as grain and potatoes, and output of dairy produce. Many dozen indices (researched by Dewey and Mandino 1963) relating to natural cycles in the American biosphere, and by Le Roy Durie (1968) confirm the fluctuating nature of natural phenomena and of the populations of all species upon which man relies for food.

The relative scarcity or abundance of these gifts of nature determines, it is contended, their relative price levels. Human expectations about quantity and price, and transactions based on these judgments, determine commodity prices and the level of trade; also the activity of processing industries.

Harvest yields may be improved by investment in fertility, vermin and pest eradication equipment, storage, refrigeration and effective distribution, as well as by methods of cultivation; human-directed inputs also affect outputs and enhance them. **But the major influence upon harvest is the seasonal weather at successive stages of production, and this fluctuates according to a pattern.**

During the centuries when mankind's economy was centred on agriculture and mining, the effect of natural fluctuations was very great. Although of less immediate significance in today's world, due to improved distribution, agricultural production continues to sway commodity prices, even within (sometime beyond) the quota systems devised by agreements between

suppliers and consumers of primary produce. The intention of the latter is to smooth demand and supply fluctuations within limits, and to maintain stocks for that purpose.

Neither may one ignore the psychological effects of weather conditions upon the nature of human beings, their moods, propensity to procreate, to fight, to become creative, as was researched over two thousand years of history by Tchijewsky (1934) in Russia. It appeared that human excitability, as evidenced by wars, revolutions and conflicts and by eras of relative peace and tranquillity, also went in marked cyclical progression.

Thus although normally considered as exogenous to models of the economy, climate and harvest are seen here as interdependent factors acting upon collective human psychology to produce a range of potent, dimly-perceived, but determining reactions to events, and thus to influence the level of economic activity.[2]

2.4.2 Group two variables - Population and employment

The direct relevance of population change has long been recognized in practical affairs; by conquerors wishing to acquire a labour force; by economists such as Malthus and Marx each seeking explanations of poverty conditions among the masses; and by economic historians such as Braudel, Habbakuk, Thomas, Flynn, Cairncross, Aldcroft and Fearon and many others, as an explanation for fluctuations in economic power, industrial and cultural development and in production indices.

Kondratieff's calculations for delineating a long-wave in prices were modified to accord with changing populations over successive time periods: indeed, this manipulation of crude data was partly responsible for his (questionable) results. Calculations of shorter cycles were not so modified, although exceptional

pulses in birth-rates (eg: post-war) did tend to produce 'echo-effects' in other economic variables over extended time-periods (cf Tinbergen 1942).

Under natural economic conditions, employment would expand in step with the growth and age-profile of the population, and contract with its decline and/or senescence. In a free-market economy where the majority of occupations were carried on as employees of organizations rather than as self-employed artisans - as become increasingly the case following land enclosures and capital development during the first century of the industrial revolution - employment and unemployment become inversely related to each other, both subjected to the effects on employers' profits of cyclical economic fluctuations.

Population growth sustained through higher harvest yields and the preservation of agricultural surplus, but undermined by plagues, famines, and disasters was clearly a strong feature of our study period. Indeed, the agricultural revolution preceding the first industrial revolution had been accompanied by a strong rise in nuptuality and live birth rates from the early part of the mid 18th century, and with many aoscillations, this strong upward trend in population continued for over a century before tailing off to lower levels of increase.

It stood to reason that greater output could be achieved by more hands employing themselves and being employed, so counts of working population and changes in numbers unemployed had significance when one considered changes in economic activity, and were judged to be variables which could not sensibly be omitted. It was thought that evolving fashions in family size reflected changing economic conditions.

Obviously, the larger the population, the greater the cumulative effects of climate and harvest changes upon its activities, and the

greater the need to improve techniques of cultivation, stock-breeding and marketing. In other words, between each of these factors, there is a continuous two-way interaction.

Population and employment figures derived from historical estimates in the Official Census, and from Trade Union and Government Department publications. Their year on year percentage changes were judged together to provide crude quantifications for the working population of England and Wales.

Writing in 'Value and Capital' p 302, the economist Hicks stated in 1952

> *"One cannot repress the thought that perhaps the whole Industrial Revolution of the last two hundred years has been nothing else but a vast secular boom largely induced by the unparelled rise in population."*

(1967
This theme was taken up by Deane and Cole (p 286) who asked

> *"To what extent were the population changes a cause, and to what extent a consequence of the economic changes? Did population grow because output was expanding or did output expand in response to population growth? Was the internal distribution of the population determined by changes in the location of industry or did the distribution of population set the stage for industrial expansion?"*

Easterlin's controversial paper outlined in 1961 the ongoing historic manifestation of cyclical fluctuations in the sizes of population cohorts in successive generations. He attributed the changes in live-birth rates to result from the effects of alternating economic[3] expansion and depression upon the high-income aspirations of the population of child-bearing age. In earlier generations, it would have been the survival prospects dependent upon harvest yields and the level of rents which

influenced marriage and child-bearing.

The relation between the annual growth rate per decade of the population with that of the workforce between 1861 and 1971 was tabulated by Aldcroft and Fearon, showing that there existed no significant correlation: GDP also grew faster than employment.

The distribution of the labour force had nevertheless changed very markedly between 1841 - 1911, as W Ashworth's research showed (1965, p62). A trend for the manufacturing sector to decline and the service sector to grow asserted itself after World War II.

Four stages of population change are readily identified through the relative levels per 1000 people of the birth rate and death rate between 1720 and 1980. During the first 30 years, both rates were high, but around mid-century, death rates fell dramatically and birth-rates increased briefly to a new level. Population increased accordingly; especially since from 1780 - 1880 birth-rates remained fairly static, and death-rates continued to decrease. From around 1880 - 1935 both birth rate and death rate fell, and in the final stage, birth rate and death rate have became almost stable (apart from the effects of mortality in war and accidents and the immediate post-war 'baby boom' of 1945 - 50).

2.4.3 Group three variable - Land and building

A natural consequence of the work upon land of an increasing population is a rise in its fertility and in consequence its economic rent. *Since each man requires access to land in order to work for his living and obtain the full reward for his labours, increased numbers mean greater desirability of access to the best sites, and much enhanced land values.*

With building comes capital accumulation and the stock of accoutrements required for further production and for the culture of the society. As progress continues, so labour specialized and is divided; the more that group contact is required, the more valuable the site the larger the premises erected on it, and the more diverse the talents collected there.

Economic conditions may vary, however, to such an extent that growing populations not only do not share rising land values, but some members of a society are altogether denied access to land by others, and become their servants, slaves or chattels. Title to land becoming hereditary and ownership of buildings made corporate creates division of wealth and adds a secondary claim of the landlord and rentier and tax gatherer to the primary claim on wealth of the worker with his skills.

Thus the rent of land reflects not only its use but the realizable demand of others for other uses; so a reciprocal system of landlord and tenant and tenant and labourer/worker/ craftsman/operative permeate an horizontally stratified society. As the balance of advantage swings between factions of society and as the level of trade improves and deteriorates, so surges of building of different types fluctuate. Such important changes were therefore included in the range of factors affecting economic activity.

The course of land rents over the centuries bears a relation both to various kinds of production upon the platform of land and to the need of access to land experienced by each individual of a rapidly growing population. The steepest increases in land rents had appeared at the time of the Enclosure Bills 1760 - 1830 which formed part of the ongoing agrarian revolution.

Higher productivity from labour upon land through mechanization and new farming and breeding techniques

helped increase yields both nutritional and financial, until marked decline set in due to cheaper imported foodstuffs and to a prolonged movement out of farming and into other occupations.

Building, as part of general economic activities, has been a branch of investment which reacted directly to changes in population. (Thomas 1953). It has also reacted directly to the need for new industrial premises occasioned by expansion in response to demand or to incorporate innovations in machinery and processes. Furthermore, it has been involved in developments of the infra-structure undertaken by civil engineering contractors.

Writing in 1927, A C Pigou (P 17) noted that industrial booms had nearly always been accompanied by large and conspicuous investment in construction of some kind. Industrial expansion had also involved building the means of production eg: textile machinery for sewing and spinning; locomotion, rolling stock and signalling equipment for railways; steel plating and boilers for steamships and the navy etc; trams, electric railways, furnaces and lighting installations to take advantage of electricity - all of which required industrial premises for production and housing for the workforce.

The main theme of J Parry Lewis' book, (admitting that the building cycle presented a problem of reconciling methods as well as of theory) was that, in the last resort, the demand for building was a function of local conditions: (he might have added that the supply was also a function of local conditions). Changing regional balances of growth and decline had to be taken into account, and judgments made as to the correct levels of aggregation in the statistics. The history of each building cycle was unique. No single model could accurately describe the cycle of one century, let alone several.

Once one started to acknowledge the importance of capacity restraints, gestation periods, shocks and interactions of all kinds, then the problems of analysis became too great for an unaided human brain. The useful records began in 1830, but still contained grave deficiencies and omissions. Nonetheless an inverse relationship may have existed for more than a century between building and overseas trade, since both thrived on borrowed money. The key to investment was the rate of interest obtained on Consols due to changes in the relative scarcity of money. A major element in demand was increasing population and rising per capita incomes. The local conditions might include bank crashes, wet summers, few resources, low demand etc.

The[4] main reason for the importance of building however, is its quantitative weight in total investment - up to 20 per cent of total domestic capital formation over the period 1870 - 1914, and over 30 per cent between the wars. Fluctuations in building thus dampened or destabilised economic activity as a whole, having also a marginal influence upon the output of some sub-sectors of manufacturing industry as well as marked direct effect an primary (extractive) industries.

In the first half of the nineteenth century building activity tended to synchronize with business cycles. From about the 1860's however, fluctuations in building were detached from the Juglars and followed a course of their own. Non-residential building continued to move in line with other forms of investment, but housebuilding became subject to separate influences.

Building booms overlapped upswings in general economic activity and continued to expand after the downturn in the economy as a whole. On the other hand, when building slumps did emerge they lasted much longer than the normal troughs of

business cycles.

A partial explanation of this phenomenon lay in rising but fluctuating income levels; the steadying participation of the middle class in cyclical investment and emigration; and the development of new sources of building finance, especially in suburban situations, with speculative ventures acutely dependent on rates of interest and credit conditions.

The general role of housebuilding in the 1930's was to act as a stabiliser, moving counter-cyclically and offsetting fluctuations elsewhere in the economy. At the same time, however, the rapid expansion in private residential building after 1932 facilitated,though it was not the sole cause of, recovery (Richardson 1967).

As both families and enterprises require sheltered accommodation, (as do most cultural activities in northern climes) the expansions of both population and industry and the increasing need to conserve governmental records and documents, fine fabrics and precious things, led to much private and public construction in post war England and Wales, once controls had been lifted.

Weber's Graph illustrating the decennial increase in the G B housing stock shows general agreement with that tracing the inter-decennial second difference in population (1821 - 1951). Less satisfactory was the agreement in the degree of movement, demonstrating that

> *"other factors are clearly at work and it is the combined influence of all of these which determines the level of building activity at any given time." (J Parry Lewis)*

Building fluctuations had a sizeable impact on business cycles, but this varied from cycle to cycle before 1914 depending on

whether or not booms and slumps in building and business coincided. But especially in the mid-1870's and the early years of this century, high levels of building moderated slumps. Between the wars fluctuations in housebuilding had a marked stabilising effect on economy-wide fluctuation. c.f. (Aldcroft and Fearon p 61 1958).

2.4.4 Group four variables - Innovation and investment

As land has been considered as the platform for all economic activity and the origin of all raw materials used in production and of most natural sources of energy, so <u>any</u> form of invention (or discovery resulting in technical innovation) which tended to increase output capacity, raise productivity per man hour, reduce effort and spare other inputs, amplify available energy, lower costs, improve quality and design, enhance efficiency and ease of operation, facilitate precision and standardization, or simplify supervision and management: to that extent it was itself another wealth and profit-engendering activity.

As title to land offered entrepreneurs possession of premises built upon those sites favourable to particular industries, it also offered possession of the production made on each site by the workforce. Control was gained over workers by this title, since the latter were landless, and so could not store their product or own their machines, (as they had done in domestic industries when not in debt to master or to merchants). Their claim was relegated below that of the owner of land and capital, and their wages reduced to subsistence level on account of their numbers and their lack of bargaining power. Successful innovation greatly expanded employment and raised wages well beyond previous levels, but the whole process of innovation producing employment fluctuated strongly.

Diffusion of technological innovations depended on their commercial and marketing success before they become imitated, adapted, and transferred to other products, firms, industries and sub-sectors of the regional and national economy, or abroad. Capital accumulation, borrowings, and a credit system were prerequisites to outlay of funds on research and development and the practical test and application of new forms of plant and equipment.

119

Once fully developed and widely diffused, innovations from previous decades exercised a deeply transforming effect on the character, volume, method and direction of trajectories of economic activity. This was carried forward at each stage by the vision, judgment and acumen of risk-taking decision-makers in all sorts and sizes of business.

As bottlenecks in various areas of industrial production were overcome by ingenious methods, so output increased to supply a greater and a more prosperous population. But equally, as the effects of changes took place in climate, harvest, population, employed workforce, value of land, stock of buildings, they impinged upon the productive process: so confidence also fluctuated, and the timing of investments in innovation tended to cause clusters of opportunity alternating with periods of relative stagnation. Economic performance as seen in fluctuating price, output and other indices interacted with the often exaggerated expectations raised by innovation and led to bunched investments.

Gradual development of unified control over industrial processes and power assisted factory production of complete commodities took a very long while to become established. Many failures resulted from not producing sufficiently market demand-oriented products at competitive prices just when and where they were required.

Those innovations which became outstandingly successful had the effect of alternately deepening and widening the capital base, with both accelerated development and accelerated obsolescence of previous methods and equipment as the frontier of production possibilities advanced and fresh combinations of capital and labour offered further opportunities for entrepreneurial profit.

Rapid growth and technological advance do not necessarily go hand in hand. On the contrary, an increase in demand may so raise prices as to make obsolescent methods profitable and encourage producers to retain, or return to using, equipment that would otherwise be abandoned.

The relationship between the number of patents taken out and the general development of the whole economy (with the exception of agriculture) may also be seen by comparing the number of patents taken out with the number of bankruptcies. Statistics of both patents and bankruptcies are available over a period of 176 years (198 yrs). In these years the fluctuations of patents and bankruptcies corresponded in the following periods: 1741 - 50, 1755 - 60, 1765 - 70, 1775 - 1808, 1814 - 42, 1850 - 56 and 1860 - 1900. As bankruptcies rise, so patent fall. The coefficient of correlation was 0.8.

Great peaks in total gross domestic fixed capital formation occurred around 1865, 1875, 1884, and especially 1896 - 1908. According to Feinstein's recalculation of Deane's estimates 1856 - 1965 the peaks reflected both house-building and the output of industry mining, agriculture, distribution and other services at 1900 prices. Feinstein's estimates for industrial and commercial capital showed marked discrepancies from Deane's figures in the range £11.2 - £56.0 millions. Taking five-year averages, Feinstein's figures were 1882 - 85 £30.2m, 1886 - 90 £28.0m, 1891 - 95 £38.4m, 1890 - 1900 £66.2m, 1901 - 5 £76.6m, 1906 - 10 £59.0m, 1911 - 13 £62.7m.

2.4.5 Group five variables - Legal and cultural factors

The basic economy so far described forms a *potentiality* which may not be realized in practical terms without the legal, cultural and institutional framework to regulate relationships between economic agents in the conduct of business. This superimposition moulds and modifies both preceding and following grouping of variables and is the pris m in the striated light of which all cooperation, transaction and division occurs.

The preconditional hierarchy of land, labour, capital and enterprise is contained in the envelope of culture, itself comprising customs opinions and beliefs influencing collective behaviour. The socio-political economy comprising vested interests had played a major part in formulating the modus operandi of this practical world.

The society which the institutional framework reflects is that of a competitive, property-owning, individualistic, merchanting, capitalist, manufacturing and commercial kind. It has changed over time from an organically based agricultural economy to a mineral-based manufacturing one, and latterly to an electronically - assisted service industry economy.

Atmospheres of liberty, romantic self-expression, religious belief and sturdy independence have also coloured its range of economic functions.

The legal framework in particular had been shaped to deal with the changes in social mobility following land enclosure, the new rôle of the employed population, the emergent work environment, the housing and sanitation of over-swollen cities, the extended trading agreements with foreign powers, and the regulation of newly invented means of transportation for people, goods and correspondence.

The franchise, combination laws, public health and safety,
and matters relating to patents, bankruptcies and insolvencies
were under frequent review throughout the last two centuries.

Laissez-faire attitudes based on Smithian ideas gradually gave way under numerous pressures to increasing regulation and intervention by government into economic affairs, with checks to the unbridled workings of a free market economy.

Attempts were made to deal with social injustice, mitigate evil practices, reduce pollution, and to create better communities through physical planning methods and provision of public amenities.

The Birmingham Incorporated Chamber of Industry and Commerce was frequently at the forefront in lobbying for new and/or amended legislation and trading agreements affecting the vital interests of its members, so continually modifying the environment of business to their advantage. Government itself came gradually to control large areas of economic activity, for which finance was raised both by direct taxation, fees and duties and indirectly.

2.4.6   Group six variable - Trade and confidence factors

The varying state of confidence experienced by the business community is derived from many factors such as: the terms of trade, tempo of activity, level of order books, rates of interest, trends of cost, recent commitments and profit expectations over successive time horizons. *These factors justify what is essentially a psychological condition.*

Commercial distrust tends to fluctuate more or less in ten-year periods, (Mullineax 1984 Ch IV, I) with alternating 'bull' and 'bear' moods (J Schumpeter 1939). The investor has to make a series

123

of irreversible choices under conditions of continuing uncertainty (cf B S Bernanke) and often lacks confidence.

> *"One can look at inflation, wars, political trends, speculative manias etc, but these are not causes. These are the effects of mass psychological phenomena involving long-term swings of pessimism and optimism that occur in short-term rhythmical patterns within a longer term rhythmical pattern, thereafter like the wheels within wheels and circles in a spiral."* *(Beckman (1983) p 52)*

The instability of the general level of business confidence with its tendency to rise cumulatively until it passes into unreasonable optimism and to fall cumulatively until it passes into a corresponding error of pessimism had been noted by many authors.

> *"The only common thread, historically, is the rhythmic sequence of greed and fear which has dominated the upwaves and downwaves for centuries",*

Beckman continued, referring to Cogan's work.

As early as 1837, Lord Overstone (who as Governor of the Bank of England influenced Peel, who brought in the 1844 Bank Charter Act) wrote his observations in an article 'Reflections . . . on the courses and consequences of the pressure on the money market' (ed McCulloch, reprinted 1857):

> *"The state of trade revolves apparently in an established cycle. First we find it in a state of quiescence - next, improvement - growing confidence - prosperity - excitement - overtrading - convulsion - pressure - stagnation - distress - ending again in quiescence".*

This viewpoint is reinforced by Lavington (1922) who argued:

> *"the nature of modern organization is such that it engenders influences which, acting on the anticipations*

124

of entrepreneurs, causes confidence, and with it business activity, to grow cumulatively; that this progressive movement continues until a point is reached at which the exposure of errors in forecasts and other adverse conditions shake the confidence on which it is based and produce a condition of apprehension; and that there follows a period in which the original influences are reversed, causing a cumulative decline of confidence and hence of the business activity dependent upon it."

It this view, it is the psychological factor which causes the cycle, not vice versa; although one might agree with Beckman that 'the view of the future for most people is an exceptionally short-sighted one.' The average businessman and investor tended to have emotional lags about boom or slump conditions, and inevitably was unprepared for a change, thus accentuating fluctuations by means of feed-back. On the other hand, anticipation of fluctuations may actually bring about their effects, so once more linking the psychological with the 'real'.

The overall atmosphere in which confidence exists may be one of activity, euphoria, expansion and boom, or it may be one of timidity, caution, contraction, and depression. The overall outcomes naturally differ, and thus a cycle is created.

While indexes existed for physical measures of economic activity even for exports, re-exports, imports and 'invisibles' comprising the annual balances of trade and payments, no index existed for legal and cultural factors or their effects on business confidence. Yet the government-modified context in which economic activity took place was equally as important as the actual entrepreneurial efforts involved in determining results. Attitudes of all having an active interest in markets - their expectations (however formed) concerning future trading conditions - were of even greater importance to decision-taking than the actions of the governments.

Reactions by the business community to the determination of conditions by the Government were the crucial element in the effectiveness or other wise of those measures. The most fundamental aspect of those reactions centre on 'business confidence', partly derived from socio-political considerations, but mainly magnifying the supposed effects on profits of changed legal and cultural obligations. Good proactive management would have taken care in company relations with suppliers, workforce, bankers, shareholders, customers, local community, the media and local and central government. Whether themselves confident or not, poor reactive managers neglecting these elements and, lacking trust, finding themselves bankrupt, *seriously undermine general confidence by their failures.*

While it remained extremely hazardous to attempt to quantify year on year essentially long-term legal and cultural changes, the actual *levels of trade and bankruptcies achieved annually seemed acceptable as surrogate measures for the preceding levels of business confidence.* This confidence might have been based at the micro-economic level simply on calculations of the net return on investment (all other considerations having been accounted for) or based at the macro-economic level as wide-spread feelings of euphoria, anxiety, stagnation and timidity within trading communities or internationally.

Views expressed by members of Chambers of Commerce over the decades had been supplemented since 1957 by surveys of business opinion conducted by the Confederation on of British Industry and supplementing H M Government's own monitoring of lagged, coincident and leading economic indicators.

2.4.7 Group seven variables - Total output and industrial production

There was no lack of indexes of industrial output howbeit unreliable and slightly variant ones - from the earlier years of the industrial revolution onward.

Largely unconcerned with the absolute size or even the trend of growth of output as a measure of economic progress, industrial vitality, international competiveness etc, this study centred on annual changes of two main indexes - total output as expressed by gross domestic product, and total industrial output. With these indices were allied sub-sectoral indices to do with outputs of various metals. All these output measure changes were aggregated and averaged to produce a new index of changes in output.

Since very crude measures were employed to describe changes, issues surrounding the initial base year selection and what was included in these indexes, and how, became irrelevant. One sought to find only the broad pattern of change not to explain the minutiae of variations. The indexes utilised were those of Spiethoff, Hoffmann, Lomax, Feinstein and Mitchell, with more recent entries from Government statistical sources.

Actual recorded output was clearly determined by the interpenetrating and combined effects upon decision-takers of all the preceding sequence of influential factors. Due account would have been taken of natural, demographic physical, technological, environmental and confidence factors on consumer demands and preferences, disposable incomes, propensities to save and invest, government expenditures, domestic and export product market shares and potential penetration, opportunities for competition, the existing concentration of industry, regulatory frameworks, import penetration, and any endemic constraints

not yet overcome by ingenuity, cooperation, manipulation, persuasion and the pursuit of excellence. Together, this abbreviated schedule of perceived conditions of business will have become integrated into an appraisal, targetted strategy, or corporate plan, against the performance of which conventional economic analyses could be conducted. Changes in the gross outcomes comprised this section.

2.4.8 Group eight variable - Price inflation and interest rates

Several indexes existed - those of Sauerbeck, Rousseaux, Schumpeter - Gilboy, and Beveridge were notable - and provided a guide to the course of retail price inflation over the centuries; banking statistics provided a summary of changes in rates of interest throughout the study period. The Bank of England and the Economic Study Association both supplied long-run trend series of retail prices, mutually confirming the historic path of inflation.

It was thought that the overall price level might have reflected overall demand for scarce resources and thus have a bearing on economic activity generally. While interest rates may have moved together with prices, and thus have confirmed their role in decisions about investment taken with consideration of the current state of consumer demand, it had to be conceded that in practice both timing and reaction may have differed.

However, in order to obtain a notion of money national income, output had to be related to the price level, and indeed anticipation of future price levels. So the courses of inflation and interest rates were held to be major elements of business confidence and also to derive from legal and cultural environmental factors.

Actual determination of product prices by suppliers and/or markets was not considered an issue in depicting the overall

changes in recorded price levels, and the external exchange rate and the imported inflation were likewise ignored.

Year on year changes in the price level did seem of paramount importance in a highly monetized economy, and to reflect the levels at which market transactions were completed and the allocations of resources to certain ends had been expedited. Thus changes in prices were seen as an essential ingredient of a measure of national economic activity; and alterations to interest rates a measure of changes in the need for money.

Rates of interest were taken as a barometer of business confidence and a proxy for expectations.

2.4.9   Group nine variables - Credit and banknote circulation

Price indexes are most often cited by cycles theorists since they appear to display long-term parabolic co-movements which more nearly optically confirm the hypothesis of patterned regularity. Output indexes did not on the whole agree with price indexes in either their timing of peak and troughs or their cyclical durations and amplitudes as measured from midpoints, where they were assumed to have crossed steady long-term trends. Moreover, export and import considerations affected both prices and output as components of gross national product. It was therefore decided to use only figures for gross domestic output and to ignore the import price element as having already been accounted in the balances of trade and payments.

A summary measure encapsulating all the preceding economic factors was nevertheless required to complete the financial aspects of changes in overall economic activity. One needed also to placate those many theorists who had attributed economic fluctuations not only to changes in the levels and content of investment but to the relative abundance or scarcity of credit under the prevailing conditions (as outlined above).

It seemed that change s in national income derived from changes in domestic product could most cogently be expressed through receipts of credits (whatever forms these took) by the clearing bankers headed by the central bank. Interbank loans, statutory bank reserve ratios, and the daily operations of the discount houses, together with the issues of gilt-edged securities by the Government, would influence setting of interest rates, but changes in the levels of credit offered by the banks would determine the money supply.

Thus the availability of credit and the velocity of the circulation of banknotes would bear inverse relations to each other and provide a summary index of overall economic activity as assisted by all other financial intermediaries in the UK centralised bank system.

The changing nature of markets, and their customs, practices and regulations and the changing uses to which money might be put would directly react on prices as set by supply and demand; but credits cleared and banknotes circulated would conveniently summarize the outcome.

2.4.10 Group ten variables - Wars, crises and financial panics

The tenth factor is historic in nature, selected because of the need to explain sudden dips in graphs and precipitate changes in activity by reference to the chronicle of events. These were judged to have had the greatest immediate economic impact when they consisted of invasion, wars, revolutions, rebellion, mutinies, blockades, embargoes, tariff walls, strikes, riots panics, bank failures, bankruptcies, debt renegement and financial crises. Much more than natural catastrophes, these man-induced, often long-gestated shocks - often referred to as 'random' but most probably periodic and certainly recurrent - shook the confidence factor hardest but provided a tremor to the entire system, thus inducing change, particularly of an immediate kind.

If it were simply a matter of over or under-production of goods and services or over or under supply of credit, or changes in the terms of trade, the market price as regulator of resource allocation would under perfect competition soon have adjusted with external shocks. Their frequency had been such as to keep the long-term trends of prices, output and employment on a disequilibrium course, along which only the fluctuations seemed a constant reality.

Indeed, large, unnatural convulsions were thought not to be the outcome of the free market system as such, nor of capitalist economies as such, so much as due to the lack of proper international arrangements to accommodate each other's changed circumstances; (and internally, short-sighted policies, poor management, inadequate information, inertia, speculation and weakness) in a situation where the structure of industry had became distorted by monopolisitc and oligopolistic concentrations of economic power covertly aspiring to cultural domination.

Were the set-backs to steady, rhythmic upward progress occasioned by wars and crises random or periodic shocks to the economic system; and were they endogenously generated or exogenously orchestrated? Did certain combinations of factors give rise to sequences of events uniquely or repeatedly? Were history and economic evolution a stochastic progress at the mercy of outside influences; and internal mechanisms in which policy-decisions played an indispensable role; or a multi-causal, interactive chronicle in which people and events were inextricably entwined and reciprocating to produce a record of changes?

'Crises' were found usually treated as exogenous factors in economic models, since crises were not the outcomes of responsible market operations in buying and selling of goods and services. Rather crises were more often the unfortunate results of ignorant and misguided policies and actions resulting in conflict and disaster, criminal mismanagement, and temporary distortions of the equilibrium of supply and demand. By dint of blocade, monopoly, restriction, speculation, exploitation and expropriation in the service of power, greed, fear and envy have crises been thrust at frequent intervals across the bows of human economic progress.

Footnote
Troughs in cyclical delineation were not found to follow crisis dates consistently, but sometimes to precede them.

2.5.1 Fluctuations - A very long perspective

It appears that fluctuations in harvests, prices, trade, output and demand have been known and observed throughout recorded history. They begin, in western civilizations and traditions, in Mesopotamia, Sumaria, Egypt, Babylon and Judea, continuing through Crete, the Hittlite Kingdoms, Greece, Rome, Byzantium and the Venetian State.

The theme is echoed in the course of development of commodity trades by Arabs, Jews and German merchants in Europe during the Middle Ages; in the East and in the Americas during the age of discovery; in the African continent and Oceanic islands during the colonial era; and in today's world economy though the oil-finance cycle, multi-national corporation marketing of output, and the differential rates of growth between donor and debtor nations.

The major strands of interest interwoven through the history of economic thought also have ancient origins. Aristotle, the Greek economic philosopher, declared that the proper purpose of trade was the better satisfaction of human wants. Pliny, the Latin writer and senator, proposed gold as the most suitable and durable means of exchange in order to allay the frequent banking crises of the Roman Republic. The worthiness of every type of labour to receive a full reward was advanced by Christianity and its doctrine of the brotherhood of man. Jewish custom instituted a system of periodic reversion of claims to land, thus re-balancing claims of landlords, tenants and servants to the fruits of the earth.

After the fall of the Roman Empire, the 'latifundia' system of large farms worked by slaves gradually transformed into the feudal system of landlord and serfs bound to Kings by a range of duties. Exempted from the rigours of medieval canonical law, merchants and Jews were permitted to trade debts usuriously, and thereby to profit from commodity price and quantity fluctuations arising in the course of trade.

In that certain events - such as Cloth Fairs and the arrival of the merchant fleets laden with luxury goods - were seasonal, and large transactions began to be financed through Bills of Exchange valid for 90 days, a series of regular impulses entered the body economic during the era of the early modern world.

In England, as elsewhere, times of feast alternated with times of famine; droughts and floods, tempests and plagues, occurred in a periodic rhythm altering in intensity but extending over centuries. A series of natural checks to population growth were thus in-built, and changing conditions induced economic fluctuations semi-regularly.

With sustained population expansion, and better farming methods, and the deliberate construction of fortified towns and villages, came an urban specialisation in crafts and artisan skills. The rise of City Guilds can be viewed as an attempt to regulate prices and the quantity and quality of output, to which the Apprenticeship System became a necessary adjunct. The Guilds attempted to gain the advantages of economic fluctuations, and to minimize the drawbacks.

With growing competition for staple exports felt in traditional European markets by English merchants, a running review of monopolies and the basis of currency and exchange was undertaken by interested parties, whether of mercantilist or bullionist persuasion. Foreign competition had highlighted the

'demand' factor, for which no adequate theory or vocabulary then existed (17th century). The merchant adventurers began the movement to exploit the markets and natural resources of newly 'discovered' lands, founding trading outposts in what later became colonial territories.

Meanwhile, an agricultural revolution largely imported from the Netherlands had slowly transformed English farming production and gave the impetus to improvement exhibited so keenly in later generations in respect of livestock, systems of cultivation, and mass marketing of farm produce.

At the end of the 19th century, the land enclosure movement gathered pace in order to corner the exceptional profits from improved crop yields, the Corn Laws, and a rising indigenous population. Simultaneously, the first industrial revolution was creating a new wealthy class of entrepreneurs who, with borrowed money, invested in capital and employed growing numbers of a land proletariat. The latter leaving an over-crowded countryside, increasingly found work in factories both rural and urban. Improvements in transport and communication enlarged the scope of all commercial markets, and new technologies opened up natural resources for enchanced output at lower prices.

The pool of labour changed in composition and character over the years, becoming concentrated in vastly expanded provincial cities as well as in the traditional 'melting-pot' of London, the national capital city. Fired by both Christian principles and by grievances, Chartists, Unionists, Socialists, and Anarchists found breeding grounds for their ideas among the masses comprising a new industrial working class.

As the large integrated works gradually became the focus for local employment and wealth-creation amid thousands of small craft workshops and family business, so their bankruptcy during

times of poor trade created waves of unemployment and misery in the casually-employed, dependent workforce. Since industrial fortunes depended more and more on domestic markets for competitively priced goods, and as workers combined increasingly to raise wages above subsistence level, so the interests of capitalist profit-takers and employee wage-earners appeared to diverge.

Wars, mass emigration to the colonies, and life-spans fore-shortened by insanitary conditions both reduced the pool of labour and raised the level of wages periodically. Reforming legislation and charitable action by the middle classes improved conditions both at work and of housing, sanitation, health, education and amenity for the greatest numbers. Mechanization tended to displace labour between occupations, and new skills were acquired only by the younger, most flexible, mobile and adaptable members of the workforce.

The decline of first agriculture, then manufacturing as sectors of employment and output in the national total took place gradually as innovative technology slowly diffused through susceptible subsectors and transformed them into new productivity profiles. Whole cities and large parts of the sub-regional economy fell into decline following the end of both the World Wars; but new industries burgeoned in areas most suitable for their growth. The regional imbalances thus created became an object of Government policy in the 1930's.

Ever increasing Government expenditure accompanying a decline in the world competitive position of the UK Economy led gradually, through a long period of deteriorating balance of payments, to rejection of Keynesian spending policies and substitution of a restrictive form of monetarism, reflecting tendencies evident 350 years previously. Both policies were aimed at stabilizing fluctuations, the first by means of anti-

cyclical intervention and contra-cyclical investment, the second by means of a cyclical control of money supply and interest rates, leaving the real economy to 'market forces'.

Thus in the long perspective one can perceive the many forms which reaction to economic fluctuations have taken. In the following pages, one may take a series of overviews of both the national and local economies, generation by generation. Decennial accounts of events within the overall cyclical patterns are contained in the Appendices.

It would have been quite possible, with the researched information, to have expounded an overview of the two centuries and of any sub-division thereof.

One could have pointed to the rapid growth and accumulation of early entrepreneurial profits; the slow spread of new manufacturing techniques, changed work patterns, and the gradual unification of control; the steady diminution of prices and the improvements in wages; the erratic diffusion of inventions and the augmentation of steam-power capacity, fuel utilisation, and power generation; the great increase in foreign competition to UK exports from staple industries, leading to declining market shares, negative payments, and depressed profits despite enormously greater absolute volumes of production; the waxing and woring of capital investment overseas and of the corresponding 'invisible earnings' from both this source and from financial services generally; in fact, to the UK economy seen as the pulsating centerpiece to the continental jigsaw of growth and development, and as the catalytic counterpart to the mighty transatlantic and trans-oceanic economics of America and Japan.

Such a view would have been taken at a level of aggregation inappropriate to that required in order to follow specific indices and to an examination of bankruptcies, therefore it

was not pursued.

It had nonetheless to be borne firmly in mind that the British Economy was set in a world-wide, multi-national trading network in which major movements and transitional adjustments were occurring continuously, sometimes affecting internal economic activity to a marked degree, sometimes only marginally.

But in any case, the economic end result was recorded by annual changes in the selected groupings of variables comprising the matrix.

2.5.2 Cycles during the last two centuries

Comments on historical cycles in this section are based upon a 200 years span chart of time-series, events, and economists (dated by the order within each decade in which their major work(s) appeared).

The duration was taken to be one Braudelian epoch, and was subdivided into five 'biblical generation's period of 39/40 years. Against these five 'generation blocks' were set 3 3/4 Kondratieff long cycles, against which were placed 24 Kitchin trade cycles, 17 Juglar cycles of industrial production, 15 Jevons 'sunspot' cycles of business activity, six Kuznets long swings, six Hoffmann 'Trendzyklen', and three Freeman innovations eras. Six Rostow periods of changes in the rate of growth were also juxtaposed, together with Solomou's three episodes of differential world growth 1856 - 1910 (according to the Gershenkron model of relative backwardness).

It is an astonishing fact that virtually <u>none</u> of the approximate definitive period dates coincided, although on a few occasions (viz 1801 - 3, 1820 - 3, 1845 - 9, 1858, 1870 - 3, 1888 - 92, 1898 - 1920, 1909 - 1913) there was rough agreement on focal years.

The entire period was subdivided into decades along the bottom of the chart as a matter of convenience for a regular chronology against which to plot both wars, crises and financial panics. Four decades thus comprised each 'generation block', within which the movements of time series could be plotted against contemporary events.

Each decade became part of a secondary series of charts upon which were recorded changes in climate and harvests; population and employment; land rent and building activity; legal and cultural changes; innovations and investment; trade

and confidence; output both general and industrial; prices (including interest rates); credit and circulation of banknotes; and the aforementioned crises.

The changes of each of these variables year on year were given numerical values so that a giant ideal data matrix could be devised, from the aggregated values of which a composite index of change was computed. I have called this an index of national economic activity (INEA).

Inspection of this chart drawn up to illustrate the major long-run time series available to economic historians, showed up numerous coincidental effects related to a succession of events occurring on specific dates, (see Appendix 2.A.3) and these were analysed in a series of five panels (A to E) each covering one generation of 39 years, as follows:

Nine incidents of crisis were recorded. Between 1780 and 1820 - the first generation era of Adam Smith, the Physiocrats; DeQuesnay, Cantillon, Chalmers, Anderson and Ricardo among economic thinkers. Financial panics occurred in 1785, 1790, 1799, 1810, 1805, (especially) 1810, 1814, 1816 and 1820, with a marked dip in business cycles and industrial output in 1795 - 6 (thus completing a short run of cycles at four year intervals).

The rising Kondratieff wave 1785 - 1816, with 2.4 per cent pa average growth as measured by Rostow, reached its peak at the trough of a Kitchin business cycle, preceding Jevon's Index turing point, and at a time when a double trough of bankruptcies occurred. Freeman's technological turing point of 1811 coincided with a peak Kitchin Cycle, a trough in bankruptcies, a turning-point in Hoffmann's 20 year Trendzyklen, a peak in the trade cycle and in Jevon's Index, and at a double peak recovery from crises.

Both French Revolution and Napoleonic Wars underlay all the middle years of this generation and poor harvests 1788 - 1792, 1797 - 1801, 1807 - 1811 seemed to precede financial crisis induced by events of human origin. An innovations peak period 1816 - 1832, (according to Mensch), traversed the generation boundary marked by the United States crisis of 1820.

Troughs in bankruptcies coincided with the top turning points of Juglar cycles of industrial production and with the trade cycle only once (1795) with top turning point of a Kitchin business cycle only once (1796), with a Jevon's cycle twice (1790 and 1803) and peaks in bankruptcies with the bottom turning points of the Jevon's business cycle four times (1785, 1796, 1809, 1819), and with the peak of the Juglar cycle once (1811).

The most noticeable outcome observed was the lack of coincidence in timing of peaks and troughs of bankruptcies with at least a dozen other indicators, allied with marked inconsistency in intercyclic co-movement. In that the minimum period of observation was one year, and many cycles varied in peaks and troughs by a minimum of two years from each other, these findings appeared remarkable enough to warrant further confirmation during the four succeeding 'generations'.

Between 1820 and 1860, the second generation era of the great Ricardo/Malthus controversy, and of Mill, Owen, McCulloch and Overstone among economic commentators, a further nine incidents of financial crisis were recorded, three connected with the United States, one with commercial failures in Calculta (1831), two with suspension of the 1847 Bank Act; one with the Crimean War; and one, in 1845, due to collapse of 'railway mania'. The downwave portion of the Kondratieff attained its apogee around 1841 - 2, while Hoffmann's trendzykle and Jevon's trade cycle coincided in 1823 but had separated widely by

the time they repeated together 1847 - 1854.

The inflation panic of 1825, backed by peaks in the trade cycle, and the number of patents sealed, also Kitchin and Juglar cycle peaks, was nearly at bottom of a Jevon's cycle yet even closer to a peak in bankruptcies. A dip in GNP (1837) followed by a peak (1839) coincided only with a contradictory trough in Jevon's cycle, and the same again (1847), (1858), both keeping completely out of phase with the trade cycle and with total industrial output. A peak in bankruptcies (1858) coincided with a dip in GNP, (in 1840, it was with a peak period of international battles) and a trough in Jevon's cycle.

The story of this generation, too, was riddled with irregularities and inconsistencies between various time series and their associated empirical time-spans; there was almost no exact coincidence of cycles with crises.

Between 1860 and 1900, five wars and ten commercial crises punctuate the third generation panel, the era of Juglar, Marx and Engels, Marshall, Jevons, Smiles, Baranowsky, George and Pareto, all leaving major treatises for consideration. Around 1872, the second Kondratieff wave peaked, yet Rostow growth had remained at a constant average of around 3.2 per cent between 1840 and 1895, even though the trough of the Kondratieff adumbrated the latter date.

The American Civil War in the 1860's, the end of the Franco Prussian War in 1870, the Russo-Turkish War in 1877, had no appreciable coincident effects on any time-series' turning points, but the 1st Boer War at the end of the 1880's coincided with peaks in business (Jevons) industrial output (Juglor) building (Parry Lewis) patents sealed (Jewkes) bankruptcies (Hoffmann) a depression in the USA, and in the (Kitchin) short cycle-all of which reversed over the next two to three years with a similar repetition in the South African War 1899 - 1901.

Major bank crises (Overend Gurney 1867) the Vienna crash (1871), the Collie fiasco (1875), Glasgow Bank failure (1882), Baring Bank crisis (1890) and Australian Bank crisis (1893) coincided with peaks in bankruptcies, but also, curiously, with peaks in patents sealed. The US railway collapse in 1885 occurred at the trough of a Jevon's business cycle but also at a trough in UK bankruptcies.

Altogether, commercial crises rather than wars seemed to have coincided with increased bankruptcies - even though industrial production and the trade cycle had often reached peaks. This indicated a speculative character to these events, and the increasing inter-dependence of the world trading and financial communities.

After the first generation emphasis on the technologies of steam, cotton, canals and highways; the second generation development of railways, coal, iron and mercantile shipping; the third generation had concentrated on chemicals, farm mechanization, steel and metal alloys, armaments, naval ships, fuels and electricity. The components of the time-series thus altered very radically over decades.

The fourth generation, 1900 - 1940, (covering the period of the writings and research of Siberling, Sauerbeck, Webb, Parvus, van Gelderen, Aftalion, Schumpeter, Stamp, Edgeworth, Robertson, Lavington, Hawtrey, Kitchin, Pigou, Michell, Kahn, Kondratieff, Akerman, Fisher, Shannon, Samuelson, Keynes, Haberler, Frisch, Einarsen and Hoffmann) developed the technologies of transportation, mass media, synthetic fabrics, medicines and engines with associated machine tools and engineering.

Four major wars, including World War I, four commercial crises, the 1926 general strike and the 1929 (USA) Wall Street

crash disfigured those decades leading up to World War II. The German crisis of 1901 coincided with a peak year of UK national income and a decline in bankruptcies. The United States crisis of 1907 coincided with a peak in UK GNP, patents sealed, national income, but also with a peak in bankruptcies, as did the semi crisis of 1913, although unemployment also peaked in that year, while bankruptcies <u>fell</u>. (This fall seemed contrary to normal expectation).

Of all the theoretical cycles, that of Kitchin seemed most clearly associated with other changes, while those of Juglar coincided sometimes. Rostow's growth estimates 1892 - 1913 evidenced an accelerated rate to 4.6 per cent per annum, and thereafter 3.8 per cent per annum (despite economic slump) until 1939. Again, in a much more synchronous era, peaks of national income, industrial output and bankruptcies reflected the industrialised structure of the economy. The downwave of the Kondratieff cycle started its decline in the bankruptcy crisis year of 1921 and did not reach its trough until 1946 - 7.

Crisis years were 1901, 1904, (Russo - Japanese War) 1907, 1911 (Balkan War) 1913, 1914 (World War One) 1919 with postwar inflation and world-wide recession, 1926, 1929, 1933 (off gold standard) 1937 (minor recession). War preparations lifted the recession in 1939 transforming it into a prolonged boom for many heavy industries.

The fifth generation 1940 - 1980, (covering the appearance of economic works by Kuznets, Rousseau, Beveridge, Prest, Kalecki, Robbins, Burns, Kaldor, Hicks, Cairncross, Forrester, Hansen, Mandel, Robinson, Hayek, Imlah, Rostow, Habbakuk, Tinbergen, Gayer, Friedman, Schwarz, van Duijn, Mensch, Delbeke, Freeman, Soete, Zimmerman, Kay, Sherman, Sterman, Williamson, Solomou and many others) completes the study period. It entrains the development of submarines, missiles, satellites, lasers, nuclear energy, biotechnology, micro-processors, robotics etc, containing both the 1944 - 5 trough and the 1975 - 6 peak of the Kondratieff cycle (extrapolated beyond 1920).

The growing number of international conflicts marginally affecting the UK domestic economy indexes marked this period, especially the Korean and Vietnam wars in the early 1950's, the Suez Crisis (1956), Cuban Crisis (1960), Iran Crisis (1963), Yom Kippur War (1965), Eastern Bloc (Hungarian) Crisis (1956) and the oil price-hikes of 1972 - 3, 1978 - 9. Neither troughs nor peaks of the available indices coincided exactly with crisis dates, although unemployment troughs and GNP peaks tended to line up with dates of wars.[5]

It seemed that evidence obtained in this way suggested little direct impact upon cycles of wars and crises over five periods of development, and remarkably little co-synergy of cyclical movements. It there was a rationale to connect the various time-series, it was one involving leads, lags and cumulants deliberately excluded from this short-span analysis of periodic change.

It therefore had seemed more appropriate to move away from cyclical analysis and its attendant complications and inconsistencies to the measurements of year on year percentage change more appropriate to a matrix, and thence to a curve summarising these changes and standing in as an indicator of overall national economic activity.

BIRMINGHAM INDUSTRIAL PROFILE IN 1865

(Abstract from Timmins 1865)
Table 2.5.3A

Trade Established			Date 'A'	No: Firms	Output	Jobs	Date 'B'	Firms	Output	Jobs
COAL	1540	1					1864	540 Collieries	10.4 m tons	
IRON	1623	4	1806	42 furnaces	1,600 tons pa		1865	170 Blastfurnaces 1000 tons		200
BOILERPLATE	1831	34	1849		500 tons	30	1864			2800
CHAINS, CABLES, ANCHORS	1824	33	1838	2	50,000 tons	2200	1864	2	65,000 tons iron	3500
EDGE TOOLS	1664	8	1820		2,600 tons	1800	1865	30	3000 varieties	
AGRICUTURAL IMPLEMENTS	1557	2	1840		10,000 tons pa					
FIRE IRONS	1745	11	1849				1865	12	up 33%	500
CAST IRON HOLLOW-WARE	1779	21			5,200 tons iron		1865	14	13000 tons iron	2430
HAND-MADE NAILS	1627	5	1845			50000	1865		16000 tons iron	20000
NEEDLES & FISHHOOKS	1768	14	1849			600	1865			8000
BRASS MANUFACTURE	1565	3	1780	30	copper goods 650 tons		1865	421	copper goods 20000 tons	
GUN TRADE	1640	6	1794	5	1200	700 - 800	1855 - 64	599	rifle bowels 611,63	7340
BUTTON TRADE	1763	17				400	1865	c100		6000
JEWELLERY & GILT TOY	1653	7	1800	10 - 12	copper plate			c550	Gold & silver £1m p	7500
ELECTRO-PLATING	1794	27	1799	96	100 tons pa		1854	licenced masters 40		5000
CAST METAL STATUES	1823	32		14	7,000 pw		1860	24	140,000 pw	2500
GLASS: PLATE, CROWN, SHEET	1771	15	1836	1			1847			
LIGHT HOUSE ILLUMINATION	1819	31	1850	1						
STAINED GLASS	1784	23	1837	1			1849	4		80 - 100
OPTICAL FLINT GLASS	1778	19	1832	10			1845			1700
INSTRUMENTS	1784	24				200	1865			
WROUGHT METAL REVIVAL	1835	35	1845	1	700 tons iron pa.	30	1865	4	2,500 tons iron pa	300
ALKALI & ACIDS	1772	16	1840			7000	1865	3	salt 12,000 tons	
SOAP	1808	29					1865	4	2,500 tons pa	
COINAGE/MINT	1794	26	1849	1	500 tons pa		1860	2	720 tons pa	

147

Trade Established			Date 'A'	No: Firms	Output	Jobs	Date 'B'	Firms	Output	Jobs
PAPIER MACHE	1772	17	1790	1	40 tons pa	300	1865	15	300 tons pa	1500
ROPES: HEMP, TWINE & WIRE	1779	20	1829				1861		export value £416299	423
STEEL WIRE	1720	10	1825				1865		2,000 tons	
PIANOWIRE	1670	9	1854	1	50 tons	250 +				
PIN-TRADE	1750	12	1824	5	30,000 miles used 150 brass wire & 2,000 iron & steel wire pa	1200				
IRON WOOD-SCREWS	1780	22	1849	1	70000		1854	20	gross pw 130,000	1600
IRON & BRASS BEDSTEADS	1836	36	1849	8	400 - 500pw		1845	9	5-6,000 pw	2300
PEWTER & BRITANNIA METAL	1790	25	1814	3			1829			
STEEL PENS & NIBS	1809	30	1849	12	65,000 gross pw	1850	1865	18	gross 98,000 pw	2410
WROUGHT IRON HOLLOWWARE	1840	37					1865			2000
CASTINGS & MACHINERY	1775	18				500	1865		steam engine 1,878	2000
MALLEABLE IRON CASTINGS	1804	28	1811		stamps, keys, locks potters 10 tons pw	50				
HYDRULIC MACHINERY			1855				1865		700 tons pa	260
SEWING MACHINES			1853				1865		30,000 mcs	
BELL-FOUNDERS	1750	13	1780	1			1865	3		200
UMBRELLA & PARASOL			1851				1865	1		746
COFFIN MAKERS							1865	12	70 tons pa black tin & 40 iron	150

2.5.3 Fluctuations Noted by Birmingham Chamber of Commerce 1783 - 1903

Chronicles of the Birmingham Commercial Society and Chamber of Commerce AD 1783 - 1913 G Henry Wright FCIS Birmingham 1913.

A buoyant period of confident trading was reported initially, giving way through riots and loss of markets during the early Revolutionary wars to stagnation of trade and high prices after bad harvests surrounding the turn of the century (1800). Controversy arose over the export of tools and brass and Birmingham 'know-how' useful to an enemy. In 1795, French capture of 'Leghorn' had led to seizure of Commercial Bills and repudiation of debts by Milano and Bologna, undermining commercial confidence.

It was noted in 1814, when the Chamber had resumed its activities after a lapse of around a decade during the Napoleonic wars, that fluctuations in trade, as in fashion and politics, necessitated flexibility in the labour market - a view persisting to this day. It was a year of 'a depressed state of trade in general'. Large scale unemployment and distress followed in 1817. Chamber requested repeal of the Corn Laws, but won exclusion of Birmingham manufactories from the 1818 Factory Act.

Commercial depression reigned in 1819, with high unemployment following the cessation of hostilities and the consequent slump in various Birmingham industries, which did not recover until 1824 - 5. Stagnant trade, financial distress and surplus stocks were reported in 1826, a year which all but wiped out numerous companies, and activity and prices stayed depressed.

A gap in the record occurs until the trade depression of 1841 - 2, with great unemployment and privations in 1843, wage reductions also causing economic suffering. In 1846 came the long-awaited Repeal of the Corn Laws and the era of Free Trade. In 1855, a branch of the Bank of England was opened in Birmingham and the money supply increased.

The Joint Stock Company Act of 1856, and the amendments to mercantile law, "accorded the principle of limited liability of so small a number as seven persons" (p 36); but the law on bankruptcy remained unsatisfactory. A debate was held in 1858 on what steps were to be taken regarding the 'commercial crisis'.

A Petition was sent to Parliament alleging the failure of Sir Robert Peel's 1844 Bank Charter Act "to prevent the fluctuations which had taken place in our currency, defeating all the calculations upon which commercial enterprise could rest, give steadiness to the character of our resources, inspire confidence in our circulating medium, diminish all inducements to fraudulent speculations and gambling and ensure its just reward to commercial enterprise conducted with honesty and secured by patience." (p 146)

In 1860 and again in 1864 - 65 - 67, resolutions were passed concerning rectifying the inadequate Government proposals to amend the Bankruptcy laws. In 1867, the Chamber opined that proper provision of a paper currency would reduce the distrust of continentals who disfavoured Bills of Exchange and demanded payments in gold, thus raising interest rates.

In 1868, the Council of the Chamber's 'Half-yearly Report' noted that 'periods of contraction and depression' were preceded by 'dangerous expansion and over-speculation'. In 1869 came a small improvement to business and the Chamber commented:

> *"We may now expect that we are entering upon the commencement of the ordinary commercial cycle: moderation and good trade for the usual time, this desirable condition probably soon to be followed by the excess of energy, over-speculation and extravagance, with the necessary result - collapse and ruin . . . the trade of the world will owe a deep debt of gratitude to the economist who shall point out the laws and cure of commercial crises and panics."* (p 224)

Trade in 1873 remained fairly active, but labour and fuel costs rose, and the United States was gradually becoming a major competitor in some Birmingham trades. Considerable depression ensued in some branches of industry in 1874, which was ascribed to conditions of supply and demand: there was "only too much evidence that much of our metallic trades was being driven to foreign countries owing to the unhealthy inflation of prices and disturbed relations between capital and labour."

Depression was general again in 1876, partly as a reaction to the ending of the Franco-Prussian war. Overproduction at raised prices had stimulated foreign competition, it was thought. Great and almost universal depression, gloomy prospects, a succession of bad harvests and disorganization of trade characterized 1877.

In June 1875, the Factories and Workshops Act Royal Commission visited Birmingham in order to collect evidence. In that year, losses in the coal and iron trades had more than offset profits gained during the previous three years. Labour unrest and foreign competition were blamed.

The chronicle of gloom and doom in 1878 seems almost endless: terrible famines, desolating wars; loss of English capital in worthless foreign loans; deficient harvests in England, with either ruinous disputes between labour and capital; keen foreign competition; excess of production over demand; "the

withdrawal of vast numbers of men from peaceful and profitable industrial pursuits to form large, standing armies, thus converting the great countries of Europe into little better than armed camps."

Silver depreciated markedly in value during 1879, and 1880 - -81 yielded "a depression probably unexampled in its duration and intensified in severity from its following a period of great and unusual inflation." the following year produced a gradual but certain improvement in trade conditions, but in 1783, profits sank below average once more, and prospects seemed dim. 'No improvement whatever in the trade of the district or the country at large' was observed in 1884. In 1885 a Royal Commission was appointed to enquire into the Depression of Trade and issue a Report.

The same depressed condition of trade persisted, with no material improvement and severe competition between traders during 1885 - 6 - 7, when advances in prices in the metal exchanges were "due to speculative action by foreign syndicates, not increased demand".

In 1888, the Chamber glowingly intoned that there had been a gratifying increase in the volume of trade throughout the city and district, which seemed likely to continue, although low prices reduced profits. A very considerable and profitable improvement in the state of trade occurred in 1889, although money was becoming dear. The foreign copper syndicate collapsed.

Fair prospects for 1890 were undermined by higher wages which made goods uncompetitive in neutral markets and restricted output and employment. The unsettled state of South America restricted foreign trade. The Baring Bank crisis was narrowly averted from disaster by the Government and the Bank of England. High foreign and American tariffs also restricted British trade, which underlined the need to open new markets overseas and increase existing colonial trade.

A slight increase in home trade occurred in 1891, but a 4 per cent drop in the general price level wiped out profits: and with static foreign demand, plus difficulties in reducing operating costs, and a tariff war in progress, the outlook was uncertain. A "most unsatisfactory condition of trade", with lack of exports, decreased profits, higher unemployment, lower wages and the prevalence of strikes, was seen as "not encouraging" in 1892. Pessimism prevailed in 1893, with a marked decrease of both imports and exports. A strike in the coal mines was seen as a national disaster, causing unnecessary unemployment. Foreign Business was adversely affected by financial breakdowns in Australia and America, revolution in Brazil and chaotic exchange rates in Chile.

By the end of 1893, the Birmingham Chamber became convinced that "commercial matters should receive a much larger share of attention from our legislators" (p 372). They reported in 1894 the view that "the great hope inspired by the acquisition of our East African territories was the opening of new markets where our trade would be unhampered by hostile tariffs which confronted it almost everywhere else . . . (p 379) . . . delays by Government in declaring policy by which British East Africa was to be administered" carried their share of blame.

Trade remained unsatisfactory in 1894, with marked foreign competition to local iron. Cheaper labour and longer hours in continental factories were cited, and 'prison-made goods from Germany' were singled out. Markets were depressed, business stagnant, metals down in value, and low rates of interest evidenced the difficulty of employing productive capital compared with the high prices of consols. Other prices continued to fall.

A burst of legislation in 1895 - 6 and 'home trade fairly well sustained' but foreign trade was still handicapped, and agricultural depression continued. Low-price, well-made and useful Belgian and German goods were competing successfully with Birmingham output.

Then in 1896, "come the great boom in the cycle trade, bringing with it a general improvement in many branches of related trades and absorbing a considerable amount of both skilled and unskilled labour." 'Very encouraging prospects' resulted from an upward tendency of prices in the United Kingdom and on the continent: railway shares rose in value and banks become more profitable as money responded to brisker trade. In 1897, a Commercial Intelligence Branch became established at the Board of Trade, ushering in the era of 'official figures'.

General trade in 1898 was said to have been good, with both plentiful harvest and better prices. The engineering and 'war trades' of Birmingham became busy again, after a strike, with naval orders. Russian aggression in China and famine and plague in India diluted foreign trade prospects, as did the keenness of foreign competition and the effects of high UK freight rates on rail and ships.

The active interest of the Chamber in so many matters pertinent to local businessmen had the effect of increasing interest in membership in 1899 from 202 to 282 firms. The Education Committee reported that "the rapid development of manufactures on the Continent and in the United States had so entirely changed the condition of trade during the preceding two or three decades that the United Kingdom no long held unchallenged the position of the leading manufacturing nation in the world."

Prosperity and expansion, despite the strengthened competition from Germany and the United States, seemed the order of the day, especially in iron and metals prices, at the turn of the century. In 1900, early price weakness led to mid-year deterioration without effects on the levels of active employment in Birmingham trades. Enhanced foreign penetration gave rise to forebodings of further depression. 1901 saw the fading of great prosperity, falling trade, and detrimental economic effects of the war in South Africa.

Membership increased in 1903 from 264 to 390 and the Birmingham Chamber become incorporated under the Companies Acts. Chamberlain's proposal for Preferential Tariffs for Commonwealth countries was examined by the Birmingham Incorporated Chamber of Commerce and Industry, and agreed.

The century-old campaign to amend the Bankruptcy law bore fruit at last in the 1913 Act, by which date membership of the Chamber had reached 1,700 persons. Information regarding the state of trade and confidence of local businessmen was published in a quite different form after 1903, when the historical series ends.

2.5.3.a Cause of Fluctuation

The Birmingham Incorporated Chamber of Commerce and Industry observed in 1855 that "great fluctuations have taken place in the amount of bullion held by the Bank since the passing of the Bank Charter Act of 1844 - such fluctuations compelling the Bank at one time to decrease the amount of bank notes in circulation, and thus to create great distress and bankruptcy; and at other times compelling the Bank to purchase gold and thus vastly to increase its circulation, thereby causing a rapid rise in the price of all property and labour and thereby creating a temporary prosperity to be followed by a renewed export of gold (the rise in price necessarily producing such export of gold) and that export compelling the Bank again to reduce the amount of their notes, great distress and bankruptcy again becoming the consequence." (Monetary Laws (5) History of the Birmingham Incorporated Chamber of Commerce and Industry - 1855) p247 .

2.5.3.b Some Causes Célèbres of the Chamber 1860 - 1900

Bankruptcy and patent law amendments; reductions to freight charges; lowering of tariffs; registration of trade marks; metrication of weights and measures; reports on visits to overseas exhibitions; advancement of technical education; preventing periods of expansion and depression causing recurrent commercial crises; information from Dr Livingston re trade to the African interior and from M de Lesseps re the proposed Suez Canal; telegraph link with America; alterations to the Trades Union Bill; petition against railway amalgamations; amendments to Factory Acts and Workshops regulations; plea for a Commerce Minister in London; campaign for taxation to fall on the annual value of property, rather than industrial or professional earnings; publication of tender prices for Army and Navy contracts; postal rate reform; decenilisation of the coinage;

need for international monetary union for industrial stability; registration of firms and marks of origin; effects of increasing foreign competition in principal markets.

2.5.4 Five Phases of Birmingham's Development 1780 - 1980

A chart was drawn up to provide but the crudest summary of changes taking place over a period of two centuries. The allocation of an entry to a specific time-period indicates only its typicality and predominance during those years, not its invention date nor whether its use continued afterward, perhaps even reaching its peak later on. The purpose is to bring together the long-term trends of development as such, thus providing a coordinated perspective of change.

Of course, many aspects of Birmingham's industrial history have remained constant during this epoch; among them have been the City's dependence upon advances in transportation and communication and their associated cost effects on product price competition; a traditional predominance of small businesses engaged in metal-bashing, even although the sub-sectoral structure and composition of output changed radically from decade to decade, some industries growing, others fading away; a corresponding diversity of skills, resourcefulness, inventiveness, ingenuity, combined with weak unionisation, flexible labourforce, usually low levels of unemployment, better than average wages, and considerable cooperation among employers; a very wide range of products by type, price and quality; social atmosphere of religious, cultural and ethnic tolerance and adaptability, coupled with civic pride and pioneering municipal enterprise; and also a certain avidity in seizing on novelties, opportunities, legislative proposals, etc and turning all to profitable advantage. Yet allied to this, paradoxically, there was a manifest tendency to cling to the tradition: the penetration of powered machinery and new computer-based design and production technology had been slow.

Among the notably fluctuating elements in Birmingham's Kaleidoscopic history have been the demands made upon the armaments industries, both by Governments and in response to fresh market opportunities. Intermittent recurrence of wars, revolutions and armed conflicts all over the world has subjected the metal trades in Birmingham to volcanic instability: sudden booms in war-time followed by sudden peacetime slumps.

The economic tendency for acceleration and deceleration in the demand for capital goods, machine tools, and consumer durables to exaggerate the recurrent fluctuations in prices, output, trade and interest rates both nationally and world-wide has also deeply affected the metal industries, especially engineering. Full employment has consequently been subjected not only to seasonal but to heavy cyclical depletion, to which have been added recurrent phases of structural decline and renovation.

Changes in taste and fashion have also had sharp effects upon particular industrial sub-sectors and upon the survival of individual companies. Survival has often been achieved only by the most flexible, adaptable and far-sighted direction. Technological innovation by its very nature cannot accurately be foreseen, and when accompanied by cost-reduction, especially by foreign competitors, can cause precipitous industrial collapse or an opportunity for regeneration.

Exhaustion of the base of natural resources and removal of ownership into pockets bearing no allegiance to the Region, coupled with industrial relocation policies aimed at 'milching' the area, have all contributed to the present situation, aggravated by recently low levels of investment, and a lack of confidence in future prospects.

G C Allen writes (1956) (p443): *"The history of Birmingham and District emphasizes the fact that changes in the*

general price-level, which are associated with the trade cycle, are among the most potent immediate causes of industrial transformation.

The weakness inherent in an industry may be obscured during the boom and may escape the notice of a contemporary:- it is during the period of depression, especially when this is coincident with the beginning of a long downward trend in prices due to monetary factors, that the weaknesses in industrial structure are revealed ...

Frequently a period of exceptionally great demand is ultimately responsible not only for a subsequent temporary depression, but for permanent decay . . . the temporary severance of connections with old customers has been, in fact, a frequent cause of decline in local industries."

Nor can the role of Government be excluded, whether successful or not in its intentions: to safeguard access to vital natural resources; determine the framework for transportation costs of raw materials; negotiate treaties with foreign powers in order to secure tariff reductions; influence the exchange rate, the money supply and the stability of interest rates; alter the levels of taxation, spending and borrowing; regulate the conditions of work in factories, offices and commercial premises; tilt the balance of restrictions and incentives available to firms through regional policy; invest directly in certain areas and projects requiring massive commitment by the state; require adherence to administrative rules and procedures etc; safeguard the environment from pollution, ensuring public health and safety...

The effects of the foregoing upon the survival of companies are held to be cogent: the blind-spots of history are the losers, the failed companies. It is to this area that shortly we turn to investigate.

2.6   NUMERICAL HISTORY

2.6.1   Congregational analysis

The definition of congregational analysis for the present purpose
is that it is a technique allowing computation of composite
change over time from a congregation of numbered and
weighted variables.

The two hundred year span of history was divided up into
twenty decades grouped into five generation periods.   Each
decade was described by numerical entries recording the year-on-
year changes between ten groupings of economic factors.

Entries into each matrix were comprised of percentage
differences plus a weighting which differed incrementally down
the hierarchy.   This weighting - arbitrary but consistent -
represented the rational 'knock-on' effects of one grouping of
factors upon another, and the relative importance assumed for
each grouping to a general assessment of the overall change in
national economic activity.

Events were entered as they occurred, with the weighting
appropriate to their level, each equal to the other, without
interpretation of their long-run significance.   Missing evidence
(resulting in blank years) was given a single basic weighting, as it
was assumed that activity did continue, even though no change
or event was recorded.

A limitation to the method consisted of the situation where each
entry represented one percentage point (multiplied by its
weighting) of the total points (multiplied by the total weighting)
for each grid.   If more or fewer facts were discovered and entered,
the result would vary by that amount.

Procedure for Congregational Analysis

	Step A	Step B	Step C	Step D
CYCLES	Abandon	Sub-segment	Take away	Subtract Value
	Search For	Phases of	Cross-section	B From A Take
	Master cycles	cycle	Differences	Percentage
CHANGE	Abandon	'Dis-member'	Treat all	Summate
	Statistical	Differential	Changes	Variable
	Perspectives	Events	Equally	Columns
HISTORY	Abandon	Summate	Add to	Summate
	Trans-temporal	Enumerated	'Cascade'	Horizontal
	Persepectives	Events	Weightings	Rows
METHOD	Utilise	Arrange	Summate	Calculate
	Numerical	Variables	Annually &	Differentences
	Evaluation	Rationally	Decennially	Between Totals

On the other hand the numerical effect of additions, omissions, deletions and errors could all be calculated very precisely. The only limitation on the matrix would consist in the amount of information which could be successfully handled.

Over 5,000 'facts' and 15,450 calculations were involved in compiling Table 2.6.A, 'The Tempo of Change 1780 - 1979'. All events referred to in the Decennial Accounts of Events and overviews and elsewhere in the text were included in their appropriate matrix, and the resultant figures summated column by column. These sums were then transferred to their appropriate row in the master matrix covering 1780 - 1979.

The large percentage variation effects of climate and harvest, although given the least weighting, caused the greatest amount of change in the entries, while population change entries, the smallest in percentage terms but arguably the more effective, were given small differences. Both reflected the arbitrary weightings given them in the 'cascade effect'.

In detail, each variable after the first was afforded a numerical weighting to reflect a) its importance to changes in general economic activity (whole digit) and b) its weight and influence relative to its successor variable in the hierarchy of then selected variables, (fraction or decemial)

Thus variables two to ten were weighted by numbers 1.1 to 9.9 in order of their appearance, so establishing ratio relationships with all other variables. A 'cascade' effect was thereby achieved which illustrated the cumulative, interactive effects of variables upon each other.

As the factors each became enumerated in turn, the effects of changes in preceding variables upon suceeding variables moved from diffuse and generalised to sharp and critical, each variable relating proportionately to its influence on the whole of economic activity.

Perhaps a variable weighting proportionate to the degree of percentage change in the raw data would have provided a more sensitive indicator. Use of a crude system nevertheless produced a compatible set of results.

One could see the successive importances of investment, invention, new technology, legal, cultural, building, and financial effects coming through in the figures. The low decennial rates of change in the earlier years probably reflected both a slower tempo and also a relative scarcity of information up to 1810.

In performing these calculations, it was noticeable how differing groupings of economic variables became more important from decade to decade and generation period to generation period, how the tempo of change within groupings altered the tempo of change over the decades, but also how consistent was the tempo of change overall. Year on year differences were sensitive and

volatile, but the composition effect decade on decade and one generation period upon another was remarkably stable.

Other sources of error may have arisen from the sources of information used, and also from data transcription. In recent years, the difficulty became that of finding compatible series of up-dated figures on one hand and second, in decisions about which facts and events were 'historical' and which were not major changes or new departures and therefore 'unhistorical'. Foreign events assumed greater prominence as the international economy became a world economy.

2.6.2 Results from the matrix

The most striking results from the decennial figures (in the Diagram 5.6.A. 'The Tempo of Change 1780 - 1979') were the stability of the rate of change within 0.3 to 7.0 (exceptionally twenty) points either side of the average, and the absence of any noticeable cycle, long-wave, or other recurrent effect, in strong contrast to the volatility of year on year differences.

Around 1810, there appears to have occurred a lift in the rate of development, as if the whole economy had changed gear to a higher tempo of change lasting until 1890. (The reader is reminded that change is understood to be both positive and negative, favourable and unfavourable, and that change or its absence is neither good nor bad).

This rate of change was resumed 1900 - 1920, but the exceptional decade 1920 - 30 ushered in a series of four decades of decreased tempo of change, with a return to previous levels only in the 1970's.

Deviations from the index at 1913 from Diagram 2.6.2, in which the strong effects of the periods surrounding the Napoleonic

163

wars and World War One and their aftermaths are clearly visible. In fact, since war was endemic to the entire period apart from a very few years, these large differences from the oscillating norm of change were comprised not just of hostilities, or their cessation, but conjointly major changes in weather, output, prices, and employment underlined.

It seemed to be the case that cycles and other forms of fluctuation inseparable from time-series of particular economic variables either cancelled each other out in the general rate of change, or were too partial and parochial to have any effect on the overall tempo of change and development comprised of a hierarchy of factors.

Exceptional years such as 1839, 1841, 1865, 1920 - 21, were all explained by exceptional combinations of events. When the differences between the decennial rates of change were graphed, the resultant trend in the tempo of change resembled other long-run series with regard to peaks, troughs and general upward or downward 'tendencies'. This curve resulted from a 'random walk' effect solidly grounded on empirical evidence.

Clearly, the level of aggregation affected whether or not 'cycles' appeared, either as 'behavioural patterns' of specific variables, or as 'hybrid' effects. As soon as the composite view was taken, so it seemed that cycles and long-waves disappeared, absorbed into the tempo of changes involving all their component parts. Each variation from the emergent 'norm' was accountable to specific events and changes. The only constant was a gentle pendulum effect in the tempo of change itself: nothing else seemed to be imminent, or implied.

TABLE 2.6.A.

THE TEMPO OF CHANGE 1780 - 1979

(Index 1913 = 100)

Years		0	1	2	3	4	5	6	7	8	9	SUM	Diff.	Generation	
1780-	89	6.3	6.4	12.6	6.3	5.9	12.8	5.7	4.4	8.4	12.8	81.60	0		A1
1790-	99	6.3	3.8	8.9	9.7	11.5	5.6	5.1	10.2	8.1	6.9	76.10	-5.5		A2
1800-	09	9.2	8.9	7.6	8.2	8.3	7.2	6.9	6.2	9.2	8.1	79.80	3.7	85	A3
1810-	19	10.5	7.6	8.1	9	12.3	12.4	9.2	10	12.7	11.7	103.50	23.7		A4
1820-	29	8.9	8.4	7.9	7.1	8.6	12.2	15.1	14	10.5	11.4	104.10	0.6		B1
1830-	39	9.2	9.9	9.8	9.6	9.6	8.6	8.6	10.1	13.4	*17*	105.80	1.7		B2
1840-	49	12	*16*	9.9	7.8	10.3	11.2	9.6	11.1	15	7.1	110.30	4.5	107	B3
1850-	59	14	9.2	9.9	9.2	13.6	9.7	8.6	10.7	8.6	12.9	106.40	-3.9		B4
1860-	69	12.6	11.1	12.1	9.7	8.6	*17*	9.9	9.5	8.6	8.1	106.80	0.4		C1
1870-	79	12.1	12	10.3	12.6	8.6	10.9	9.9	8.9	8.5	10.1	103.90	-2.9	102	C2
1880-	89	12.4	11.8	9.2	9.5	9.8	10.3	12.4	11	9.3	10.2	105.90	2		C3
1890-	99	9.6	10.7	8.1	9.8	10.6	8.1	8	9	10.3	7.9	92.10	-13.8		C4
1900-	09	8.6	9.6	7.5	12.8	10.8	7.9	8.2	8.4	8.9	10.1	92.80	0.7		D1
1910-	19	7.7	7.7	8.9	10	12.4	8.8	12.2	13.7	11.6	6.9	99.90	7.1		D2
1920-	29	9.9	*20*	*19*	9.1	9.9	9.2	10.4	12	9.8	9.7	119.40	19.5	105	D3
1930-	39	8.6	10.4	10.2	9.6	10.9	7.9	9.2	10	12.2	9	98.00	-21.4		D4
1940-	49	10.9	10.2	8.2	8.9	9.9	10.2	10.5	8.6	9.1	8	94.50	-3.5		E1
1950-	59	10.6	9.3	9.9	7.8	9.4	8.6	8.1	10.3	10.3	10.2	94.50	0	97	E2
1960-	69	12.5	9.3	9.6	9.1	10.2	10.2	8.7	7.9	9	8.6	95.10	0.6		E3
1970-	79	8.9	9.7	8.9	11	10.2	9.8	12.2	10.6	10.6	10.6	102.50	7.4		E4

Figures in italic form denotes exceptional year.

Chapter Two

Footnote 1

Consideration was also given to utilising multiple regression analysis on the changes evidenced by this sequence of time-series. The technique was thought to be unsuitable since the presence of trends would produce either perfectly positive or perfectly negative correlation coefficients; moreover, the pre-requisite deletion of fluctuations would have rendered the datasets sterile for my purpose. (see also Appendix , Floud 1973)

Footnote 2

A surrogate for climatic change in the British case was taken to be rainfall measurement in London, an observational series extending over several centuries. Percentage changes in annual rainfall, expressed as a deviation from the average for each decade, provided a numerical entry for this row in the Matrix.

Footnote 3

In his study (A Reconsideration of Easterlin Cycles' in population studies vol 35 No 2 July 1981 p 247) D P Smith modifies Easterlin's hypothesis by reference to earlier work done by Yule (1906), Lösch (1937), Bernadelli (1941), Grauman (1960) and Griliches (1961), reviewed in Leibenstein (1974) and Sanderson (1976).

Footnote 4

"A good harvest, or some other favourable shock, is likely to have a profound impact on the demand for housing and other forms of investment if there is an abundance of credit, while a bad harvest or war is likely to have its most serious effect if it comes at a time when credit is in any case strained."

'Building cycles and Britain's Growth' J Parry Lewis

MacMillan London 1965

Footnote 5

Troughs were not found to follow crisis dates consistently, but sometimes to precede them.

Addendum

The weightings forming the 'cascade' effect in the ten groupings of economic variables were numbered progressively by 1.1 increments up to 10 plus 1.0. Each level of the economic hierarchy thus added 1.1 to the previous one, having a cumulative effect equal to 60.5 on the major scale A - J.: (the remaining values were net changes.). An example of a matrix, (for an unspecified decade and filled by using random numbers tables) is demonstrated thereunder. The composite change values comprising the bottom row are summed to provide a decennial change value, then converted individually into an index in order to facilitate graphic presentation of the sequence.

CHAPTER THREE

Company Life Spans, Survival Longevity and Precipitation Rates

3.1 Discriminatory Basis for Research

> *"Enterprise is overweening in the confidence with which it backs itself to do as well as the representative businesses that are established"* J H Macgregor. Enterprise, Purpose and Profit Ch. 3, 'The Risk of Enterprise' 1934

> *"The return of every business ceases after a time; every business, if it remains unchanged, soon falls into insignificance."* J A Schumpeter. Theory of Economic Development 1912

3.1.1 Preamble

These two statements by economists taking retrospective views of the company population appear dismal and anti-entrepreneurial, but may be justified by the findings of this research. MacGregor and Schumpeter highlight two contrasting elements in human psychology: on one hand an attitude to company morbidity; on the other a choice to evolve or decline. Company management may deliberately or unintentionally shorten or lengthen the lifespan of an individual company, but the longevity of the company population remains almost unaltered in its periodicity no matter what is attempted.

MacGregor thus speaks in an actuarial sense about the average lifespan of a new business and the overall rate of failure, hence the rarity of success and long establishment. Schumpeter refers to the transient availability of entrepreneurial profit and the creative destruction awaiting ossified companies who cannot renew themselves. Both phenomena may be relieved or aggravated by business cycle and long wave recurrence.

Arising from theoretic origination, the longevity concept as an average of lifespans of company populations is associated with the cyclical postulate: the latter stipulates that symbiotic *fluctuations in economic variables arising from business transactions so alter the business environment as to repeatedly expose the vuluerablity of some firms to closure*, while offering other entrepreneurs opportunities to form new companies.

Thus quasi-regular, synergistic cycles may become apparent both in national economic activity <u>and</u> in the formation and closure rates of the stock of companies. This meso-economic contingency theory is somewhat modified by the micro-level decision-taking of individual company managements. The resultant calculation of longevity is comprised of the intervals between formation and closure of company populations lodged in a sequence of selected time periods, for which evidence is available.

Longevity research remains a complex, neglected area for most economic historians and even for archivists; despite earlier work by Shannon (1927), MacGregor (1932) and Payne (1974) much of the historical period 1780 - 1980, covering five Kondratieff long-waves and 26 business cycles, has not been covered systematically. Hoffmann's (1959) Index of Bankruptcies extends over the period, but does not provide information about the rates of company formation nor about the stock of companies.

Indeed, much of this information is unobtainable, especially relating to earlier decades. Nevertheless, the chronological marshalling of what sample-specific evidence exists both nationally and for the West Midlands, within which lies the Birmingham area conurbation, seemed a worthwhile presentation to pursue in order to estimate precipitation rates for

metal industry companies insofar as was possible.

Apart from the wonderment and curiosity of research into 'missing links', it may transpire that longevity is predictable; closure rates of new-formed companies almost inevitable over a short span of years; and that a company insolvency index viewed chronologically may provide a lagged economic indicator of some value for forecasting the viability of investment and for understanding present ratios of employment: unemployment; output: productivity; and price elasticities of demand and supply in both financial and real economies.

Presumably, if the cyclical effect is confirmed, an insolvency index would have relevance to the Government's regional policies of financial aid and to the private sector's assessment of the viability of new projects requiring substantial capital investment. The importance of such an index, so often ignored by economic commentators, is that **company precipitation rates are the quasi-cause of most other out-turns.**

3.1.2 Introduction

The turbulent, crisis-prone national and local history of the past two centuries (summarised nationally and for Birmingham in generation-long overviews and decade by decade reviews comprising 2.A. and 2.A.) is strewn with the scrapped registrations of defunct companies. Yet from the entrepreneurial pattern of the past comes today's industrial structure, hammered out upon the anvil of experience, and still surviving for a while longer.

Some few firms evidently outlived- through caution, shrewdness, preemption, inertia-a multitude of changes, shocks, vicissitudes and challenges in a form consistently recognizable from their foundation dates to the present - even though the great majority failed. Compounding the consequences of

management reaction to these pressures, fickle fashion has elevated successive sectors to pre-eminence only to desert them for yet another novelty, so leaving innumerable insolvencies in its wake. Thus *two longevities are involved: that of total populations of failed companies and that of the sample populations of the stock of surviving companies.*

Many valuable questions arose from considering the effects of this process, the recurrence of fluctuating business conditions of definable types, and the transience of the plethora of enterprises.

How long did the average company survive from its date of origin?
What rates of failure were recorded during a succession of time - periods?
Were figures available for metal industry firms located in the study area?
Were there differences between national, regional and local economies resulting from varying rates of development?
And between industrial sectors?

An aim for the empirical research was to establish a ground and a framework for such deliberations.

3.1.3   Some definitions and parameters

What entity constituted a company for the purpose of this thesis was taken as that legal unit (disregarding size, location of principal office, form of ownership and control) which remained identifiable by name (but not necessarily by main activity or product-market), managed its accounts, organized its administrative structure, and directed its own investment: which, having started to trade on a date specified upon its Certificate of Registration, enjoyed a lifespan terminated either when it ceased trading and/or was removed from the Register of Companies, or when it had become an undertaking subject to judicial proceedings ending by its closure; or which still survived at a date determined by the enquiry, and thus achieved a survival longevity.

Firms subject to involuntary takeover, arranged to be bought out, voluntarily merged with another company, or acquired in order to be amalgamated were excluded from this enquiry (although not regarded thereby as failures). Perhaps some would continue to trade for some while, but ownership and control having become transferred and vested elsewhere, the original firm was judged to no longer be responsible for its own destiny, its survival depending on parental company direction. Firms which themselves undertook acquisitions in order to expand and diversify their activities and increase integration and industrial concentration, were taken to be a continuation of the same company, and thus were included in the enquiry.

Problems of accuracy in determining the early starting dates of longest surviving companies were so formidable that the quoted date was taken as a 'given', even without proof of incorporation of registration, (howbeit skeptically). Otherwise, company birth was assumed to be that of the official registration date: (some were known to have had several false starts beforehand). When

restructuring of an existing firm involved the first registration of a company, that date was taken as its foundation.

The death of any company was found to be even more difficult to determine on account of the plurality of modes of its demise: some 'abortive' enterprises never began trading; or if they did, they never made official 'returns', and thus possessed no identifiable longevity. Others were very short-lived, before becoming dormant, although not yet de-registered. Yet others, - established for a period - registered late, then were either sold or closed down permanently. Some 'phoenix' companies, appearing under a succession of names, were permanent defaulters only finally expunged following court proceedings notified in 'London Gazette'.

Other categories of companies, especially if solvent, existed and were dissolved outside the official framework: family firms in particular had no need to present accounts and for many years registration remained voluntary. Many were doubtless never recorded; many struck off the register several years after they had finished.

Both numbers and timing of demised companies represented an area of great uncertainty, the more so the further back in time. When new legislation was introduced, the numbers of firms converting from older forms of existence into the most recent comprised an undefined proportion of the total of new registrations, and their subsequent failure was in relation to an undisclosed date of origin. Since comprehensive information was unobtainable and all the statistics that were available extremely suspect, one could but use what historical samples came to light, about which the facts were more sure and substantiated.

Yet other companies, with clearly dated origins and phases of development, surviving to record an anniversary or centenary

year by means of a published company history, had no recorded death, although untraceable in the main 1980 business directories. They were known to have survived to the date of their publication and assumed to be still surviving, without evidence to the contrary. Their longevity would thus be an interim, survival longevity, rather than an absolute one based upon a verified life-span.

The longevities of surviving firms comprising the present stock of companies could not directly be compared with the longevities of defunct companies from past decades, although both longevities may have had some relation to the dates of origin of all those companies.

At any particular period, the stock of companies - the difference between formations and failures - would have consisted of cohorts of firms having a succession of starting dates and a large range of survival longevities. At any later date, the stock of companies would be similarly composed, but the companies started on a longer succession of starting dates would produce longevities which differed by the addition of the later years; and from which a failed proportion of the earlier companies would have been deducted. A fluctuating chronological record of formations and failures or closures would result in erratic growth of the stock of companies; but *would it result in a varying average longevity or one which stayed much the same?*

Some starting dates may have been accompanied by more favourable conditions than others; this enabling founding enterprises to get more rapidly established, and on the stronger basis, to survive longer because of their greater size and strength than less fortunate firms started during a different phase of the business cycle or in another trend of the long wave. Differing degrees of vulnerability and differing eras of business risk may have affected both the precipitation rates as percentages of the stock of companies.

Results of a kind could be obtained by deriving an arithmetic mean from the summated lifespans of a sample from the company stock–provided it was borne in mind that each sample was different and the population always changing and never homogeneous. **The simple span of company life from birth to death or to some cut-off date of the research process would provide a basis upon which to estimate and compare absolute and survival longevities from differing temporal frameworks.** Outcomes could only be viewed as rough indications of what, in general, appeared to be happening at an irregular succession of sampling dates, with little or no information for earlier years than the mid-nineteenth century.

3.1.4   Legislative influences

Not only did the stock of English companies enlarge prodigiously over the years in which records have been kept, but the legal requirements and registration procedures also evolved remarkably. New legislation effectively brought forward companies to register in large numbers as it proved first worthwhile then obligatory to do so; and as the scope of regulations extended to include the vastly greater numbers of the smaller firms, so the registered stock swelled. Administrative arrangements did not always match the

resulting in delays which had the effect of transferring some entries from one year to the next.

In general, insolvent individuals had been dealt with under Bankruptcy Acts (stretching back before 1780) and insolvent firms under the Companies Acts, (mainly following 1856) Voluntary liquidations by solvent partners and viable companies were disregarded in analysis of the official figures; but insolvent companies involved in compulsory liquidation, demised by winding-up orders made by the courts and creditor's voluntary liquidations by assignment (without legal proceedings in Court) were included in the tally: deeds of arrangement were not. Insolvent partnerships were dealt with under the Bankruptcy Acts and also included in totals for receiving orders. Administration orders related only to deceased insolvents. Thus the general term 'failure' or 'deregistration' covered a variety of cases.[1]

Neither was the definable situation found to be clear-cut,

> *"If the firm is a large one with extensive financial connections, the Courts are prone to do everything possible to avert its failure as a going concern, and it may operate for years in an insolvent (failed) condition"*
> Penrose, p 23 1959'

One had also to bear in mind the caveat-issued by Dr E H Clapham, the historian, to the effect that in important industries in this country, joint stock was a slow development after the Companies Acts were passed, so that the private firm kept for a long time a representative position. Estimates of company populations in 19th century Britain were very incomplete, yet the schedule of legislation, covering over a century and a quarter is extensive (see Appendix A3/1)

Since 1856, amended procedures for dealing with bankruptcies and provision of better statistics of registrations and company insolvencies had been energetically pursued by the Birmingham Incorporated Chamber of Industry and Commerce. Success was to prove elusive until the 1926 Amendment to the 1914 Bankruptcy Act (Consolidating those of 1883 and 1890) gave the County Courts, and High Courts in the metropolition areas, together with the Board of Trade requisite powers to adequately control and supervise legal proceedings.

Over a very long period, in which many Reports were supplied, the bureaucracy tightened up its methods, and gradually figures became more comprehensive, detailed and reliable, but arising nevertheless from specific legal provisions. Changed legal requirements concerning both registration and notification of insolvency were reflected in the numbers of *RECORDED* company failures. The historical sequence of statistics, broken though it is by gaps in evidence and changed basis of computation, provides only a variable approximation to what must have been the real state of affairs.

The time taken to conclude legal proceedings often meant that a span from one to five years might elapse between first listing and final dissolution of a company, and a further interval before its expurgation from the Register. Both the beginnings and endings of many companies remained fuzzy, but their official 'start' and 'stop' dates presented notwithstanding an interval between which lifespan could be measured, and the average of lifespans taken to provide a series of longevities for specific sample populations.

3.1.5 Information sources

Notices in 'London Gazette' and 'The Gentleman's Magazine' in the latter quarter of the eighteenth century probably comprise the earliest records of notified insolvency. They are supplemented from 1801 onwards by at first amateurish occupational supplements to the Census of England and Wales. Parliamentary Sessional papers from 1861 onwards provided insolvency statistics in a discontinuous fashion. From 1865, however, 'London Gazette' published all liquidations; from 1884 onwards, a quarterly listing (amid the twice weekly editions of the paper) was enumerated, and from 1890 - 1 it became possible to relate company insolvencies to the stock (as it was then partially recorded). The basis of these records was both changed and enlarged in the following years: 1900, 1914, 1926, 1948, 1967, 1976 and 1980, through a succession of both Bankruptcy Acts and Companies Acts.

Not until 1974 did the Department of Trade commence quarterly statistics of all insolvencies by type under nineteen standard industrial classifications (SICs), the first publications of which extended the series retrospectively to 1960. A surrogate measure had been published much earlier, in 1917, as part of the Bankruptcy General Annual Report, in the form of tabulation of the assets and liabilities of companies after they had become officially insolvent under receiving orders or deeds of arrangement: but no separate information was provided about liquidations, affecting so many smaller firms active over wide areas.[2]

The possibility of using receiving orders in bankruptcy cases as a surrogate measure for company insolvency was not pursued, as 30 per cent of all receiving orders were dealt with by the High Court, which meant that figures for County Courts in the regions were not at all representing the entire number of legal

177

proceedings, which were themselves only a proportion of regional failures. Had a team of researchers been available, 'London Gazette' notices 1780 - 1980 could have been filtered to produce a list of bankruptcies in the Birmingham metal trades irrespective of which Court had dealt with them, but from these would have been extracted company liquidations, and the latter would have been far short of the numbers of actual failures of companies, as distinct from those about which legal proceedings had been necessary. Such information would have had value only as a supplementary series.

As late as 1984, a Committee of Public Accounts Report submitted to Parliament expressed strong suspicions about the reliability of information supplied by the Companies Register. It appeared that 49 per cent of the 930,000 and more incorporated companies registered on 31 May 1983, had not supplied annual accounts and 43 per cent had not supplied the mandatory annual returns. Although the circumstances were exceptional in that record numbers of registrations and de-registrations were occurring simultaneously, the situation did highlight the inadvisability of assuming that official figures were either accurate or reliable in relation to their time-span, since similar situations had occurred historically.

Although the Birmingham offices of the Companies Registrar and of the Department of Trade and Industry made returns to London headquarters on a regular basis, access to information was controlled from London, and regional and area returns were not compiled in that form but computed into national totals which were subsequently published through official channels.

Analyses on the bases of industries and sub-sectors were not conducted at the regional level and were unavailable to outside researchers at the national level. National insolvency statistics did reveal some interesting cyclical propensities, reflecting movements in other indicators composed of selected

economic variables, but only recently had these series been
set up.

Enquiries at the Companies Registration Office, Cardiff, also drew a blank. Although a company numbering system dating from 1862 identifies entries within Registers, they are not sorted regionally, industrially, (or by date of foundation if other than that of registration) or alphabetically. One has to travel through a mirco-fiche to discover some detail of companies already known by name and listed by number.

Records of companies dissolved more than 20 years ago are passed to the Public Records Office, which keeps only those of special interest, and which has confirmed by letter that no separate lists exist of private limited companies, forming the bulk of the historic population. (The search fee per file has increased from 50p to £1). The Stock Exchange Official Year Book contains lists of all quoted companies that have become defunct in the preceding year, but does not provide regional or industrial breakdowns or include unlisted public or private companies.

In fact, no companies were required by the Board of Trade to
submit accounts before 1908; all non-private companies were
required to do so only from 1948 onwards, but around
250,000 small businesses were exempt until VAT registration
levels were lowered for all types of businesses in 1978, thus
bringing the vast majority into scope.

Based on resultant information, reports have been recently published in 'British Business', a monthly magazine of the Department of Trade and Industry. Other contemporary sources of information about bankruptcies are the company credit monitoring agencies such as Trade Indemnity and Dun and Bradstreet, whose clients comprise an estimated one fifth of the

general company population.

Secondary sources by contrast provided considerable statistical material relating to registrations, company stocks, various forms of insolvency, rates of failure and even life-spans of firms, which had been derived from numerous documents and computations but which were unco-ordinated, unsystematic and a-chronological, discontinuous and sometimes incompatible (Chronology - see Appendix 2 A1).

Arrangement of this heteromorphic evidence on a sample specific basis, calling on the ingenuity of the creative researcher for its cohesion, seemed the only alternative which could attempt to approach the aim of discovering average company longevities, and coordinating these with spectral tracings of cycles of economic activity. (ie: the tempo of change).

3.2   Synopsis of Sporadic Evidence

3.2.1   Towards estimation of longevity

The available information on life-spans of groups of companies, existing only in secondary sources (since the organizations were defunct), related in most cases to short schedules of calendar time at which the samples were taken.   The universe from which successive sampling populations were taken had two possible dates of origin.

a   The foundation dates of the companies comprising the sample, or

b   the start of the study period in 1780.

Lifespans and survival longevities might therefore vary according to the date selected as that of their foundation and also as to the date at which an assessment of their lifespan or survival longevity was made.   Several approaches to this

180

problem suggested themselves:

1   To group individual company life-spans by decade of origin and obtain an average longevity for each decade: discarded because of lack of sufficient information to provide a sufficient number of entries for each temporal sub-division.

2   To take a number of separate samples, derive average longevities and compare them in a Table from which an approximation of a mean longevity could be calculated: utilised as an interim measure.

3   To disaggregate samples of long-surviving and other companies in order to produce an a-temporal composite list, from which an overall longevity could be calculated as the mean of the frequencies of the recorded longevities: adopted as a preferred technique, **but subject to several reservations** as to veracity, representation and so on.

The difficulty attending option No 2 was demonstrated by the effect (see page 🔳) of taking the mean of lifespans of one sample containing long-surviving firms and comparing it with that derived from a sample consisting of general companies selected because they were not centenarians. The two longevities were very far-spaced, and their mean represented neither sample.

If evidence of longevity from the longest-surviving companies was taken, it had to be diluted in due proportions by evidence from 'normal' firms and from the far greater number of start-ups in the company population as a whole. Longevities of each category may well be typical of that category, but the overall average was typical of no particular category and not of the company universe either, unless option No 3 were adopted, ie: an abstracted, composite sample.

TABLE 3.4.A

TABULATION OF SAMPLE LONGEVITIES

	Source	Nos.	Company Types	Started	Years Ranges	Av.	Timing Scale
1	Birmingham Directory 1982	172	Surviving W. Mid. manufacturing	1780 -1880	110 - 200	131s	Long
2	Stock Exchange Year Book (1945-69)	143	Public floatation Birmingham	1780 -1880	110-190	107s	
3	Birmingham Post 83	27	Metal-working B'ham	1780 -1880	105-200	142s	
A	*1+2+3 =*	*342*	*Local mixed*	*1780 - 1969*	*105 - 200*	*[127]s*	
4	British Archives Council Library	258	Centuary & other C'oy History	1152 - 1980	23 - 202	102s	Long/ medium
5	Birminhgam Sketch Jun 57 - Jan 60	22	General local Survivors	1730 - 1927	32 - 802	87s	
6	Barbara Smith Index UBL 1964	136	Failed & surviving metalmakers	1664 - 1880	63 - 307	126fs	
B	*4 + 5 + 6 =*	*416*	*General & local*	*1152 - 1980*	*23 - 481*	*[102]*	
7	English Guns & Rifles J W George 1907	10	Gunmakers & Flintmakers	1750 - 1835	10 - 70	26f	Short
8	Box 18, B-Smith Index, Heslop UBL	11	Coffinworkers	1818 - 1895	3 - 73	32f	
9	Handbooks 1910 of Cooperative Societies	42	Birmingham area cooperatives	1862 - 1802	1 - 40	12f	
10	Stock Exchange 'Default' Register	8	Public firms removed	1865 - 1900	0 - 35	23f	
C	*7 + 8 + 9 + 10 =*	*71*	*Local special selections*	*1750 - 1902*	*0 - 73*	*[23]f*	
11	W. Midlands Review of Cemmerce 1914	102	General manufacturers, Birmingham	1780 - 1902	12 - 134	54s	Mixed
12	The Ironmonger 1856-1906	255	Birmingham metalworkers	1650 - 1900	1 - 268	46f	
13	Stock Exchange 'Default' Register 1900/36/57	111	Liquidated Birmingham Public companies	1811 - 1956	0 - 87	16f	
14	S.E.Y.B. 1957	194	Surviving local firms	1855 - 1956	0 - 97	38s	
D	*11 + 12 + 13 + 14 =*	*662*	*Survivors & failed/local*	*1644 - 1956*	*1 - 307*	*[38]*	
15	DTI	23666	UK Start-ups in 1973-4	1974 - 1980	1 - 7	3.8	Short
16	- ditto - (1983)	ditto	Survivors' lifespans	1973 - 1982	1 - 10	5.7	
E	*UK Total (1983)*	*23666*	*Failed & surviving*	*1973 - 1982*	*1 - 10*	*[43]*	
17	Centenariän QI	212	Birmingham Centenariäns	1650 - 1880	?	140.7	Mixed
18	General QII	323	Birmingham surviving metal firms	1780 - 1980	?	47.2	
F	*QI + QII*	*622*	*Birmingham local metalworkers*	*1650 - 1980*		*70.2*	
	ALL	2548 26312	LOCAL FIRMS	1152 - 1980	1 - 481	[80] 45.9	

<u>3.2.2</u> Interim Tabulation of Longevity

Average longevities and ranges of lifespans were collected in a tabulation of sample longevities (Table 3.2.A) derived from a preliminary collection of 18 information sources of mixed type and containing samples of companies having dissimilar life-spans. It rapidly became evident on scanning this table that the mere fact of company survival beyond the average for the largest samples was itself exceptional, and that the longer the survival endured, the more rare and extraordinary was it. *A distinct polarization began to emerge between absolute longevities based on lifespans of large populations and the relative longevities based on survival of smaller samples.*

<u>Group A</u> samples comprised Birmingham firms of notable lifespan surviving more than a century and still 'alive' at the date of listing in the secondary data-source. A number of firms (130) were represented in more than one sample: the combined population of 342 represented 212 firms, a large number of which had been 'floated' as public companies on the Birmingham Stock Exchange 1945 - 1969. The resultant 'average' longevity was a temporal mid-point of the three longevities, (or a heteroscedastic equi-variance) derived from the arithmetical mean of the survival longevities (s) of the constituent companies, some of which were double - counted. It is therefore an indicative, not a statistically 'pure' value that we see in the average longevity of 127 years for this sample population.

<u>Group B</u> samples derived from antiquarian sources listing long-surviving companies still existing at the time of record compilation, or recently failed at that date and whose lifespans were known (cf: Item 6). All these companies were medium to long-lived in the range of 23 - 803 years, (and not double-counted through cross-representation in successive samples). The longevity outcome (on the same basis as Group A) was for this

group 102 years.

Group C contained four very small samples of historic special activity firms, all with known life-spans, a total of 71 entries producing a 'failed' longevity of 23 years. It would have been desirable for several dozen of such small-firm historic samples to be available for comparison and longevity calculation, had sufficient information been traced. *All these samples were Birmingham area companies associated with metal.*

Group D samples comprised metalworking firms in Birmingham whose lifespans had been researched from secondary sources providing lists of names or card-index entries of companies. The sample was roughly even balanced between life-span longevities and survival longevities at the two sampling dates of 1914 and 1957. None of the samples overlapped numerically or temporally, and an average longevity indication of 38 years was obtained from the arithmetical mean of all 662 companies' lifespans or survival longevities. No attention was given to either stock levels or contexts.

Group E comprised (for the first time) official figures for firms started in 1973/4 and either failing or surviving during the ensuing decade. *Average lifespans of cohorts of fledgling companies were dramatically brief compared with all estimates obtained from previously inspected groups of established and long-surviving businesses, which having developed, then experienced quite different morbidity levels.* An enlargement of the sampling frame to include firms unnoticed by most management centre studies drastically altered the longevity result, if a timespan of only one decade was stipulated.

Group F samples, derived from Questionnaires Nos 1 and 2, attempted to bypass some of these problems by testing two distinct types of surviving firms - the centenarian companies

and the generality of established businesses, resulting in two longevities, one of 140.7 years and the second of 47.2 years. In the first case, all firms from both Q1 and Q2 over a century old were grouped: in the second case, all firms other than those in the first case were grouped. (It was assumed that results from small samples typified the sampling population).

While these samples served to yield rough guidance, they were all flawed statistically and imperfect in their composition, constricted in their periodicity, and biassed in their results. Ideally, one needed a composite list of defunct Birmingham - only metal trade companies evenly balanced for all decades of the study period, and representing known percentages of successive historic stocks of companies. Since this information seemed unobtainable, one had to fall back on a composite sample of firms abstracted from a series of sampling dates viz: 1862, 1884, 1890, 1900, 1913, 1935, 1958, 1974, 1983.

This unsystematic, temporally multi-focal sampling framework was unbalanced, but the only one available. Although it was possible to allocate company formations to earlier decades than 1860 - 70, one could not allot company failures to decades until after that date-after the Company Act of 1856 had begun to take effect on registrations of incorporated joint stock companies. Previous information on bankruptcies (indexed by Hoffmann from numerous sources) covered both individuals and firms: 'stops' were recorded by 'London Gazette', but 'starts' only by later historians.

3.2.3 A Local Average Longevity

The overall figure from a Birmingham metal industry, a-temporal, unduplicating sample of 1,351 firms about which sufficient information was available was calculated as a mean longevity of 45.9 years based on the lifespans of failed enterprises. These defunct businesses had, however, become

sufficiently well-known in their 'lifetimes' to have been recorded for posterity. The above result **compares with averages of 47.2 years and 50.3 years obtained by Questionnaires No 1 and 2** to a sample of firms still existing after 1980. (see Chapter Four)

This striking preliminary result gave the average Birmingham metal - industry firm a prospective life-span of 45 - 50 years. However, the sample contained only firms established for at least three years and many firms had been very long established. If one took as the foundation date of the longest surviving firms the same date as the start of the study period - 1780 - the average longevity of firms surviving more than 50 years was 81.4 years for the composite sample, compared with 140.7 years for the long-survivors in the heavily age- biased Questionnaire sample, without restriction of starting date. The non-typical average of the two small Questionnaire samples was 70.8 years.

This result did not apply with mechanical predictability to the existing stock of companies: it was not a failure rate (since date of foundation) for hosts of companies having similar, proscribed starting dates. It was relevant only to the Birmingham area metal trades companies, not others, nor elsewhere.

Many firms ceased trading early in their projected average longevity, never having attained a survival plateau eg: 262 Birmingham Companies trading in 1936 were reduced to 121 by 1957 and only 33 in 1969 (Stock Exchange Official Year Books' listings). *Only 12.4 per cent of this sample survived for as long as 33 years.* (See Tabulation of Sample Longevities p). These were all public quoted companies with shares traded on the Birmingham Stock Exchange.

3.2.4 Some reasons for failure

A mini-study of the West Midlands foundry sub-sector demonstrated the complexity of the forces at work behind the decimation of this major traditional branch of local industry during the past decade, and makes an interesting record both of catastrophe and of attempted renewal. (Appendix A3/8). My own research into the Barbara Smith Index in the Heslop Collection at the Birmingham University main library, highlighted reasons given by the principal directors of 1,018 failed firms in local metal industries, 1853 - 1906.

This 'saturation survey' deliberately <u>excluded</u> information from outside the trade, the area; from surviving firms; those completely changing name, selling half interest, or floated for re-purchase; also references to obituaries, retirements and cancellation of bankruptcy; those which were holding companies or purchased subsidiaries (even if old-established), or merged or amalgamated with new controlling interest, and those many other cases when there existed no apparent outcome to proceedings.

Brokers and commission agents, dealers, factors, purveyors and chapman, warehousemen, merchants, and syndicates were also omitted, as these services traded and handled rather than used and improved metals. Friendly and co-operative societies, unions, associations and clubs were also excluded.

Sources of information in the Index were annotated, publications such as 'The Ironmonger' and 'The Engineer' each providing continuous and (by their own lights) comprehensive coverage; the Stock Exchange Year Book, Parliamentary Papers; newspapers, journals, books, biographies, directories, catalogues, brochures, pamphlets, companies archives, and the records of Unions, Federations and Societies, and the London Gazette,

comprising in all over 140 separate sources.

Reasons preferred for business closures presented an intriguing permutation, headed by 'poor trade' as the main excuse: other explanations given included expiry of lease; depreciation of stock or plant; in order to settle succession to the proceeds of the business following a death or retirement; ill-health and/or insanity; expiry of patent; to repay debts (ie: incurred in an expensive law-suit); transfer of business; relocation; incessant strikes by labourers; personal and family dis-agreements; product out of date; profit-taking without plough-back; sold as a going concern, but asset-stripped, or closed by new owner whose motive had been to eliminate competition.

From the liquidator's standpoint were added such reasons as under-capitalizations, poor financial control, mismanagement, negligence, dishonesty and deliberate fraud. The common denominator of all these reasons was simply 'changed circumstance', to which each company had in some way or another failed to adapt through lack of foresight, finance and flexibility.

3.3   Official Insolvency Estimates
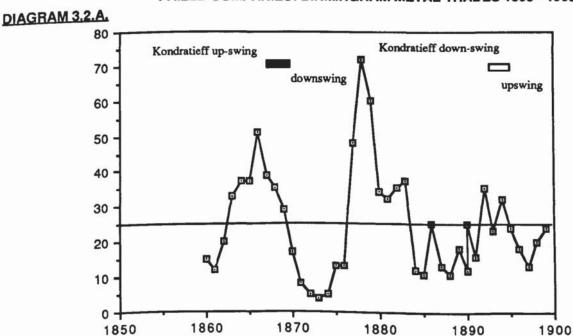
3.3.1 Decennial Insolvencies 1850 - 1899

The aforementioned groups of firms had survived long enough to be recorded, attract comment, and many to celebrate various anniversaries through publications and articles. Yet each sample was temporally isolated, not permitting, therefore, spectroscopic views to develop over decades, either of total, regional, industrial or local populations.

My own research into the Barbara Smith Index was able to remedy this omission in less than comprehensive manner, but fairly thoroughly and consistently in regard of all published

references to insolvent companies in Birmingham references to insolvent companies in Birmingham area metal trades between 1860 - 1900. During these decades an average of 250 firms failed, a figure consonant with the average 464 failed firms of all kinds recorded in the Crown Court's Register of Bankruptcies over the same period, given that the metal industry firms during these decades accounted for roughly 55 per cent of all local companies. (This assumed equal rates of insolvency over the period between metal firms and others, which could have become problematic in the event of aphasic changes in either index).

A notable deceleration of insolvencies decade by decade was a feature of the Table; and the heavier incidence in the last four years of each decade suggests a repeated wave-like motion; while closer inspection showed a moving peak appearing in the years 1863 - 68, 1877 - 1883, 1892 - 1895. Crises years also stand out clearly on Diagram 3.2.A.

FAILED COMPANIES: BIRMINGHAM METAL TRADES 1860 - 1900

DIAGRAM 3.2.A.

Source: Barbara Smith Index   Reliability: incomplete, but best evidence available

189

TABLE 3.2.B
DECENNIAL INSOLVENCIES 1850 - 1899

	0	1	2	3	4	5	6	7	8	9	Decade
1850	-	-	-	(1)	-	-	-	-	(1)	(2)	(4)
1860	15	12	20	33	37	37	51	39	36	29	
1870	17	8	5	4	5	13	13	48	72	60	
1880	34	32	35	37	12	11	25	13	11	18	
1890	12	16	35	23	32	24	18	13	20	24	
1900	(1)	2	(1)	(2)	(5)	(2)	(1)	-	-	-	(14)
TOTAL	78	68	95	97	86	85	107	113	139	131	1000

Source: Barbara Smith Index, (Compiled by writer)

3.3.2 A slight controversy of yesteryear

Rebutting a political claim by Joseph Chamberlain, MP, that the Government's recent legislation had reduced Birmingham's bankruptcies, Allen Edwards in May 1889 presented an Address to the Birmingham and Midland Society of Chartered Accountants based on his paper 'Bankruptcy Act 1883 - Its operation in Birmingham', which subsequently was published in 'The Accountant'.

Edward contrasted the figures following the 1869 Bankruptcy Act with those after the 1883 Bankruptcy Act, as they applied nationally and to local firms. Only the most trivial change was noted in the number of cases; although, it was true, losses incurred had reduced substantially in money terms. Edwards gave figures as follows:

TABLE 3.3.A

LOCAL BANKRUPTCIES COMPARED

	Sample Year	1870	1871	1872	1873	1874	1875	1884	1888
A	England & Wales	5,002	6,280	6,885	7,489	7,919	7,889	4,170	8,885
B	Birmingham	-	-	-	-	-	-	120	115

B as percentage of A in last two cases 2.9 1.3

LOCAL BANKRUPTCIES COMPARED

The low national figure for 1884 reflected industrial reaction to the end of the Franco-Prussian War, although for Birmingham this had a slightly adverse effect, possibly giving rise to political alarm, on account of the then big local involvement in armament production.

A breakdown of insolvency petitions at Birmingham Crown Court 1870 - 1883, also provided by Edwards, is shown in TABLE 3.3.B.

Compositions	174
Liquidations by Arrangement	136
Abortive Petitions	130
Bankruptcies	25
	465

Edwards remarked that there had been a large avoidance of registration through use of Compositions and Private Deeds of Arrangement. This again reminded one of the aution with which all insolvency estimates should be viewed. *The low proportion of bankruptcies to total insolvencies was notable.*

3.3.3 Chronological statistics

Official statistics for national, Birmingham and metal trades bankruptcies became available sporadically from 1869 to 1884; 1891 appears to be the first year when listed bankruptcies were published by the Board of Trade, and only from 1900 was an attempt made to provide consistent totals. The following Table (3.3.C) assembles information gleaned from Edward's references by the writer.

TABLE 3.3.C

GENERAL INSOLVENCIES

1869 Act   **1883 Act**

National		Birmingham		National
1870	5,002	1884	110	4,170
1871	6,280	1885	115	
1872	6,885	1886	139	
1873	7,489	1887	131	
1874	7,919	1888	108	8,885
1875	7,889			
Total			598	13,055
AV:			120	6,528

TABLE 3.3.D

INSOLVENCIES IN BIRMINGHAM METAL TRADES
1884 - 1888

Hardware	Jewellery	Iron & Steel	Electro-Plating	Brass foundry	Gunmakers	TOTAL
56	47	10	9	8	1	=131

Birmingham Bankruptcies averaged 1.8 per cent of the national total; metal trades in Birmingham 21.7 per cent of the Birmingham Total, (and merely 0.4 per cent of the national figure), so providing an idea of these proportions, between 1870 and 1888, on dates when sufficient information was available, eg: 1884 and 1888.

The 1884 edition of 'London Gazette' contained the following (estimated) numbers of advertisements or legal notices: windings-up under the Joint Stock Company Acts and the Winding Up Acts, 1,713; notices of dissolution of partnership, 1,472; assignments for benefits of creditors 1,588; bankruptcies, 1,129 (all for England and Wales). In Scotland, an estimated 192 company insolvencies and 282 individual bankruptcies were registered. The total for England and Wales was 5,902; for Scotland 474; for Great Britain, 6,376. Edward's national figure for 1884 evidently did not include voluntary windings-up.

Subsequently, insolvency figures became available on a regular basis in each category through the General Annual Reports of the Board of Trade Nos 1 - 26 (1891 - 1917), and pursuant to the 1908 and 1913 Companies Acts, by the Comptroller - General's Report of 1918, Parliamentary Papers No 458, The latter document provided opportunity for the writer to compile the following fragmentary schema:

TABLE 3.3.E

TOWARDS COMPREHENSIVE STATISTICS

Year	New Firms	Liquidation	Percentage	Additions	Registered
1885	-	-	-	-	8,119
1893	8,119	754	9.3%	7,365	39,053
1908	4,291	1,238	28.9%	3,053	46,418
1916	3,081	1,350	43.8%	1,025	58,229
1917	-	-	-	-	59,254
1907-16	Compulsory	1,300	3.7%	-	-
	Voluntary	17,492	49.7%	-	-
	Supervised	127	0.4%	-	-
1907-16	TOTAL	18,919	-	Average	54,146

A picture of the trends in company formations and failures became possible on the basis of statistics available from commercial sources covering 1915 - 1944, thus linking across these interwar years from mid-World War 1 to mid World War 2. Dun and Bradstreet were founded in America in 1860, and have monitored industrial failure both in the United States and in Europe, including Great Britain, for three score years and ten. Their information is in Diagram 3.3.A.

DIAGRAM 3.3.A   Company Formations & Business Failure 1915 - 44

Source: Derived from Dun & Bradstreet company registers, London.
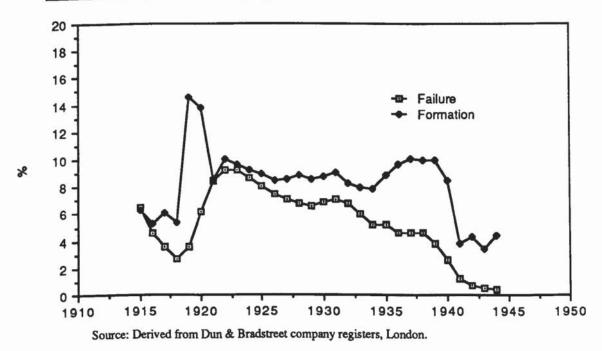
With reference to the Registrar of Bankruptcies Report of 1880, the statistician Giffen was reported to have remarked that there was no sign of a decline in either bankruptcy or insolvency. **This view of a constant failure rate applying to the business population** is corroborated by Dun and Bradstreet's analyses of statistics 1860 - 1980, as held in their Registers. Other evidence between 1915 - 1980 was kindly provided by Trade Indemnity, the UK credit insurance underwriters. Like the previous evidence, it showed **strong fluctuations of a cyclical type in the numbers of new registrations and failures,** hence of the stock of companies to which they naturally held a fairly constant proportion.[3]

My own series 1938 - 1983 is in tabular form: It comprises abstracts from several official sources for which five, seven, and ten-year moving averages were taken together with an arithmetical mean of 6,531 per annum for the whole period (cf Table 3.3.F).

3.3.4 Contemporary Statistics

Analyses of employment in various industrial sub-sectors, relating declining opportunities in metals and mechanical engineering to the disappearance of a large number of small companies 1920 - 1970, appeared in the Department of Employment Gazette, (October 1985). Strong cyclical fluctuations were again evident in the accompanying graphs, consolidating the impression that cyclical movements had recurred in output, employment, company formation and insolvency ever since records had been kept.

Trade Indemnity's records revealed a surge in the number of insolvencies 1965 - 1972, as against a more slowly rising trend in the value of cases. The statistical series 1954 - 1973 provided by the Department of Trade and Industry corroborated this trend.

Metals and engineering sector analyses 1971 - 72, showed that this sector had accounted for 22 - 6 per cent and 30.8 per cent of compulsory liquidations and 38.4 and 36.6 per cent of creditors' voluntary liquidations in these two years. These proportions varied annually; in explanation, the Department cautioned that there were some insuperable difficulties over industrial classification under the minimum list headings.[4]

3.3.5 Regional Figures

In 1981, about 22 per cent of West Midlands failures were engineering insolvencies. A single years' figures could not reliably be taken as an indication of long-run historical averages, when annual totals of bankruptcies altered so markedly from each other.

Official regional and sectoral analyses unfortunately become available only in 1984, covering 1978 - 83 initially, and

continuing. They showed insolvency fluctuations in engineering and metal-working in the West Midlands as a co-moving but lesser fluctuation that of the national. These industrial sub-sectors had been responsible for 13.8 per cent in 1985. Some retrospective averages for groups of earlier years were also calculable:

TABLE 3.3.G

Engineering and metal manufacture:

	1932-4	1935-9	1945-9
	4.4%	3.6%	6.6%

(See Also Diagram 3.3.B)

It thus appears that deceleration and accelerations in the sub-sector proportions of insolvencies may occur in relation to the national trend, and that as regions develop or decline as a whole, their company (formation and) insolvency ratios may alter. Therefore, one needed to collocate whatever could be discovered about average rates of company closure, and whether they mutated over the decades. But first, information about changes in the stock of companies seemed an essential prerequisite.

3.4. Investigations into the Stock of Companies

3.4.1 Composition and Evidence of Registers
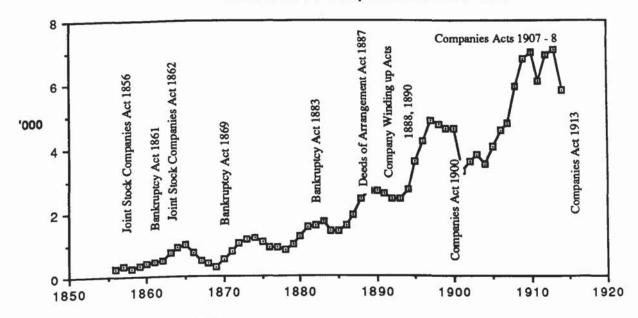
The stock of companies at any one time is comprised of exiting firms of the previous year still registered as active trades, to which is added newly registered companies formed in the current year and from which is deducted deregistered companies for that same year. The stock is therefore a residual balance of companies, at a counting date.

Historically, the stock of UK companies has continued to grow, new formations almost always outweighing cyclically - heavy insolvencies. In earlier years, the numbers of companies registering comprised a tiny proportion of the total number of firms; but as the degree of legal compulsion increased and the scope for registration widened, the coverage expanded to include all but clandestine enterprise.

The registration figures also included unspecified proportions of conversion from family enterprises, partnerships and other unincorporated forms of trading activity into the joint stock company form. Thus new registrations were not invariably new companies in business. Payne (1980) estimated that about ten per cent were already established as traders. Obviously, as new legislative opportunities opened up from time to time, the immediately following years' registration figures contained higher than average numbers of these conversions.
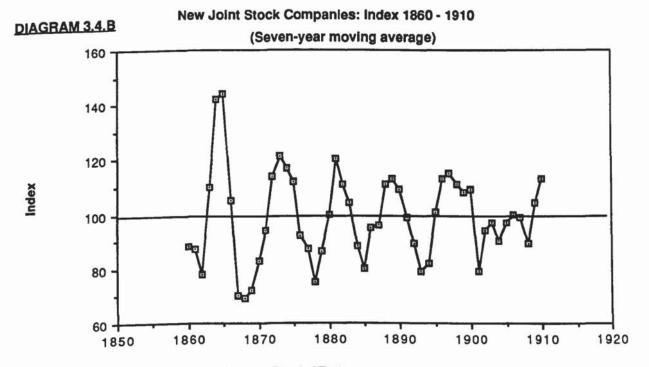
The Companies Act 1856 remains the commencing date for statistical counts of company population on a national basis. The accompanying graph (Diagram 3.4.A) illustrates the increasing numbers of companies registering in the period 1856 - 1914, and the generally fluctuating character of these registrations between a sequence of dates marking the introduction of new legislation.

DIAGRAM 3.4.A

**Nos: Companies registered in England and
Wales under the Companies Acts 1856 - 1914**
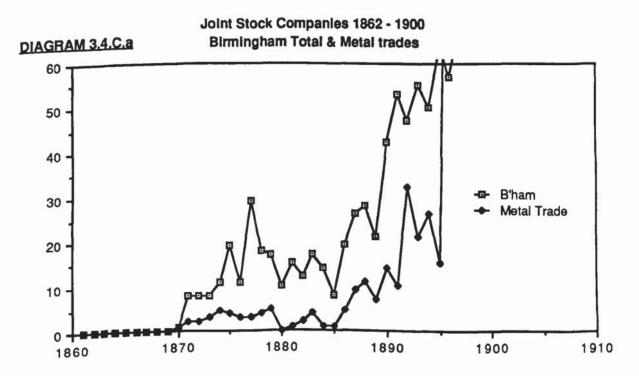
Source: Derived from P.L. Payne: The Early Scottish Limited Companies 1856 -1895
Scottish Academic Press. Edinburgh 1980 Table 9 (p. 31 Appendix)

Official figures may have became misleading by as early as 1867, for already the accumulation of defunct companies on the 'active' register had begun, and by 1880, *an Act of Parliament empowered the Registrar to dissolve over 2,750 'left-over' company entries from the previous two decades*, (about 15 per cent of the total of 18,113 registered companies). *This was one reason why insolvencies peaked so extremely in 1879 - 1881*, accentuating a sharp upward phase of the cycle of bankruptcies, accompanying a sharp downturn in economic activity at the start of the Great Depression. (See also Diagram 3.4.B).

DIAGRAM 3.4.B

New Joint Stock Companies: Index 1860 - 1910
(Seven-year moving average)

Source: Company Statistics, Board of Trade

DIAGRAM 3.4.C.a

Joint Stock Companies 1862 - 1900
Birmingham Total & Metal trades

Source: Statistical Tables 1854 - 1908. Board of Trade

National figures for the registration of public companies floated on the Stock Exchange are available from volumes of the Stock Exchange Year Book 1962 - 75, from 1875 onward also containing alphabetical lists of defunct companies struck off the public companies register. (Since the latter gave no date for foundation or flotation, nor a precise date for demise, these records were not suitable for calculating either longevity or failure rates).

The total number of companies registered per annum rose from 152 in 1862 to 8,119 in 1885, down to 6,871 in 1913, but soared upward to 59,254 in 1917. The impact of revised company law under the 1907 - 8 Companies Acts had been enormous over a decade, but many firms already registered under previous legislation re-registered under the new. Between 1907 - 1916, the average gain in new registrations over insolvencies was 6.5 per cent per annum; a total of 35,227 companies added to registered stock over a decade including several years of World War One.

The following table has been assembled from data given sporadically in General Annual Reports Nos 1 - 26, 1893 - 1918 of the Board of Trade, covering England and Wales.

TABLE 3.4.A

SPORADIC CHANGES TO COMPANY STOCK

	Registration	Liquidations	Change to Stock
1893	8,119	754	+7,873
1908	40,291	1,238	+39,053
1916	3,081	1,392	-1,025

Source: (compiled by writer)

Between 1900 and 1905, new additions to the Register were 9,158 companies, yet additional formations (when added up) were 18,226 and dissolutions of partnerships and company liquidations 14,135 - ie: a discrepancy of 5,062 companies. This difference was accounted for by a large number of conversions of family businesses into the incorporated form, together with administrative vagaries.

The Registrar to the 1886 Royal Commission on Trade Depressions reported that in 1880 - 84, some 560 of the 7,000 newly registered companies were conversions from private firms. During the first six months of 1890, about one third of those registering were such firms; and of these, around 65 per cent had anonymous titles, 35 per cent personal name titles.

The total stock of companies rose from 66,094 in 1915 to 184,610 in 1944. The rates of new company additions to this stock varied annually in the range 5.1 to 14.6 per cent of the total, averaging 8.1 per cent per annum. New company formations exceeded losses in every year: a post war formation peak in 1918 - 19 resulted in a surge of insolvencies in 1920 - 1, and in the seven ensuring years on a diminishing trend.

It was noticeable that new formations continued to exceed dissolutions on average by 2.7 per cent growth per annum, regardless of depressions altered by World War Two, when formations fell to one half but failures to as little as one tenth pre-war levels. These annual averages (formation rate of 8.1 per cent and failure rate of 5.4 per cent) 1920 - 44 corresponded with estimates for the latter half of the 19th century.

3.4.2 Recent Stock Estimates

'Companies In' series (Board of Trade, 1982) provided a summary list and graph showing peaks and troughs of new company registrations 1920 - 80; *peaks were usually followed by lesser peaks in deregistrations after about three years; troughs by a pendulum effect of increased registrations. This seemed to indicate that a rate of failure followed from formations, and that a compensatory effect followed from any decline in the rate of formation.*

The positive balance of 'starts over stops' (although regionally differentiated) ensured an increase in the national stock of companies on the Register from 96,000 to around 789,000 in England and Wales 1920 - 1980. Registration peaks occurred in 1936, 1946, 1964 and 1973, years also notable for uplift in the business cycle. Over the more extended period of 60 years, the rate of growth of the stock of companies averaged 1.3 per cent per annum, derived from formations at 12.1 per cent and deregistrations at 10.8 per cent per annum of the total stock.

At the end of 1979, the UK possessed 1.29 million businesses: 165,000 new ones had been registered and 140,000 deregistered. Analysis of 690,000 deregistrations 1980 - 84 showed that 126,000 (18.3 per cent) were in the production industries, of which 58 per cent went out of business; 23 per cent were taken over; 14 per cent sunk out of scope of VAT, and 5 per cent simply changed legal identify.

During the recent recession 1979 - 83, the Companies Register Office in Cardiff was swamped by a massive rise in insolvencies requiring de-registration of firms. During the same period, new company incorporations rose from 66,000 to a record 95,000 per annum. The stock accordingly rose from 786,000 to more than 950,000 registered companies which were active, in scope, and

had made returns. *Fluctuation in the growth of stock of companies was thus identifiably attributable to the changing differences between formation and closure - ie: to changes in their precipitation rates.*

3.4.3 Changes in Birmingham's Company Stock

In Birmingham, around 420 firms registered between 1867 - 1891; another 800 or more up to 1900. Up to 1891, approx: 38 per cent were metal industry companies, after which 55 per cent were of that kind. In the peak year of 1897, no fewer than 128 from a total of 239 newly registered firms were metal users. Registrations in the 1870's and 1890's totalled 126; 242; and 777 respectively. (see Table 3.4.B)[5]

Industrial public companies quoted on the Birmingham Stock Exchange between 1875 and the national link-up of Stock Exchanges in 1958 were numbered as follows:

TABLE 3.4.C

Nos Birmingham Quoted Companies

Years:	1875	1880	1890	1900	1936	1957
No:	4	12	25	114	74	102
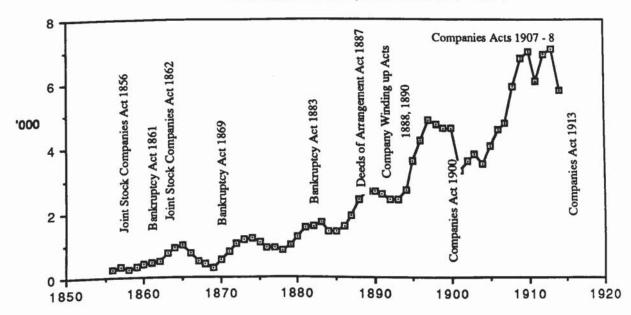
Sources: Burdett's Official Intelligence 1882 - 1898; Stock Exchange Official Intelligence 1899 - 1933; Stock Exchange Year Book 1875 - 1933 and Stock Exchange Official Year Book 1934 - 1980. (Unfortunately no trades or addresses were given).

Statistical Tables published by the Board of Trade (Cmnd 4954) in 1909 cover the years 1862 - 1900, against a graph of which have been plotted the numbers of joint stock companies registered with head office in Birmingham since 1870. The late 1870's and late 1880's show marked peaks in general firms, while the early

1890's and especially 1895 - 6 show very large rises in registered joint-stock companies, due to engineering innovations and the rise of the cycle and motor car trades. *The earlier peaks went contrary to national trends; the later peaks preceded national developments, especially so in metal trades.* (See Diagram 3.4.A herewith)

DIAGRAM 3.4.A   **Nos: Companies registered in England and Wales under the Companies Acts 1856 - 1914**

Source: Derived from P.L. Payne: The Early Scottish Limited Companies 1856 -1895
Scottish Academic Press. Edinburgh 1980 Table 9 (p. 31 Appendix)

More recent figures covering 1963 - 1978 analysed by size (in terms of numbers of employees) show how changes in the numbers of smaller firms influenced the overall composition of changes in the stock of local companies; and also how changes between size groups (caused by growth or decline of individual firms) formed a sizeable percentage of the total change in these stocks (23 per cent). A net decline of 514 firms was recorded between 1963 - 78. (See Table 3.4.D herewith)

TABLE 3.4.D

	EMPLOYEE GROUPING OF BIRMINGHAM COMPANIES				CHANGES IN STOCKS	
Year	1000+	500+	100+	10+	+	-
1963	-3	-8	-18	-354	0	-383
1964	-1	0	-16	75	75	-17
1965	0	0	21	-475	21	-475
1966	-2	-5	-16	60	60	-23
1967	4	-6	-17	-122	4	-145
1968	2	3	-12	-16	5	-28
1969	2	-5	-6	48	50	-11
1970	-2	11	1	102	114	-2
1971	-6	-11	58	-192	150	-17
1972	2	4	-7	-99	6	-106
1973	-5	-4	-18	-126	0	-153
1974	-8	-7	7	81	88	-15
1975	2	7	22	68	99	0
1976	-8	-1	-16	-9	0	-34
1977	-2	-2	-11	32	32	-15
1978	-1	8	5	29	42	-1
Total	-26	-13	-23	-452	746	-1425

STOCK IN 1962 = 2,436	**-679**
STOCK IN 1978 = 1,922	
CHANGE IN STOCK = -514	
CHANGES BETWEEN GROUPS = 165	

Source: Derived from Birmingham Historical Abstrats

Tables 51 - 58. May 1962 - 1980. Starting page 79

From a spectroscopic standpoint, **the cyclical movement of the national registrations is punctuated by volatile, contrary and explosive oscillations in the numbers of Birmingham registrations 1870 - 1900, reflecting periods of exceptional expansion.** It shows a strong local economy countering national depression and leading national development.

3.5   Historical Failure Rates

3.5.1   Testing early opinions

Writing about the failure rate of the then population of Scottish companies, Adam Smith opinionated in 1786

> *"but a very small part of the whole number engaged in trade and all other forms of business; not much more than one in a thousand."* (Wealth of Nations, Book II, Chapter III, Falkirk 1786)

But Snyder (1917) working on Dun's records for the first 1,445 American companies since 1866, (quoted by MacGregor) stated:

> *"Over a period of time, one firm in every hundred in business and one firm for each 6,000 of the population fails regularly. With all the changes that have occurred in the world of business, the percentage of failures has remained constant."*

Besides attempting a ratio of business failures to business company stock in the United States, Snyder plotted the graph of bank clearings against insolvencies and found a close correlation up to 1916.

These two estimates concerned the rate of failure of established companies: the rate of failure of newly formed companies might prove to be markedly different.

Dissolution of partnerships derived from samples obtained from 'London Gazette' 1862 - 1911 had been compiled by C G Todd (1932), as follows:

TABLE 3.5.A

DISSOLUTION OF PARTNERSHIPS

Years	numbers	Index No
1862-71	2,520	100
1872-81	2,720	108
1882-91	2,380	94
1892-1901	2,260	90
1902-11	2,050	81
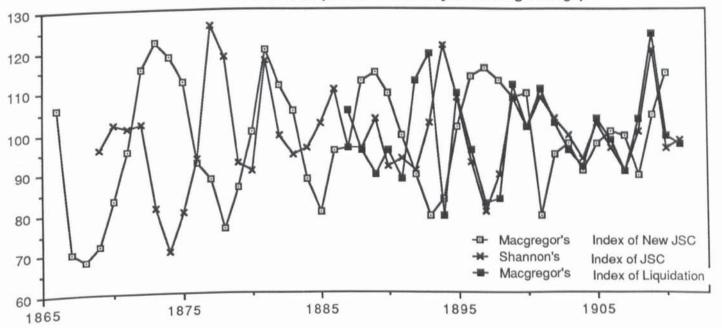
The popularity and convenience of other forms of registration obviously depended on their suitability, since numbers declined only slowly over a generation between 1862 - 1902, despite much new legislation.

3.5.2 Link with 'trade cycle'?

Foreign research aimed at finding a direct link between insolvencies and the trade cycle [Aftalion and de Foville (France) and Wagemann (Germany)] showed only disturbed rhythms and complicated figures. MacGregor's work on British insolvencies 1868 - 1910, from which he derived an index of insolvencies as a ratio of the number of registered companies (see Diagram 3.5.A) showed a 'close fit' to trade fluctuations after 1892, but not a continuously good one prior to that date. If a three-year mathematical treatment was accorded to the same raw data, the resultant time-series showed a moving average having good co-fluctuation from 1883 onwards. Insolvency appeared negatively related to employment over the whole period, but positively to prices after 1886. A degree of uncertainty persisted.

DIAGRAM 3.5.A

New Joint Stock companies & Liquidations - England & Wales
1865 - 1913 (Indexes of seven-year moving average)

Legend:
- -□- Macgregor's   Index of New JSC
- -✕- Shannon's   Index of JSC
- -■- Macgregor's   Index of Liquidation

Source: Macgregor Appendix Table C, G, and H

MacGregor remained unsure whether any clear and regular relation of business enterprise to the trade cycle existed in respect of both formation and liquidation of companies, or that this would have represented any trend of business as a whole. He thought that the significance of the figures related positively to the size of enterprise, and to the upward or downward trend in the development of each industrial sub-sector.

MacGregor's research into company formation 1865 - 1910 produced a very clear and decisive fluctuation, coincident in its turning points for employment and prices, when a seven-year moving average was used. This use of this technique clashed fundamentally with this research into date-specific failure rates of firms.

209

3.5.3 Rates of company failure: evidence

Turning to figures of survival rates supplied by Shannon (1928) and reexamined by MacGregor in his table of 737 new operating companies (1880), (as traced in 1920) about 20 per cent had disappeared almost at once; 44 per cent within five years; and 60 per cent within ten years in the period 1880 - 1920. *Their average longevity was only 6.7 years.* A mere handful had survived forty years or more, from this restricted sample stock.

MacGregor also researched what had happened to Shannon's 2,004 companies 1880 - 1929: (the total registered since 1856 and still surviving), five of which were abortive. By 1929, only 115 of the original 1,199 still existed; 622 had been liquidated; 84 reconstructed or amalgamated; 20 with 'missing' information; and 311 'inoperative'. A further 47 of the original number had been old firms which had became newly re-registered.

Shannon and MacGregor both agreed in that around 30 per cent of formations were dissolved 1893 - 1902, and about 27 per cent 1902 - 1913. *Between 40 - 50 per cent of the original quota had survived for one decade, but only 30 per cent for two.* After 40 years, only 23.5 per cent of those started in 1856 - 63 had survived; only 18.2 per cent of those started in 1880 were still active in 1920.

Some evidence of a decline in liquidation levels plus bankruptcies for England and Wales 1885 - 1913 is also provided by MacGregor (Table K p200), of which the following table is an abbreviated version.

TABLE 3.5.B

INSOLVENCY RATES 1885 - 1913
(PER 100,000 MEAN POPULATION)

Year	Number		Year	Number
1885 - 9	18.0		1900 - 4	16.8
1890 - 4	17.7		1905 - 9	16.5
1895 - 9	16.6		1910 - 13	14.1

Source: MacGregor Table K (p200)

A synthesis of investigations based on judical statistics 1865 - 1913 and upon London Gazette involving 1152 companies started in 1865, all joint-stock and registered in England and Wales, produced the following:

TABLE 3.5.C

SURVIVAL RATES FROM 1865 STOCK

Year	1870	1875	1880	1890	1905	1914	1919	1929
Duration	5 yrs	10 yrs	15 yrs	25 yrs	40 yrs	49 yrs	54 yrs	64 yrs
Percentage	44%	41%	28%	21%	16%	14.1%	11.6%	7.2%

Source: Compiled from MacGregor and calculated

Well over half the stock had failed within five years. Insolvencies in the general stock of companies between the same date had risen in line with the growth in numbers of registered companies: 164 cases in 1865 to a peak of 1,647 in 1908, and a terminal date figure of 1,464 in 1913. As a percentage of the current stock, the liquidations ran at 6.4 per cent in 1889 but this had reduced to 2.7 per cent in 1913, having displayed an overall declining but cyclical character since 1856.

A comparison table of Shannon's and MacGregor's researches into rates of failure, showing percentages and cumulative percentages over 40 years, based on 2,100 and 737 companies respectively, now follows:

TABLE 3.5.D

COMPARISON OF RESEARCH RESULTS: FAILURE RATES

Shannon (2,100)   Macgregor (737)

| Years | From 1856 - 63 | | From 1880 | |
	Per cent	Cumulative	Per cent	Cumulative
0 - 3	18.6	18.6	31.2	31.2
4 - 5	14.3	32.9	12.6	43.8
6 - 10	19.4	52.1	14.8	58.6
11 - 15	8.2	60.3	8.8	67.4
16 - 20	4.7	65.0	4.5	71.9
21 - 30	6.9	71.9	6.9	78.8
31 - 40	4.5	76.5	3.0	81.8
at 40	23.5	Surviving	19.2	Surviving

<u>3.5.4</u> **Some comparative estimates of failure**

How did these results compare with those obtained from other samples and from analysis of the stock of companies after 1865? Payne's examination of 2,936 Scottish companies 1856 - 1895 (of which 882 were in the manufacturing sector) showed that 10.1 per cent, 311 firms, had survived 114 years to 1970.

Their industrial distribution interestingly reflected almost exactly the distribution of the 2,625 dissolved companies, strongly suggesting a *statistical probability for survival holding*

valid across industrial subsectors.

A study undertaken in the Netherlands of the survival rate among 15,000 new small and medium-sized business which were set up annually during the 1970's confirmed a similar pattern of 20 per cent failure within one year, and only 60 per cent survival after five years (Europe 84 No 1 p 12) and 50 per cent at ten.

Recent research into summaries of the 159,766 UK companies registered by the Board of Trade in 1916 had shown that the average duration of a company on that Register had been 23.7 years; due to the large numbers registering in later years, the median longevity of an entry was apparently 16.8 years.

Until Registration became compulsory in 1948, very many short-lived smaller firms did not register. Thus even the most 'complete' list is in fact a biassed sample and one may hazard a guess that had all firms started 1865 - 1916 become registered, their average survival would have reduced to around 6.8 years, in line with the lifespan suggested by other research.

There had been earlier reports - such as Return No 452 (1864), covering seven years since the 1856 Joint Stock Companies Act - which gave survival percentages:

TABLE 3.5.E

SURVIVAL PERCENTAGE 1857 - 63

Year	(1st) 1857	(2nd) 1858	(3rd) 1859	(4th) 1960	(7th) 1863
Survival	84%	73%	70%	63%	46%

The average life-span of the failed half of these firms was around 3.1 years; that of the 122 failed companies from the stock of 224 registering in 1856, 5.8 years. A more optimistic return made by the Registrar to a Parliamentary Select Committee in 1867 had indicated that 2040 out of 2551 companies registered 1856 - 1862 were surviving, 511 having failed (20 per cent): a far more forbidding tale was told by J Parry Lewis (op lit), who referred briefly to 624 joint stock companies formed or projected in 1874 - 5, over one third of which never issued shares, while in 1877 (after five years) only 127 still existed, (80 per cent having failed).

3.5.5 Taking short-lived firms into account

In 1903, a Board of Trade Report No 291 suggested an average lifespan of companies compulsorily liquidated following the 1890 Winding Up Act as *approximately* four years.* A list of 52 major UK industrial organizations based on the Stock Exchange Year Book 1905, which had begun trading between 1864 - 1903, had survived on average 13.7 years: the metal - related enterprises had survived 18.2 years (only 9 firms). *All but a handful of these companies survive today, the survival longevities of 46 of them now average 93.4 years.* These rare long-surviving companies form a part of the pattern of failure rates, and do not invalidate other findings about the typical company's survival.

Reports issued in 1880 and in 1913 indicated that half the stock comprised companies registering in the previous three years. Between 1890 - 1913, 35 per cent of newly formed companies survived their third year; 20 per cent their fifth year; only eight per cent their tenth year.

Between 1916 - 1944 company formations averaged from 5.1 per cent up to 14.6 per cent of existing stock, but averaged 8.1 per cent per annum. Failures oscillated in the range 2.1 to 9.2 per cent of

the existing stock, but averaged 5.4 per cent per annum up to 1940 (ie: the stock grew on average by 2.7 per cent per annum). After 1956, the deregistration rate from an enlarged stock averaged only 1.3 per cent per annum, until a greater than 50 per cent increase in deregistrations started in 1979 - 80, accompanied by a record number of over 200,000 new registrations.

3.5.6 Latest corroborative research

Contemporary research by the Department of Trade and Industry, Business Statistics Section, published in a series of articles in 'Business Week' by Pom Ganguly, suggests variable short-run figures: but **over a span of years, about one in every twelve of the total stock of companies fails every year, but new company formation was about one in every ten of current stock. Half of new firms failed within two years, and few passed ten years and survived.** As in 1891 - 1917, so in 1959 - 82: the entire stock of companies 'turned over', on average, once every eleven years.

Regional research among relocated firms by S Nunn, DTI, (1980) had shown 89.5 per cent survival after five years (2,350 firms 1966 - 76). The death rate of inter regionally transferred companies employing more than ten persons had displayed significantly more volatility than had the birth rate 1971 - 75, remaining persistently higher. (The number of jobs provided through this aspect of regional policy had declined from 30,000 pa in 1945 - 65, to 25,000 pa in 1966 - 71, to 20,000 pa in 1972 - 75, through what he termed the 'plateau' effect).

Latest information from the DTI, who tracked 23,666 start-ups over a ten-year period 1974 - 1983, revealed *an average longevity for failed firms of 3.8 years and of the survivors of 5.7 years during this decade* - nearly all firms had failed because they were no longer making profits; very few managements sold out in order to retire on the proceeds. Thus

the high vulnerability of the majority of companies to closure for one reason or another became very apparent, and so was researched further.

3.6   The Propensity to Terminate

3.6.1   Vulnerability of existing firms

Analysis and interpretation so far have been conducted upon historical evidence as viewed retrospectively. The fate of the majority of companies and their likely longevity has become clear. The lifespans of well-established companies have been estimated, as well as those of long-survivors.

Some reference has been made to the correlation of insolvencies and other economic indices from cycle to cycle, decade to decade, over the three generations 1860 - 1980. However, limits arise to the attribution of company failure to external exigencies manifesting as statistical probabilities.

In surviving companies, *the role of management and its attitude has some bearing on their vulnerability to closure and to their chances for survival.* Mismanagement, no matter whether in times of prosperity or of depression, can induce insolvencies and kill off industries. The failure rates of companies seem to remain broadly consistent over a century, but not without reason.

3.6.2   Use of financial ratios

Since 1979, the Department of Trade and Industry has monitored the liquidity ratios of 250 manufacturing companies on a quarterly basis. The usefulness of multi-period financial ratio comparison in predicting and preventing company failure has been recognized by several studies,[6] and the monitoring

responsibilities of banks and professional advisers underscored. But ratios need to be compared carefully with those of the industry average and interpreted in the light of real events and of internal factors: they could become misleading as performance indicators and their adequacy has been questioned as a basis for failure prediction.

Dun and Bradstreet have introduced 'Dunsmatch', (for which Dr G Smith, Aston University, acted as consultant following an MBA thesis by T Taffler (1978). This is a computerised database service providing early warning of a change in the credit status of a customer through assessment of financial ratios. It is currently in use in the UK, France, Belgium, the Netherlands, and Italy, and features 'Dunscore', a vulnerability index developed from analysis of both failed and surviving firms in the mechanical engineering industry 1981 - 3.

An analysis (Taffler 1982) of the 1975 'Z - score' distribution of 1257 quoted companies in the Jordan Dataquest data base indicated that 10.7 per cent of firms were at risk. This figure confirms the results of historical analysis comprising this research, and indicates the likelihood of a continuation of roughly the same rate of failure as hitherto.

Companies undergoing current difficulties produce patterns of insolvency risk which can be analysed from traditional accounting ratios.Reference 1 Eleven identifiable risk patterns, modified by specific industry characteristics, enabled professionals to discriminate between firms which consistently do or do not display vulnerability at all stages of the economic cycle.

In 1972, the Bolton Committee of Enquiry into Small Firms had reported upon their decline. A decade later, this situation had been reversed in the North-West Region where large firms had taken to encouraging and using small semi-independent firms,

to be able to cut back on labour and overheads themselves.

There also occurred devolution through franchising and licensing and also disintegration via the use of sub-contractors and suppliers. It became easier for dominant firms to adjust to fluctuations incrementally, but when demand dropped in a recession, closures and redundancies became widespread. Sudden reversals of this type would not provide early warning of failure, and the financial ratios of the large firms would scarcely alter.

3.6.3 Matters to be considered

As a final step in the research, it therefore seemed most appropriate to question long-surviving and a range of other companies in the Birmingham metal trades concerning their subsector, activity, size, ownership, recent history, dates of reequipment and reorganization, attitudes to trends, cycles and strategic planning priorities, and in particular, how they had managed to survive so long, when so many other firms had failed.

Chapter Three

Footnote 1

An eleven-year run of figures covering the different categories was found in the 1980 Annual Abstract of Statistics, Tables 17.71 and 17.75

Footnote 2

The Census of Production, begun in 1903 and taking place erratically, gave but partial coverage of insolvencies, without analysis by size of firm or by region.

Footnote 3

National metal industry insolvencies during the periods 1932 - 49, covering the depression, prewar recovery and immediate post-war readjustment years, were cited in 'British Historical Statistics':

TABLE 3.3.G

OCCUPATIONS	1932-4	1935-9	1945-9
Blacksmiths and Farriers	23	23	4
Engineers and Founders	124	110	119
Iron and Hardware Dealers	117	69	15
Ironmongers	102	57	9
Metal Brokers and Merchants	36	20	12
Motor and Cycle Dealers	156	180	43
Miscellaneous Metal Ware Dealers	139	60	9
Miscellaneous Metalworkers	133	54	41

Footnote 4

By 1983, metals and engineering insolvencies accounted for 39.7 per cent of the total for manufacturing industry and 11 - 3 per cent of all insolvencies - a rising proportion. In 1984, the ratio of all depletions to the total UK company population was 11.8 per cent, compared with 5.7 per cent in France and 13.4 per cent in West Germany.

Footnote 5

Earlier company population of main industries in Birmingham were roughly enumerated by Timmins (1855), as an outcome of his survey (by correspondence) with local entrepreneurs.

Footnote 6

Studies by F L Patrone and D Dubois (1981), D Beaven (1982), Dickson (1983)
Steele (1984), and Aris (1985) are key works among many which expand on
these points

Reference 1

The Australian Accountant, July 1983 (p 394 - 399)

CHAPTER FOUR

Postal Enquires to Surviving Birmingham Firms

4.1   Preparatory Considerations

4.1.1   Project Concept

The main thrust evident in preceding chapters of this thesis has been directed towards establishing a numerical matrix of changes in economic variables and of dated historical events. This had been accomplished in order to ascertain whether a close relationship existed between the tempo of change in national economic activity and an available index of bankruptcies between 1780 and 1979.

In order to conclude the longitudinal research, by direct enquiry with contemporary local companies, it was postulated that <u>varying management responses to rapid economic change</u> <u>influenced the propensity for companies to survive in active</u> <u>trading</u>, and thereby also influenced the average longevity of cohorts of firms in their industrial sub-sectors.

A nul hypothesis was set up to link the historical with the contemporary:

> Companies in general do not read cyclical economic signals nor do they incorporate an appropriate proaction into their survival strategies.

The corollary was implied that:

> Companies not heeding cyclical economic signals risk to shorten their longevity.

It appeared that little enquiry has been undertaken directly with management in order to discover their attitudes to trends, cycles and strategic planning, and to ask how, in their view, their companies had survived so long when so many other had failed.

A multiple aim thus imbued this project: to remedy neglect of this research topic; ascertain whether continuing historical patterns were recognized by management to have heuristic practical significance; survey the stance taken by management vis à vis economic change in order to define causes underlying continuing survival of their companies; and in particular to categorize current attitudes and awareness in relation to economic fluctuations when it comes to planning survival strategies.

A number of assumptions were entertained which reflected my own values: that a sample of firms from sub-divisions of Birmingham metal industries would reflect majority opinion in the company population; that an adaptive, proactive, flexible management stance enhanced company survival potential whereas reactive, passive and rigid stance invoked demise; that even though circumstances beyond company control had resulted in external influences and internal pressures, management stood at the fulcrum, able to sway company fortunes by decisions and leadership, - although unable to influence whole industries or regions (unless they were monopolies - see Footnote).

Studies into entrepreneurship on one hand and financial ratios on the other seldom referred to trade cycles as a possibly major influence determining company growth and company precipitation rates. It seemed vital to enquire of contemporary management what relevance and salience economic fluctuation had to them in order to better comprehend the historical perspective, and to gain fresh insight.[1]

4.1.2 Field of Enquiry

The enquiry focuses on metal-using companies in the Birmingham area, of which more than 300 distinct classifications of activity exist as sub-headings in business directories (see Footnote).[2] Historically, the West Midlands conurbation areas of Birmingham and the Black Country have contained a high concentration of small to medium - sized firms, around 10,500 of which existed at the end of 1980.

Over 5,500 establishments are located within the Birmingham electoral, administrative, postal code and telephone exchange area boundaries, of which over 3,900 were then involved directly or indirectly in 'metal-bashing'. Despite severe contraction during the 1979 - 83 recession, metal industries in the Birmingham area remain its staple manufacturing sector industry, and form the three main sub-divisions of foundry and process treatment, engineering and fabrication, and manufacturing, with distribution services, with which we are concerned.

Each directory classification and sub-sector of the industry varies in the numbers it contains from a handful to well over a hundred companies, many providing specialist products and services within those sub-divisions. An attempt to trace ownership of firms comprising smaller entries produced no discernible pattern and it remained uncertain 'who owned whom' currently, since directory information was several years out-of-date. It was necessary therefore to confirm in the course of enquiry the current status, size, ownership and sector of each company, and to develop a highly discriminatory approach to such a large and fragmented survey universe.

4.1.3 Research objectives, strategy and design

In view of the labyrinthine complexity and multi-dimensional structure of the local metal industries, and the accompanying difficulty of containing such diversity within a single conceptual framework, it was not thought that a case-study approach would be significant or could be utilised other than in supplementary summaries. Accordingly, a standardized, general approach was adopted for implementing the aims of the enquiry and a number of sub-objectives were specified to facilitate grouping of questions.

An information objective was to obtain details about each company, its main activity, legal status, size, and a short chronology, followed by an assessment of how progressive each was in terms of patents, new technology, and recent internal reorganization, and to what stage development had reached. This information served as a reference grid for discriminating between answers to the first main research question asking about how companies had managed to survive so long, when so many other had failed.

An essential, second objective was seen to concern how each correspondent manager viewed the practice of his company with regard to interactions between economic events and the internal strategy planning process. It seemed important for managers to state how they rated information about economic fluctuations, trends and cycles, and how each business had been influenced by successive booms and financial crises: how, also, managers understood the research questions, and responded.

A corroborative objective of a standard format of enquiry was to derive evidence about company formation, survival longevity, the dates of recent peaks and troughs of economic cycles in the metal industries, and whether investment had occurred pro or anti-cyclically. A final objective of using a common framework was to obtain an overall picture which might help verify that the research design had been adequate to obtain the required opinions in their context.

A strategy was required that would result in the objectives being fully met in a relatively short space of time, for answers spread over different phases of a cycle might become invalid through changes in contemporary events affecting the views held by managers; or indeed, the survival of some of my respondents.

A census-type survey seemed out-of-the-question for a one-man operation; selection of some fifty local firms and obtaining access for formal, but open-ended interviews would have most likely produced a fascinating wealth of unrepresentative material; a leaflet 'drop' over the central core of industrial Birmingham requesting interviews might have produced adequate random response, but without any assurance that firms surviving in those areas still represented either the organic and historic growth of metal industries or their present geographical disposition.

It seemed most important that the sample should represent the current industrial structure 'across-the-board', and that my research procedure should taken this fully into account. A postal enquiry using a standardized questionnaire offered the best solution.

4.1.4 Status of the exploratory model

Substantial advantage of objectivity derive from the use of a questionnaire as a vehicle of enquiry: one may explore the subject area and the respondent's responses at a distance in space and time, calmly, and in detail. The respondent is not disturbed from his normal perceptual routines by sudden implantation of alien notions, and can consider replies carefully, research company records, reflect upon presentation and so on.

Set against this is the rigid, non-interactive nature of a written questionnaire, and the impossibility of any mistaken meanings of communication being immediately rectified, as in tape-recorded, verbal, face to face interviews. Subtle expressions of opinion are not always apparent from written replies, and therefore implications may be missed by the researcher in interpreting the answers.

The written format does lend itself to analysis and the calculations of proportions and percentages from aggregating answers, which can all be checked as they form a permanent record, moreover one in which anonymity and confidentiality may be guaranteed, and in which the respondent invests no personal risk or commitment.

Some respondents may be deterred from a constructive reply because the pre-set questions are felt not to apply to their own companies, and no interviewer can 'prompt' on the spot with a relevant alternative question. Some may feel unduly constrained by the alternatives provided by 'tick-the-appropriate box' questions, and/or by the small amount of space allowed for opinions.

Among other disadvantages of a postal enquiry are the psychological ones: lack of motivation to reply; no interest in the enquiry; inconvenience factors; embarrassing nature of some questions in the company's current predicament; difficulties in understanding what the questions mean or relate to; set ideas against students and researchers who send out impersonal questionnaires; belief in the uniqueness of their enterprise, and thus the inappropriateness of the questions in a standard format; illiteracy and innumeracy; laziness of respondents who minimize replies; unreliability of respondents who reply on the basis of what they guess the answer should be, or what is being sought, rather than on a factual basis.

Absence of an appropriate category may deter some respondents from completing answers to some questions, thus giving rise to a cumulative form of information loss when a whole sequence of questions is involved. When repeated over a number of respondents, such an occurrence may distort the pattern of reply and somewhat invalidate the enquiry. Fatigue may also bring about a tapered response to later questions, and therefore the number of questions must be restricted.

A deliberately planned sequence of questions superimposes a framework of thought and may lead to increasingly contextual answers, advantageous when carefully followed, but possibly misleading if there occurs an early lapse of understanding. With written replies alone, there is no means of clearing up ambiguities beforehand, so clarity of question is of paramount importance when lucid answers are preferred to more generalized responses. One had to eliminate bias as far as humanly possible within the ambit of one's intention.

4.1.5 Testing the Draft Questionnaire

Taking the above stipulations into consideration, a draft proto-type questionnaire was tested first among colleagues on the Aston University doctoral programme; modified, typed; then tried out on managers in the metal-stockist sub-sector (who were excluded from the eventual final version which concentrated upon metal-using firms only).

The questionnaire consisted of an admixture of tabulated answers, yes/no ticked answer boxes, one-word replies, numerical responses, and also several open-ended spaces for unguided subjective replies. Each question probed the knowledge of the manager and invited a specific response in most instances. Care was taken not to lead respondents in their normative replies, and to allow them to approach each question neutrally, even when a 'filter' series was involved.

Some revisions were made to the draft before Questionnaire No I was printed ready for distribution. As far as possible, it was planned to achieve a single unambiguous reply with full understanding at each stage of the sequence of questions. If non-response prevailed, this would indicate some mismatch between intention, question format, and the perception of the respondent.

It may have been the case that certain questions had never been previously considered by the respondents and therefore did not constitute part of their 'norm': or maybe hard experience precluded a polite answer. Incomplete response arose when an answer to the first part of a multi-stage question was negative, and therefore what followed became non-applicable.

A note on question formulation and answer recording is found in Appendix A4/7. Altogether, twenty minor amendments were made as a result of the prototype testing manoeuvre; they helped ensure a more easily read and completed format, the elimination of some threatening types of question, and working and content acceptable to all representatives of the metal industry who had been approached. The pilot survey which was to follow could then prove its worth, allowing both numerical analysis, descriptive summary and interpretative synthesis. It did rely upon the veracity and accuracy of recall of the respondents, who although occasionally unreliable as individuals, together painted a worthwhile picture. The addition of a question concerning name-changes made by a company helped avoid duplication; and ensured that continuity of identity, selected as a criterion for measurements of company lifespans, was maintained, (although a pledge of anonymity was upheld in writing up the results).[3]

4.1.6 Strategy and Sample Design

A strategy was required whereby a representative sample typifying a stratified, highly fragmented industry could be reasonably obtained. The postal enquiry conducted on an appropriate scale seemed to offer opportunities for carefully segmented distribution of the Questionnaire No 2, comprising the main enquiry. The pilot survey, Questionnaire No I, was scheduled for all centenarian companies in the metal trades listed in The Birmingham Directory 1982 (correct at 1980). The latter distribution would obviously result in heavy bias due to the longevity of long-established firms comprising the sample. Therefore a balanced distribution was sought among contemporary companies selected by a systematically quasi-random method for Questionnaire No 2, so that more meaningful aggregation and averaging could occur.

By itself, this attempt to obtain a typical sample of opinion from a segmented list of companies did not rule out saturation coverage, when desired, of any particular sub-sectoral sub-division, provided that the numbers of respondents were not disproportationate to the totality of respondents. Neither did it seem to prohibit excursions outside the designated survey area in order to obtain comparative mini-samples from firms having a different history and environment, or of a size very rare in the Birmingham sampling population due to different traditions of ownership. The questionnaire already contained several checks in relation to identity, location, category, and it would be useful to be able contrast results from various sub-groups.

The research design next involved a sampling framework, which, when implemented, could fulfill the criteria of randomness, adequate representation of firms in the main three sub-sectors, cohesiveness, comprehensiveness, and therefrom objectivity in the sense of lack of deliberate bias in selection, weighting, or quantity.

Since the aim of the enquiry was to establish a confirmed level of opinion and not to calculate a probability of occurrence or representativeness within the sample, a non-probabilistic method recommended itself from the available range of techniques (cf: Bailey 1982 Ed - Overstein and Phillips 1978)

4.1.7 Sampling Framework

Randomness of company selection if unsystematic might result in suppression of important sectors and specialisms. The quasi-random (Reichman 1981 Ed p 249 - 51) method adopted - that of dividing the Universe by the number of specialist categories, and taking the nth firm in each category (possessing at least n firms) ad seriatim and across categories until the entire list of 301 classifications - now reduced to 46 sub-sets - had been exhausted - produced a sampling population but one not entirely free from lack of representation of small but possibly significant sectors in terms of size of firm and economic importance.

A quota sample would have involved too large a population to handle: statistical procedure required only a 1 - 1.5 per cent sample, ie: around 40 - 60 respondents, in order for it to be representative. The research aim was to obtain a stratified sample sufficiently reflective of the industrial structure to be judged 'typical'. It therefore had to represent each of the main sub-groups as near proportionately as events might permit.

The geographical dispersion of this sampling population derived from the areas where large numbers of firms in the same categories existed, and was arrived at purely by chance. The longevity of the selected firms was not evident from any directory list, and therefore the sample was without bias in this respect also.

Questionnaire No I, on the other hand, approached firms whose learning curves were long-established reflections of their processes of growth and development, and it could be said that they had evolved through a succession of organizational strategies and structures before reaching their present situation and condition. Many might be established in areas no longer traditional for their activities, or have moved to new industrial

231

estates.

The contrast of responses from both questionnaires enabled one to capitalize on these differences and perhaps to isolate characteristics which are a function of survival longevity. At all events, ancient firms linked long-vanished historical populations with contemporary companies trading in the same general area, thus providing continuity by dint of their survival, and extending the validity of the postal enquiry retrospectively into byegone eras.[4]

4.1.8 Typicality and Enumeration of Response

It had already been recognised that the selection method might by-pass small number of companies entered under highly specialist or little-demanded classifications. A further dimension to the sampling population was clearly the ratio of responses to non-responses, in this case 68 : 265 (Total 333). A number of envelopes were returned 'Ceased Trading'; 'Present Address Unknown', or 'Gone Away', indicating lapses since collection of the directory information.

It was also realised that the declared main activity of the respondent company may have altered over time so a question was devised to clarify the position. Around 229 firms simply ignored my circular, for whatever reason. One had no means of knowing whether the 68 respondents were representative of the 250 non-respondents. Replies subjected to analysis and interpretation were received at random from only 21.4 per cent of the actively trading sampling population - normally considered an excellent rate of response in commercial practice, but in academic terms, it reduced this sample of the company Universe down to 1.7 per cent - just adequate. (A breakdown of the Questionnaire No 2 (Q.2) distribution is found in Appendix A4/3, of Q No I response in Appendix A4/4).

232

In addition to the response profile not covering that of the distribution, the questions put to respondents were not invariably answered. Non-replies were counted in the numerical analysis in order to afford the reader a balanced picture, and to pinpoint areas of difficulty encountered by respondents. It was thought nevertheless that a sufficient response from a broad enough spectrum was obtained to permit one to impute 'typicality'. Non-response may also be 'typical'.

Inclusions to the distribution of Questionnaire No 2 (detailed in Appendix A4/3) related to foundries, small assisted 'debutant' companies, and to large national civil engineering contractors. Although these inclusions perverted the statistical normality of the sample, they enhanced its balance and typicality; and these additional inputs resulted in a proportionate response entirely in keeping with the bulk of the survey. Each stratum to which distribution had been directed contributed a response in the range 5.9 per cent up to 38.5 per cent of the potential, according to the large or small numerical strengths therein.

Invalid responses - incomplete (or sarcastic) - were received from one respondent for Questionnaire No I and five for Questionnaire No 2, and excluded from analysis. The remaining valid replies, 24 and 44, provided a reasonable coverage from each of the main sub-groups eg: foundry/process; engineering; manufacturing fabrication, assembly and production.

Five companies had politely refused to answer, since they declared that the format was wrong for their sort of enterprise; one other declared that the requested information was 'confidential' to the company (although confidentiality and anonymity had been guaranteed); two more simply said that they were unable to reply; finally, one company said that their Questionnaire (No I) had come at absolutely the wrong time of year . (March 1985). A further company sent their company

233

history unsolicited; two returned envelopes with double postage to pay; three apologised as they were involved in take-over bids; one late response was received, too late for inclusion, but also invalid.

4.1.9 Methods of Appraisal and Analysis

It seemed clear that the numbers of valid replies received were sufficient to fulfill the information objectives in the three main sub-groups. However, an alternative was needed for presenting a numerically - reduced but nonetheless qualitative appraisal in respect of the essential objective; - viz, an appraisal of managers' opinion about the occurrence of consideration of economic fluctuations, trends and cycles in the formulation and monitoring of business strategies in their own companies; then the coordinate of differing opinions into a meaningful form of presentation.

While further surveys might reinforce the original data, they could not assist in analysis or interpretation: one needed a practical solution to the double bias of both individual perception and subjective response of both manager and researcher. The use of Likert Scales to present the spectrum of opinion and bi-polarised Descartian Scales to plot the intensity of any view both depended upon the range of values placed by the researcher on the respondents' replies.

The clustering of responses for each sub-group within the ensuing diagrams served as a rough guide to their qualitative aspects. The frequency of entries within these clusters lent a quantitative measurement to the qualitative, visual effect, from which comparative tabulations and synthetic ideograms might be derived.

In this indirect manner, quality as perceived by the researcher could be presented quantitatively, and an industry viewpoint

constructed to assist in interpretation of the survey information. Indeed, several such interpretations could usefully be juxtaposed within a neutral framework so as to present either numerically or graphically a composite picture of qualitative characteristics.

There appeared to exist no relevant means of testing the reliability of managers' opinions other than the general impression given by completion of the replies; and such qualities as may have become apparent through analysis of vocabulary and handwriting, as to the character of each respondent. Neither could one verify opinion by means of cross-referenced information and 'hidden' double questions, as one had done with factual question and answer entries. **One could but form a tentative view from one's residual impressions, the accuracy of which may be felt but not tested empirically.**

Analysis of questions requiring factual answers was achieved numerically and any relevant percentages by means of simple calculation with reference to the sample population and the numbers replying or not to each query. Some of these 'counts' lent themselves readily to pictorial presentation as histograms, pie-charts, bar-charts and 'snow-flake' diagrams when it was thought that interesting comparisons could be made between the sub-groups and between sizes of company.

Nevertheless, one recognized that any one company experience of movements in the economy of interest to them would tend to be seen through the focus of their specialisms, reinforcing their learning patterns and cultural responses. The dimensions and types of their immediate product-markets would also provide a variety of feed-backs according to their characteristics; further, the career-patterns, relative permanence and maturity of their managers would also influence *their* interpretations, thus their recollection of these events, so producing a veritable kaleidoscope of perspectives, yet further distorted by the memory-distracting factor of long-survival.

Given this heterogeneity and unverifiable character of replies involving managers' views and opinions - even those of Company Secretary - the simple and practical expedient was adopted of grouping replies together which seemed similar; thereby a rough consensus was derived from each of a series of sub-aggregations.

Any convenient form of tabulation or graph would then serve to cross-connect collections of opinions with averages derived from cohorts of facts, one was able to view the outcome of a mixed set of questions on a common basis, yet retain the ability to disaggregate to the level of sub-groups. Both plurality of questions and multiple sources of replies could be intelligently cohered together.[5]

4.2 Points arising from analysis

4.2.1 Questionnaire No I

It was evident from answers to question one that activities of long-surviving companies did extend into every branch of the industry. By far the most common category of ownership was that of the private limited company three out of four group

subsidiaries were in the manufacturing sub-group (or category).

All but four of the fifteen manufacturing companies owned freehold sites and all process and engineering companies likewise. None attributed this taken-for-granted fact as one reason for their long survival, *all preferring product-centred or managerial explanations.*

Question four confirmed the correct location in Birmingham of all respondents, except one case of the registered office of the local plant situated in Glasgow. Products of this group indeed consisted mainly of metal, as corroborated by all but one reply.

Automated methods were less than universal and robotic technology in a one in four minority. *More than half the firms thought that some or a few of their products might be replaced by non-metal substitutes.* Individual answer patterns varied, the engineering companies showing less interest in innovation than did the manufacturing, possibly explicable by the specific production methods involved in each case.

In general, question five revealed a moderate profile of technological commitment but higher awareness of possibilities, although *only one third of all firms held internationally recognised patents,* which therefore had to be discounted as a universal ingredient of long survival. *Frequent or continuous modernization,* on the other hand, *was often quoted as a reason for a company surviving the severe recent recession.*[6]

4.2.2 Historic components

Company histories were avowedly possessed by ten respondents, who provided details of year of publication and the anniversary which this marked. Nearly all knew the date and place where their company was started; by whom incorporated and with what original products. Only five were publicly floated

companies: ten firms had somewhat changed their name since then, while retaining legal identity and continuity as a company. Fifteen had undergone fairly recent reorganisation and had installed new technology and equipment in the past three years. One had not done so since it began.

A three to one majority of firms agreed that the Chandler thesis of three stages of development control applied to the development of their own company, and nearly all replies identified which stage they had then reached. Most contradicted, queried or ignored the proposition that development passed through a sequence of policy emphasis, yet seventeen were able to identify exactly where their current policy emphasis lay, and this seemed connected with their size and the nature and scale of their operations.

Replies from several firms indicated that the categories in the development sequence were neither mutually exclusive nor successive, but could recombine in differing orders of progression, according to their actual experiences. In general, larger companies agreed on the developmental sequence far more readily than did smaller ones, especially with regard to policy emphasis. One suspected that survival of both larger and smaller firms had more to do with having learned how to survive than with the succession of current necessities involving policies. But did this knack include active consideration of the essential objectives of the questionnaire?

4.2.3 The question about survival

Answers to questions concerning survival were extremely varied and individualistic (see Appendix A4/4). Simply, they underlined the value attributed to a flexible, adaptive, cautious but progressive and intelligent approach to each specialized field of business activity. Failed companies may have displayed similar characteristics to these survivors, but had somehow become deficient over time in one or more essential, and so came to their downfall (Goldsmith and Clutterbuck 1984).

Replies about survival from these 24 centenarian Birmingham companies belied the oft-repeated contention that old age and rigidity are synonymous: on the contrary, a proactive attitude predominated, with emphasis upon new ideas, products, technology, markets and a search for excellence both in quality of product, relations with suppliers and service to customers. Managerial responsibilities to all stakeholders figured largely as reasons for survival, coupled with determination to win.

Company Secretary replies about survival are summarized under four headings - product, technology marketing, and management. Causes of survival cited in relation to products included pioneering new materials and exclusive product designs, and pride in the quality and range of goods produced. Those related to technology included continuous investment in innovation and use of patents and licences.

Those related to markets and marketing included competitive development of new and replacement customers in order to keep a large, stable or expanding network: good service, right prices, and kept deliveries were seen as equally important, second only to ability to withdraw from declining situations.

Management qualities made up the fourth element, including flexibility, foresight, adaptability, hard work and keenness (also family involvement and 'Christian attitudes', plus the 'protestant work ethic'). A prudent, conservative approach to expenditure, wages, investment and the optimum size for an undertaking, with profits more often ploughed back than distributed, were quoted as concomitant virtues.

Condensing these replies exaggerated their self-congratulatory aura, and one wondered to what extent these idealised self-images were matched by the historical reality of what occurred and what <u>was</u> responsible for survival? *Absence of even some of the above factors could arguably lead to a non-survival situation, given unforeseen change or threatening circumstances, and inappropriate reactions.* It became all the more vital to examine company management's views regarding economic cycles, trends and fluctuations in relation to their actual practices of strategic planning.

4.2.4 Economic factors in strategic planning

This section of the Questionnaire provides a crucial link between management attitudes underlying performance for survival, and happenings changing economic variables in the business environment. It assumes the typical company studied at Management Centres, where strategic planning does occur, rather than the typical firm in the company population, where no such preoccupations dominate. In the case of long-surviving firms, all but one respondent attempted answers to these (page 3) questions, but the replies tapered sharply.

Twenty firms coordinated policy from a central office, nineteen undertook internal forecasts, only twelve made regular predictions about trading conditions for their industry and region, and but six of this sample undertook their own

projections regarding the future state of the national economy. Statements about the time periods covered by these activities had so wide a range that one wondered if the questions were properly understood, or perhaps careless replies were given. Some probably confused fluctuations, cycles and trends.

Those firms displaying high explicit interest and/or altering their expectations greatly in line with their perception of regularly monitored business cycles were a small minority. The opposite approach was the firm which abandoned economic projections, replying optimistically upon 'appropriate reaction' rather than intelligent anticipation.

The majority of respondents considered economic fluctuations as part of an on-going review rather than explicitly in relation to their strategy plans, but seven firms considered them unimportant. Six companies did not at all alter their companies' expectations through recognition and monitoring of business cycles; so one wondered how they insulated themselves and why they undertook the exercise in the first place?

Perhaps their size limited them to local environments. **Half the sample did admit to modifying their expectations greatly or moderately** - a result which neither confirmed nor denied the nul hypothesis of this Chapter, and with it the assumed link with longevity.

In fact that these companies had survived many a cyclical fluctuation with or without a strategic plan, or one which took them into account, had obviously been adequate under past trading conditions, but this was not necessarily any longer the case in a more turbulent, restrictive and competitive modern environment.

It could be argued that statistics showed fairly constant rates of company formation and failure over spans of years, regardless of management attitudes. On the other hand, long-survival or short survival might still be considered a function of management attitude and practice, perhaps more important during the first decade than subsequently, when greater strength and stability had been obtained and an optimum size and profile for the business decided upon. The element of good luck, and its deliberate cultivation, may have played as important a role as good management in its many disguises, (or bad management which had not yet met its 'armageddon').

4.2.5 Relevance of Macro-Economic Changes

The majority of firms had some interest in the relevance of macro-economic changes to their own activities, especially in relation to product-markets. This interest appeared to be related to the scale of a company's operations[7] rather than to the underlying, forward-looking strategies, and tended to be confined to narrow time-horizons. (These economic fluctuations thought to be of uppermost interest are itemised in Appendix A4/4).

Some Company Secretaries recognized periodicity in the recurrence of short-term trends, but *very few acknowledged the existence of cycles as an idea having salience and strong relevance, mostly on account of their lack of reliable predictability or regularity.* This attitude may well reflect short-term reality and a myopic preoccupation with reactive necessities, or it may reflect genuine experience of the need for flexibility in exploiting long-term commercial opportunities.

Indeed some resistance was detected to implications of mechanical periodicity in both comments and the higher incidence of non-replies to these specific questions. Perhaps some managers saw a threat to their self-confidence in the suggestion implicit in the Questionnaire that there were longer-term perspectives to be taken into account rather than habitual quick reaction to continuous change under the banner 'we can handle each situation as it arises.' Question 11 challenged accepted notions about entrepreneurial spirit, capability, personal knowledge, etc and revealed very nicely a spectrum of attitudes.

Opinions about the predictability of cycles were about evenly balanced in this sample: those concerning trends favoured an image of a constant tendency, rather than any pattern of periodic alternation. One third of companies entered 'no reply' to this question (11c). One half of the sample gave opinions as to what caused the cycles in which their companies were most interested. Clearly, those disinterested would not reply. Answers were divided between four categories: financial, economic, industrial, political (Full summary in Appendix A4/4). *It appeared that the nature of each business strongly affected the selection of answers and excluded wider considerations.*

4.2.6 Comparison of Q I with Q 2

Questionnaire I was a pilot study for Questionnaire 2, within the larger sample of which separate analyses were undertaken for the main sub-groups. Comparison of results obtained by these two surveys revealed both similarities and differences, one confirming and modifying the other. Both focussed on the management view of company practices in relation to economic information form the standpoint of surviving firms, although survival longevities differed enormously. No attempt was made to track down managements of recently deceased

enterprises in order to obtain alternative samples of non-surviving companies. A comparison of results from surviving firms at 1985 which had been founded before 1980 now follows (Appendix A4/9a,b).[8]

The immediate aim of the comparison was to isolate the longevity factor differentiating replies from Q I from those of Q 2, and to do so far as many variables as possible. The most obvious step was to take the majority score from each topic, convert it into a percentage of the total replies, and subtracting Q I percentages from the average of the three groups in Q 2 percentages, derive plus or minus 'scores' for each question which could be treated in this way. (The result forms Table A4.1.A in Appendix A4/9b)

It appeared that the longest surviving companies were more often in private limited company form and were more likely to own their premises freehold than the main group, which in turn possessed more patents and more recent technology by a small margin.

Understandably, long-lived firms had not reorganized themselves as much quite as recently as others, while at the same time their past-loadedness enabled them to recognize stages of evolution and development much more readily.

They coordinated policy more often from central offices than more recent companies, made slightly more forecasts but a great deal less predictions, or reliance on predictability. They also produced fewer internal projections as a group, according to the majority count.

Both Questionnaires produced identical results regarding whether companies considered economic fluctuations when planning strategies for survival and prosperity: half did, half did not. The longer-established companies were less inclined to think that trends repeated at intervals, and were less inclined to modify their expectations since they were more inclined to believe in the regularity of cycles than were their younger counterparts.

Differences between answers to Q 1 and Q 2 seemed evenly distributed, and distributed according to the older or younger character of the companies in each sample. It was quite remarkable that firms from the same area should vary so much as they did in these two groupings. Yet the differences in establishment and perception in favour of older firms, and modernity and progressiveness in favour of younger firms simply confirmed what one might expect: they did not explain longevity or link it with a 50:50 situation regarding the effects of economic change upon the process of strategic planning. (Appendix 4A-8')

4.3   Interpreting the Evidence

4.3.1   Longevity of subgroups per size of company

Utilising size information to divide Q 2 sub-groups into clusters of small, medium, large and giant firms according to the standards set out in Appendix A4/3, and dividing Q 1 companies into a 'basic' group of ten firms and a 'finishing' group of fourteen, one was able to draw up a further illustration of longevities (Table A4/2), Appendix A4/10.[9]

Table 4.3.A

Survival Longevities: Totals and Sub-sectors

Q1	Nos.	Years
Q1a	10	145.9
Q1b	14	133.5
Q1	24	144.2

Q2

Size	Nos.	Years	Foundry		Engineering		Manufacturing	
Small	16	30	6	36	4	24	6	29
Medium	11	57	5	69	4	66.5	2	26.5
Large	4	47	2	47	2	47.5	0	-
Giant	9	63	2	142	3	59	4	65.5
Total	40	50.1	15	73.5	13	49.3	12	40.3
Q1 + Q2	Nos.	Years			See also Appendix A4/11			
Sum	64	78.8						

The relevance of size to longevity thus stood starkly apparent, as also the variations between sub-groups, yet inadequate size data was available for long-surviving companies;[10] (although enquiries had shown one giant, one large, two small and twenty medium-sized companies to probably be the case).

It was natural that giant firms at twice the longevity of small firms should have taken time to develop to their present size. The average longevities of sub-groups also reflected their varying antiquity as industries: *the average manufacturing firm started after World War Two; engineering in the mid-thirties; foundries before the First World War.*

The average longevity of medium-sized firms was a decade longer than that of large companies (perhaps insufficiently represented in the sample).   This suggested that a non-progressive sequence might have arisen due to some firms launched in the depression years of the late 1920's and early 1930's not growing so fast or from such a firm base as other firms started in recovery phases of the business cycle in later years.

Medium-sized companies might equally well be better adopted to their niche in each industrial sub-structure, and deliberately kept to an optimum size. Alternatively, trading conditions in 1979 - 80 may have discouraged firms from natural expansion. Thus size by it self bore a tenuous relationship to longevity, having a stronger connection with policy.

4.3.2 The Management Quotient

Changing environments might be expected to influence the size, organization, and strategies of companies, themselves the outcome of policy decision-taking by management. The growth and development of a firm will reflect a succession of actions resulting in the acquisition of patents, introduction of new

technology, reorganization of structure, and involvement with particular policy emphases. Innovative products, successful marketing, good service to customers might reasonably lead to higher profits, growth, development, acquisitions and expansion.

Changes in the business environment may equally be expected to modify outcomes, and management *may* therefore take economic fluctuations, trends and cycles into account when forming their business strategies. An extended time horizon might reveal patterns of movement in the economic variables of interest to particular companies, in line with the practical need of each business.

Some managements may take pre-emptive or precautionary action with regard to the timing of investment, product innovation, marketing promotions etc. Others will deal actively with events as they arise, yet others will lag in their reactions, and some will apparently stay inert.

Management was seen to adopt a variety of styles and stances, modifying the company/environment interaction, and possibly influencing company lifespans. A profile of the industry would need to include the x factor, or management quotient, in order to possess some explanatory value. Preferences had their part to play, in the moulding of resources to achieve desired goals.

4.3.3 Constructing an Attitude Profile

Question 10 dealt with *practices* of companies in regard to changing economic indexes of those variables of practical use and interest to specific enterprises. Question 11 dealt with the *signal awareness* of management, from which an evaluation of stance or attitude could be derived in conjunction with Question 12, which dealt with *recognition* of booms and slumps affecting particular companies in the past few years. A Bayesian scale matrix of these three items comprised a composite management *attitude* - (which could be dis-aggregated into sub-groups and size of companies in the case of Questionnaire No 2, comprising nearly two-thirds of the sample population.)

It was assumed theoretically that the practices of policy coordination, internal forecasts, industry predictions, and economic projections would have equal relevance but enjoy differing time horizons. It was found that the higher sophistication and longer time-spans and wider scale of the latter activities compared with the former produced a strong downward trend in positive answers matched by an upward trend of negative replies as the sequence of questions was followed.[11] This was confirmed by both Q 1 and Q 2 and its sub-groups, and revealed an average time horizon of only one year, in ranges of between three months and ten years. (Non-replies remained at a constant level for Question 10).

By summing the positive scores and dividing by the sum of the negative scores one found a quotient which could then be expressed as a percentage of the number of respondents and converted again to its natural proportion: a 'q-score'.

249

This procedure was applied to analyses of answers dealing with awareness and recognition, (also extensible to include sub-groups in Q 2). As a result, one had available 'q-scores' for management response to Questions 10, 11, and 12 which quantified these qualitative inferences, and provided an overall numerical estimate of management attitude.[12]

Table 4.3.B

Management Profiles

Q1	(Nos. 24)	Q-Score %
q10	Practice	12.1
q11	Awareness	13.4
q12	Recognition	9.2
q10 - 12	Attitude	34.7
Natural conversion		65.3

Q2	(Nos. 40)	Q-Score %
q10	Practice	7.8
q11	Awareness	15.7
q12	Recognition	15.4
q10 - 12	Attitude	38.9
Natural conversion		61.1

Interesting and clear contrasts emerged as between Q 1 and Q 2 and the answers to Questions 10, 11 and 12, the higher Q-scores indicating more positivity than the lower. (The percentage quotients did not represent proportions of an absolute score of zero or 100, but simply provided an internally neutral standard for numerical comparison of qualitative attributes as revealed by response rates, both positive and negative, made by actual numbers of respondents in the sample populations).

4.3.4 Observation of Attitude: Q - Scores

Progressive lengthening of time horizons and increasing frequency of positive replies - correspondingly decreasing frequency of negative replies and of non-replies - were noticeable within sub-sector matrices as size of respondent companies increased. This indicated a better suitability of the questionnaire approach, the explicit value assumptions, and the actual questions to the larger organizational structure administration, than in general to the smaller.

TABLE 4.3.C   Differential Attitudes

Q2	(Size)	Q-Score %
16	Small	32.2
10	Medium	35.1
4	Large	21.8
10	Giant	20.3
40	Total	109.4
Average		27.4
Natural conversion		72.6

Q2	(Sub-group)	Q-Score %
16	Foundry	40.6
13	Engineering	51.5
11	Manufacturing	28.2
-	-	-
40	Total	120.3
Average		40.1
Natural conversion		59.9

Differences in managerial attitude between Q I, Q II and Q II analysed by size and by sub-group were thus detectable: this confirmed the relevance of these considerations to determination of attitude.

TABLE 4.3.D

Summary of Attitudes

Q	Category	Q-Score	Longevity
QI	Centenarians	34.7	144.2 yrs.
QII	Total	38.9	50.1 yrs.
QII	Size	27.4	
QII	Sub-groups	40.1	See Appendix A4/11 Diagram A4/1

At appeared that medium-sized companies and engineering sub-groups found that the questionnaire had least salience and relevance, and responded least actively to the questions forming the components of 'attitude'.

The relative attitude 'q-score' of the long-established companies was 4.2 relative points more positive than that of the main sample. (nearly 11 per cent absolute difference). A detailed analysis of attributes revealed by each part of Questions 10, 11 and 12 showed that the relevance of economic fluctuations to strategy planning was least appreciated in terms of response (ie: awareness item).

A similar exercise was undertaken with regard to the 'technical modernity' of each company and sub-group, comprising answers to Questions 5b, c, d; 6j to the 'progressiveness' of the same, comprising answers to Questions 6k, l, 7 and 8, and the 'performance', as derived from the ratio of answers to Question 4b:4c. This resulted in Table , as follows: (see also Appendix A4/10)[13]

TABLE 4.3.E

Comparison of Q-Scores (Unconverted

		QI	QII	Scale	Mid-Point
1	LONGEVITY	78.8 yrs.	50.1 yrs.	40.90	65
2	Attitude	34.7%	38.9%	30.40	35
3	Technical Modernity	8.6%	15.4%	5.20	12.5
4	Progressiveness	50.5%	48.6%	45.55	50
5	Performance	34.5%	40.0%	30.45	37.5
Nos.	-	24	40	-	-

The longest-surviving companies' longevity had contrasted strongly with that of the main sample: the size groupings within Q 2 responses also differed considerably in respect of both longevity and attitude scores; and between Q 1 and Q 2 both attitude q-scores and those for technical modernity, progessiveness and performance also differed.

253

No doubt common-sense reasons underlay some of these differences, but the fact of their existence resulted from management policies, decisions and actions. Could the existing information yield a meaningful description of the 'survival stance' of the respondents - a numerical interpretation of answers to Question 9 which could be matched with existing q-scores and assist in comprehending them?

Subscript

A note of miscellaneous summaries derived from earlier questions is found under Appendix A4/8

4.3.5 **Survival Stance of Company Management**

One could not avoid arbitrary subjective judgment as the sole means of evaluating managers' answers to Question 9, asking 'why, specifically, in your view, has your company *survived* so long, when so many others have failed?' Company secretaries themselves, presumably informed by the ethos of their company during their working life, gave reasons couched in a varied tenour of language. Impressions of the content, significance and intention of their replies, and the form and character of their presentation, nevertheless provided sufficient promptings for crude discrimination to be effected.

A difficulty was to assess each opinion in relation to groups of other factors which affected each company, but were not necessarily related to its spokesman. **One could but review the total evidence from each company, form an impression, and group together responses of a similar disposition.**

The need to accommodate these observations into a reference frame gave rise to a Likert-scale which classified replies on a spectrum ranging from proactive through active and reactive to passive and rigid (or inert). These categories were utilised to arrange observations from all respondents to both

questionnaires under the four headings 'product' technology, 'marketing' and 'management', already referred to (page 239) as the areas of the main reasons given by management for company survival. The 'third dimension' of intensity was equally divided into several subjective evaluations into which the character of the replies received could be located according to whether they seemed to be (low) involuntary, (high) deliberate, or intermediate.

In the case of Questionnaire No 1, the numerical rate of response was divided fairly evenly under technology, marketing and management as reasons for survival, but the quality of the product was cited twice as often as any other category of reply. Process/engineering and manufacturing firms figured in almost identical numbers across the bands of the Likert scale towards proactive from passive; in terms of intensity, three times as many responses were found above the intermediate level as below, thus confirming the more deliberate aspects of the 'survival stance' of firms (as reported by their company secretaries and interpreted by this researcher).

About two-thirds of companies quoting 'good management' as the main reason for continued survival, yet evidenced strongly passive or reactive character replies. The Q I replies as a whole averaged around the intermediate, reactive/active area. The six most active/proactive companies all instanced advanced technology and innovative product, coupled with strong marketing campaigns, as their reason for survival. (See more detailed extracts in Appendix A4/6)

Each respondent company had suggested a factor responsible for survival which by itself seemed unexceptional. This mundaneness and often brevity of response described what seemed obvious to the Company Secretary, and was almost devoid of thought or theory. Indeed, the whole repertoire of

answers could have belonged to a single firm, for each reply covered another facet of the whole. To view them together was 'honoris causa' an exercise in holistic comprehension.

4.3.6 Polarized Responses Contrasted

Common characteristics were shared by firms grouped at each end of the spectrum, which contrasted strongly with each other. The six most passive firms, all long survivors, were mixed with regard to ownership, tenure, size and type of activity, but generally scored low on progressiveness, were tardy with modernization, in early stages of development and policy sequence (if any), were normal in respect of central coordination and forecasting over short time periods, but only one gave any consideration whatever to external economic factors. These characteristics seemed compatible with their rating on the Likert Scale.

The six most active firms (- perhaps their Company Secretaries understood better than the others what the questions were about) scored far more strongly on policy emphasis, internal restructuring, external awareness and recognition factors, and acknowledged explicitly the importance of external economic change. Their replies on other matters were all unexceptional, and size appeared to have no bearing on this rating.

It has to be said that in both passive and proactive groups there existed firms which in some respects represented anomalies, but whose survival stance characteristics placed them in their band on the Likert Scale. *Vulnerable though some firms appeared to be, all had survived so far, were contemporary, had responded to the Questionnaire, had afforded an opinion about their survival, and this had been analysed on the basis of subjective and linguistic evaluation of their replies.*

The predominance of 'good management' as an answer to the conundrum of survival from five of the six most proactive companies revealed their stance; it might have been thought a management failure not to be able to answer this question unequivocally. (Those firms in the sample who did not reply to this specific question were automatically given a low, inert rating).

As in the Q I sample, the six most passive firms (one public limited company's Company Secretary gave a lazy answer) in the Q 2 sample all scored low on progressiveness, even lower on technical modernity, had only moderate development according to the Chandler thesis, and their policy emphasis was on operations and marketing in the sequence.

Internal practices were apparently slightly below average, while external economic awareness and recognition were virtually non-existent (despite 'full-house' on ticked and written replies). This set, mixed in size and activity, appeared to provide a tenuous link between low development, lack of forward policies, and neglectful economic attitude.

The intermediate, reactive 'set', (as expected), displayed a thorough mix of scores ranging from zero to very high. In this 'middle' section, the *marketing* function was almost universally quoted as that which enabled the firm to survive. Progressiveness was markedly higher than in the passive set, but technical modernity scored under, and less than any set in Q I replies. Early stages of development and policy emphasis preponderated. Both internal practice and external awareness were higher, considerably, than the passive set.

'Proactive' Q 2 set replies displayed consistently higher (but not outstanding) scores for progressiveness with altogether stronger and more up-to-date technical modernity. (One amazing

exception was the company which had last installed new technology in 1879). Chandler's level 3 of development and a far more developed level of policy emphasis figured in every case but one, (a company which survived 'hand to mouth'). Practice, awareness and recognition scores were solidly above those of other sets, especially in the one case of a management 'buy-out'. Size of firm in this set was a concomitant (perhaps 'sine qua non') of a higher plane of development, and was particular to it.

4.3.7 Review of Q 1 and Q 2 Profiles

Compared with the more even distribution of companies comprising Q I, those of Q 2 as a whole clustered markedly in the Reactive-Proactive, Deliberate quadrant of our Chart (No 4.3), evidencing a high rating and overt consideration of survival policies. Longer established firms appeared to have nested themselves in a secure product-market niche, concentrating more on technical modernity than a flair for aggressive marketing, and constraining their size far more than expansionist newcomers.

Centenarians also accorded far less credit to management for their performance, but rather saw in the excellence of their product and their customer relations a sure foundation for their continuance. It appeared that a differing philosophical outlook was engendered by the older and the newer cultures.

Table 4.3.F

Survival Stance Answers

	Q1 (24)	Q2 (40)	Both (64)
Product	5.0	5.0	10.0
Technology	-17.0	-19.0	-36.0
Marketing	11.0	5.0	16.0
Management	15.0	15.0	30.0
Survival	9.0	11.0	20.0
Quotient	2.25	3.75	5.0
% Q	9.4	6.2	7.8
Conversion	90.6	93.8	92.2

(These scores represent an unsegmented review of all companies) Calculated an the basis that high profile management and external responsiveness were better survival characteristics in management attitudes than their reverse, it appeared from Table 4.3.F above that the more recently established, main sample group of companies had currently a better propensity to continue surviving than the already long-surviving firms. (see Appendix A4/14)

4.3.8 Tracing relevant cycles

Very few companies appeared to recognize either the existence or recurrence of economic cycles. Some spoke of the need to 'change with the times'; one even of 'leading the field': none volunteered a view that a pattern of booms and slumps associated with other events constituted a challenge to management to seize opportunities and counter overt threats through generating sets of adaptive, strategic policies. It seemed undeniable that all Birmingham firms operated in the same business context, no matter how little heed was taken of it.

Asked 'which years were most significant for your company in terms of boom and crisis?', many firms either gave dates or wrote 'Not Applicable'. Some regarded boom and crisis as a purely internal phenomenon, countered by a policy of steady progress and staying 'in the black' financially. Other firms conceded that every year produced booms and crises. An overall impression was gained that companies preferred to think in terms of trends, perhaps also fluctuations, but were largely unaccustomed to the long, cool look needed for cyclical appraisal.

An attempt was made to construct a time-series graph from evidence supplied by respondents to this question, which would confirm not what individual firms had experienced but what, at a higher level of aggregation, had been the industrial pattern according to their *collective* assertions.

The resultant graph traced year by year the changing totals of firms in each of the foundry/process, engineering and manufacturing sub-groups of both Questionnaires which signalled boom or crisis. The extraordinary movements of these time-series did not necessarily reflect the economic cycle, but did portray how many firms in the sample *thought* that, for them, each year (1968 - 84) was either up or down. 'Experience of recent cycles' thus refers only to that of Birmingham area metal industries represented in the 'typical' sample under inspection, as reported by company secretaries, and is a time-series constructed from response frequencies.

The construction of a simplified, composite cycle was complicated by the fact that the numbers of firms supplying information rose almost annually; especially in more recent years, as memories became more clear and records more accessible. One had to ignore that many firms were talking about quite different cycles,

and concentrate on the fact that one was attempting to graph the industrial reaction of all the respondents to their changing environment.[14]

Sub-groups of this sample evidently experienced differing degrees of good and poor trade during the same years, shown as gaps in a discarded, more complex version of the graph. Nonetheless, peak and trough years were discernible for the sample as a whole, (see Chart×) and when adjusted for the numbers of respondents and smoothed with a three-year moving average, a decisive undulation appeared with peaks 1974 - 5 and 1979 - 80, troughs 1968 - 9, 19-76 - 7, and 1983 - 4 - an empirically grounded representation of opinion which vividly traced the form of a cycle.

4.3.9 Economic fluctuation 1968 - 84

The progress of this review of the state of the metal trades began 1967 - 70 with mild stagnation, followed by five years of sustained recovery by some engineering firms and a steady rise to the level of prosperity by an increasing majority of companies in the manufacturing sector. Although half the engineering firms and some foundry and process companies continued to experience depressed conditions until 1976, confirming an undercurrent of uncertainty in the industry as a whole, a growing number from all sub-sectors participated in the manufacturing-led peak of 1974, followed as it was by a gentle slide into recession by 1977.

The years 1977 to 1979 signalled strong recovery for a majority of companies from all sub-sectors, especially for the foundry/process subsector firms, which led engineering into a plateau of prosperity lasting until the mid-1980's (and beyond).

Some foreshadowing of an underlying downward trend was seen first in the decline of manufacturing fortunes in each year

from 1978: a more precipitate fall, amounting (almost) to collapse, affected a swelling number of engineering firms, and to a lesser extent foundry/process and manufacturing companies who had never shared the prosperity of high-flying companies during this period. The renewed plunge into deep crisis 1981 - 82 affected all but the longest-lived firms in engineering. A slight, but general and sustained recovery manifested 1983 - 4 (and beyond), but leaving the local economy operating at a lower level than hitherto.

When adjusted for rate of response, the time-series 1968 - 84 displayed these vivid cyclical characteristics. These were the movements ignored and so little understood by the great majority of companies preoccupied with day-to-day operations in their own sub-sectors. The information supplied by their company secretaries had facilitated the mapping of these trajectories, which were generally ignored for strategic planning purposes.

It was arguably inevitable that economies should fluctuate, since aggregates are comprised of so many components whose activities differed and whose product markets waxed and wared as events changed the business environment, and as differential development occurred.

The evidence of the Questionnaires confirms the 'nul hypothesis' as a generality, but does not by itself either confirm or deny it's corollary. The historical record showed sudden movements in bankruptcies coinciding with or closely following major <u>changes</u> in both economic and political spheres. Evidence other than that from surviving companies must complete the enquiry insofar as it extends back into former decades, generations and centuries. Conclusions, such as they are, may be drawn only from the whole panoply of the evidence.

Chapter Four

Footnote 1

A Peltigrew's study 'The Awakening Giant' Blackmore, Oxford, 1985, examined managerial policy changes in depth at ICI, where he was a consultant. He reported that economic planners at company headquarters had proved wrong in forecasts made on the basis of research into business cycles: ICI was large enough and spread wide enough world-wide to mould its own economic environment within national and world trends. A dominant role to entrepreneurial leadership at the individual level was also accorded by authors as diverse as Smiles (1858), Sloan (1954), Payne (1974), Chandler (1977), Stewart (1967), Drucker (1980), Young (1983), Thomas (1977), Goldstein and Clutterbuck (1984), Peters and Waterman Jn (1982), although contradicted by other studies including those by Cyert and March, 1963), Sinon (1968), Penrose (1959), Child (1969) Nelson and Winter (1970), Hoskins and Morley (1982), Klein (1983) and Blackburn, Coombs and Green (1986). Two schools of thought exist on the matter. For globalization of markets, see also T Levitt, Harvard Buisness Review, May - June, 1983, (p92 - 102)

Footnote 2

Among directories consulted where Kelly's, Kompass, KBE, Rylands, that of the Birmingham Chamber of Commerce, Thomson Yellow Pages - Industrial and Commercial, 1980, Dial an Industry 1986.

Footnote 3

Questionnaire No I did not contain any question concerning the size of the company participating in the research, which was found to be useful when analysing response. An attempt to remedy this deficiency by means of Aston University Library on-line company information facilities was partially successful, as was use of Extel and Moodie card indexes. May companies were small to medium sized private companies without published accounts, and several were subsidiaries of large groups having only centralised accounting procedures and providing only corporate statistics. In the case of Questionnaire No 2, the main enquiry, a question about size of company as measured by nominal capital, numbers of employees, group sales, and ownership of subsidiary companies was included.

Footnote 4

Questionnaire No I was despatched by post to 72 long surviving metal-using firms in the Birmingham area at the end of January 1985, and returned in pre-paid envelopes before 14 February. The despatch of 261 Questionnaire No 2 took place in March 1985, but the cut-off date for receiving replies had to be extended due to a strike by post office workers.

Footnote 5

A precedent for this type of approach is found elsewhere within the holistic tradition and is represented by cybernetics. This is a method whereby the taking of an overview of a dynamic structure leads to the finding of formal relations in patterns of interaction: these have counterparts in physical laws affecting quite different systems, a comparison with which leads to a 'meta-understanding' of what is under observation. It this way eg: machines, natural systems, and human organisations may be usefully compared, leading to insights and renewed understanding .

Footnote 6

A numerical analysis question by question is carried in Appendix A4/4, from which the proportions of response are evident. A reservation about the development of generalizations from the qualitative analysis was that each company presented a unique profile; unavoidable loss of specific information occurred in the attempt to group like with like and derive a typical mode from aggregation. Thus the same drawback was experienced as with numerical averages; except that in the qualitative case, there was no means of specifying the range in terms of a common unit of measurement, (although algebraic expressions such as a (γ- to +$\hat{\beta}$) might do so).

Footnote 7

Perhaps the alternative reply 'as part of an on-going review' proved to be an easy option answer for some firms.

Footnote 8

The Q 2 sample was reduced from 44 to 41, (the total sample of Q 1 and 2 from 68 to 65), when three manufacturing sub-group firms were found to be principally in merchanting, wholesale and other services.

Footnote 9

The manufacturer sub-group was reduced to 40 firms because one respondent did not provide an answer as to his company's date of foundation. All companies were surviving at 31 December 1984.

Footnote 10

All contrasts in Q 2 size estimates were derived from very few firms; the combined longevity estimate was heavily weighted by Q 1 companies, who lived nearly three times as long as the average Q 2 firm.

Footnote 11

Positive and negative responses were graphed across each of the three question groups to reveal trends in answers.

Footnote 12

Questions such as 11a with answers offering an odd-number of alternatives were weighted double for answers positive (11ai) while other more negative answers (11aii and iii) were counted singly to allow for enumeration of positive and negative answers (for the purpose of calculating a percentage quotient) on an equal basis. *Natural Conversion*: The percentage quotient was in inverse form: deduction from 100 converted it.

Footnote 13

These disparate qualitative entities could be compared because they had been rendered into a neutral numerical score: they could also become diagrammatized into an equlinear pentagram, (see Appendix A.4.12 should a visual presentation of their differences be required. The scale column in Table provides a means of calibrating each side of the pentagram. The q-scores are then marked along each side by measurement from their midpoints, and these marks conjoined by straight lines. The different shapes emerging thus configure holistically the differences in q-scores. A dwadecanal shape probably represents the maximum legibly accommodated for a single series of variables; an octagon the maximum for a double series of variables (eg: one series for Q 1, another for Q2). See Appendix A4/9b for diagram, and note on interpretation of differences in response frequencies.

Footnote 14

The graphed information was derived from two thirds of the sample population. One third gave no reply.

CHAPTER FIVE

5.1   A spectrum of conclusions

5.1.1 Outcome of the conceptual hypothesis

The main provisional inference drawn from a symphonic-type orchestration of fact, review and argument through the movements of four complementary chapters has been as follows: <u>the initial instability theorem appears to be vindicated per ipse</u> through both the historical minutiae comprising Chapter Two and its extensive Appendices, and by the manifest inter-temporal differences shown by changes in the tempo of economic activity as portrayed by INEA.

DIAGRAM 5.1.A

TWENTY DECADES TREND IN TEMPO OF CHANGE 1780 - 1979
(INDEX POINT DIFFERENCES)

Generation

The Index of National Economic Activity proves to be a sensitive numeric reflector of underlying movements in the

gently pulsating rate of general change in the British economy 1780 - 1979. Composition of events with statistics of a series of groupings of economic variables having underlying economic rationale, and weighted according to their progressive effects, appears to be operationally viable as a method.

This concept of an index whereby the surface appearance of cycles is abandoned, together with the normative interpretation of successions of events, in favour of a unification model utilising an assimilation technique for treatment of raw data at low levels of aggregation is believed to be a prototype of its kind.

This numerical approach to historical economics and to economic history contributes to the progress of more recent work under the general and systemic approach of the holistic paradigm, yet utilises the atomism of positivist techniques of reductionism in a novel and constructive 'durch-technik'.

It *is* vulnerable to criticism in its present early stage of promulgation. Results are obviously influenced (as in other methods) by initial assumptions and judgments directing the selection, ordering and weighting of variables.

Conventional historical perspectives centred on imaginative interpretation of documentary evidence and a 'feel' for the study period are rendered obsolete by this technique, which underpasses the usual requirement to explain causal connections in a retrospectively selective manner. Although INEA is chronological, it is not cyclical, nor is it selective between data.

Use of coeval data-sets without explication reflects the recent

sophistication of 'observation - without - theory' applied to long-run time-series. Since no viewpoint is expressed through a 'reportage' system for coincident events (yet recorded reactions of economic agents can be incorporated), the method is ideologically neutral. *Since the operational matrix is bounded only by the limitations of current information technology, it possesses unbounded rationality in potentia*

The logical foundation for INEA, originating from consideration examined in the Introduction, has been explicated in the opening chapter and extended and contextualised in the following, both at abstract level and that of the meso-economy.

To some extent, <u>an integrated view of the historical process grounded in empirical observation has been initiated</u>, despite the nature of the evidence and the contradictions between existing theories.

5.1.2 Results from the matrix

The most striking results from the decennial figures in the Table 2.6.A 'The Tempo of Change 1780 - 1979' were the stability of the rate of change within 0.3 to 7.0 (exceptionally twenty) points either side of the average, and the absence of any noticeable cycle, long-wave, or other recurrent effect, in strong contrast to the volatility of year on year differences.

Around 1810, there appears to have occurred a lift in the rate of development, as if the whole economy had changed gear to a higher tempo of change lasting until 1890. (The reader is reminded that change is understood to be both positive and negative; favourable; and that change or its absence is neither good nor bad).

This rate of change was resumed 1900 - 1920, but the exceptional decade 1920 - 30 ushered in a series of four decades of decreased

tempo of change, with a return to previous levels only in the 1970's.

Deviations from the index at 1913 from Diagram 5.1.A in which the strong effects of the periods surrounding the Napoleonic was and World War One and their aftermaths are clearly visible. In fact, since war was endemic to the entire period apart from a very few years, these large differences from the oscillating norm of change were comprised not just of hostilities, or their cessation, but conjointly major changes in weather, output, prices, and employment combined.
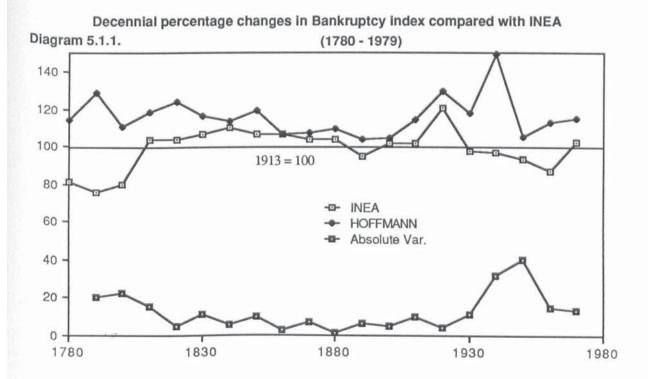
It seemed to be the case that cycles and other forms of fluctuation inseparable from time-series of particular economic variables either cancelled each other out in the general rate of change, or were too partial and parochial to have any effect on the overall tempo of change and development comprised of a hierarchy of factors.

Exceptional years such as 1839, 1841, 1865, 1920 - 21, were all explained by exceptional combinations of events. When the differences between the decennial rates of change were graphed, the resultant trend in the tempo of change resembled other long-run series with regard to peaks, troughs and general upward or downward 'tendencies'. This curve resulted from a 'random walk' effect solidly grounded on empirical evidence.

Clearly, the level of aggregation affected whether or not 'cycles' appeared, either as 'behavioural pattern' of specific variables, or as 'hybrid' effects. As soon as the composite view was taken, so it seemed that cycles and long-waves had disappeared, absorbed into the tempo of changes involving all their component parts.

Each variation from the emergent 'norm' was accountable to

specific events and changes. The only constant was a gentle pendulum effect in the tempo of change itself: nothing else seemed to be imminent, or implied.

Decennial percentage changes in Bankruptcy index compared with INEA
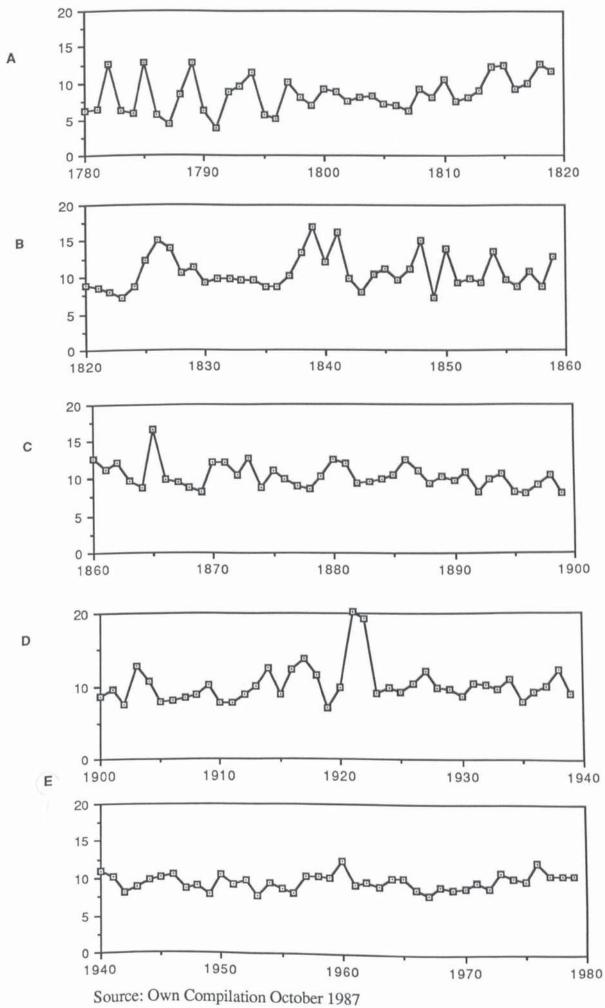Diagram 5.1.1.   **(1780 - 1979)**

Examination of the juxtaposition of INEA with the Hoffmann Index and of their absolute co-variance seems to demonstrate several distinct phases of visual correlation.

First, an initial phase between 1780 - 1810, when scant and incomplete evidence may have contributed to an impression of pre-'take-off', inverse relations between the rate of change of bankruptcy and that of the tempo of economic activity.

Second, a long intermediate phase wherein the alternating pulse of positive and negative change decade by decade converged and appeared to synchronize between the two variables, there-by indicating possible confutation of the nul hypothesis (but not necessarily also of its corollary.)

270

ANNUAL VOLATILITY OF INEA

Generation Period

Source: Own Compilation October 1987

Third a period of extreme alternation, with co-movement during World War One on a violently oscillating scale, followed by divergence until 1940, when a new period of synchronized co-movement began, only to reverse itself in the 1970's. (See accompanying graph derived from material in Chapters Two and Three).

A further chronogrammatic approach featuring year on year variable differences affords a detailed opportunity for inspection not available through the use of decennial averages. This graphic presentation aimed to enhance a broad view of change by comparing the five generation periods.

It is interesting to note that the period 1810 - 1910 was a century which may have represented a unique traverse between the Napoleonic wars and the Germanic wars, where high rates of change occurred, and wherein almost all evidence for the existence of verifiable appearances of economic cycles is contained, anchored there by date to more reliable data-sets than hitherto available.

The co-incidence of rates of company failure with these changing tempos of activity is not uniform, but appears to be indicated over part of the period. The longevity of groups of companies examined in Chapter Three cannot be said to be a wholly dependent variable upon the changes recorded in the tempo of economic activity.

While both series consist of clinically isolated observations such as are used in comparative statics, they contain in a covert manner the lags and cumulants obvious in explicit longitudinal presentations of data, from which the impression of cycles appears, and also that of a long-wave effect.

All 'result' derive from method and from purpose, and thus are viewed reservedly. The effects of 'maverick' years on the decennial averages of both series requires further resolution, as does the strict 'legitimacy' of the decennial average as a presentation device.

A logical outcome of the extensibility of datasets and consideration of their effects upon analysis would be either to state assumptions and model parameters explicitly at the outset, or to opt for total information in respect of any specified dendrology of subject matter.

The choice of dates also clearly alters the results obtained, but as historical events all occur ᴁn dates, and make them memorable, the choice of time-span is basically the choice of starting date *event*.

INEA withstands close inspection - unlike cycles and long-waves, which 'vanish' when too close a view is taken - partly because it does not manipulate or transpose data or utilize information for ulterior purpose.

Its possible use as a prescriptive tool will depend on its acceptance and future development. This thesis establishes its precedence only in relation to its theme of devising a methodology whereby an integrated overview, or reference sequence, can be established for comparisons' sake.

It is submitted that a new method permitting a value-specific coordination of historical complexity through use of congregational analysis is not anti-historical, or anti-economic, and has some potential for application to other disciplines, including some branches of physical science, financial analysis, and administration management.

Its submerged treatment of 'fluidised' blocks of numbers while maintaining mathematical precision may recommend itself, (if approved,) as an alternative means of dealing with exponential increases in complexity.

5.1.3 Some other contributory aspects

Few conclusions, other than those italicised in the text, can be drawn from the historical chapter and its appendices. The historical portions were written as an exemplification of an a-theoretic view of processions of historical data, not as an exposition of patterns or in relation to possibly teleological developments.

They do present what is believed to be a unique and up-to-date assemblage of historical information catering 1780 - 1980, centred on the economic and industrial transformations that occurred particularly those in the metal industries, and especially those in the West Midlands Region and in the Birmingham area.

A particular character is given to these accounts by the use of a schema of ordered information corresponding to the 'cascade' effect of economic variables utilised to provide enumeration at the end of Chapter Two.

The chronological passage of this data-base of economic variables arranged hierarchically provided the vertical elements recorded in the data matrix, the years and decades comprising the horizontal axis providing the other arm for this Descartian effect.

Although no special attempt was made to outline the course of cycles throughout this period, reference was made to both theoretical intervals and to the apparent turning points evident from statistical indices.

Separate texts provide long perspectives of cycles and the course of fluctuations in their phases as seen by various cyclical authors and, according to my own research, by members of the Birmingham Incorporated Chamber of Industry and Commerce.

In one sense, the thesis has became T-shaped; the lateral stroke comprised of the central thematic argument developed through careful rotation of the subject matter through the four main chapters, and the vertical stroke by a wealth of reference material elaborated in depth and contained in an extended series of Appendices.

The approach in this case was unashamedly eclectic and lexiographic, with the aim of providing a compendium of information relating directly to points raised in the main text but too bulky to be considered there. <u>It is believed that these synopses are assembled in this way for the first time in relation to a comprehensive view of the field of enquiry within a single volume</u>.

As a result of devotion to a technique aimed at finding absolute differences between variables per time period, no additional support was obtainable to verify the assumed existence of the perceived cycles or of the long-wave effects. Just as interval selection modifies time - series figurations, so matrix intervals modify the quantities of change available to any cumulative calculation of the tempo of change.

The lack of coincidence in the cyclical features of all the main hypothetical cycles and their disjointed conjunction with the succession of historical events contemporaneous to their anchor dates was noteworthy, and did not inspire confidence in anything but the partial perspective gained thereby.

If the appearance of cyclical phenomena was principally the product of a technique confronting a cyclically predisposed cognitive framework, what happens when one takes off one's cyclic spectacles? It seemed that patterns dissolved back into a chaotic, dis-synchronized set of random oscillations. Cycles had no existence without the participant - and to some extent believing - observer.

Turning to Chapters Three and Four, and switching to the micro-economy and organization of the firm, an attempt was made to coalesce all existing research literature providing information about company precipitation rates. By this was meant the numbers of formations and failures in relation to successive annual stocks of companies, together with whatever information could be derived concerning the rates of formation, failure, and change in stock.

In this endeavour it was found that all samples short of the (still somewhat deficient) official total figures were specific to the dates between which samples were taken. They also varied in result according to industry, location, age of establishment, dates of foundation and demise, and whether between defunct groups of firms or those still surviving.

A number of estimates were made which, subject to data limitations and averaging within broad ranges, provided for the first time historical rather than contemporary information and might apply to companies more generally as well as to the researched samples appertaining to (mainly) local and (principally) metal industries.

Once again, this information has been offered as an indication of the sort of longevities involved and the implications behind this (neglected) type of research, rather than as concrete figures of a precise kind having impeccable lineage.

Centenarian firms are quite obviously 'freaks', whatever else may be discerned. Indeed, the majority of companies forming the subject matter of management studies are rarities, for in order to reach a size to be noticed, they will generally have to survive more than ten years, the odds against which do became progressively heavier.

The transitory nature of the vast majority of start-up companies is apparent from statistical records of failure: eventually, virtually none survive. The question as to whether the rates of formation and failure vary over the years is only partially answered in the affirmative, and the same goes for the rate of growth of the stock of companies.

It appears that the evidence for and against cyclical growth in the stock of companies and simultaneously in economic activity is approximately evenly balanced. The thesis maintains that both positive and negative change create instability, and changes in the tempo of change have partial correlation with changes in the annual rates of bankruptcy.

Change occurs in scenarios that differ, and the attendant problems to be resolved may be misspecified from one period to the next. The quantity of insolvency says nothing about its significance in social terms, the compensatory possibilities of new registrations, and the necessary importance of both to the regeneration of industry (Hambrick 1986).

The tempo of change, however, and the double-edged threat and opportunity which variations in tempo comport to the management of companies; and the spectrum of attitudes which arise in the dynamic process of confrontation between the firm and the business environment, are all observable, researchable and analysable facets of an industry.

Questionnaires sent to local company secretaries gave evidence of a spectrum of management attitudes to the requirements for survival in business, together with a detailed exploration of both the character of their firms and the practices then prevalent. The potential importance of an advance warning company vulnerability to failure index, comprised of tested financial ratios and other information, offered distinct possibilities for improvement.

Why were the majority of company managements apparently myopic, seeing only at best current fluctuations and very recent trends; without regard to longer term strategies in relation to apparently recurrent phases and features of cycles in economic variables which were of importance to the conduct of their business affairs?

Possibly, the lack of regularity in cyclical phenomena made them unreliable as predictive tools for practical purposes. Probably, since few firms survived long enough to experience more than two short business cycles, and mature and established firms survived less than one long-wave effect , there exists no tradition of the significance and possible importance of these rhythms to events.

What seemed very obvious, was that given proportions of the stock of companies started at any one year fail by the elapse of a certain series of other years, and this fact did not noticeably penetrate management thinking either at the level of national, regional, industry or company resource allocation and policy planning.

As in most other areas of research, evidence on all these matters was simultaneously abundant in general and scarce in areas where it was particularly wanted. Much further work could be undertaken in relating various features of groups of companies

to their recorded longevities, and the various attitudes of company managements to the actual survival of their firms. The typicality of responses from one industrial sub-sector in one area require cross-checking with others.

5.1.4 Suggestions for future research

To parallel further research required into historical company stocks, further enquiry into the massive records of 'London Gazette', together with Judicial Lists, and Parliamentary Papers might be undertaken methodically by teams of researchers in order to assemble further information about historic levels of recorded bankruptcy. The unrecorded levels are likely to rise the further back one goes into all these records.

Current work by Governmental statistics departments has extended the availability of information relating to the regenerative rates and life-spans of companies forming recent stocks, and may continue as an adjunct to improving the bankruptcy figures in cyclical indicators.

Alternatively, greater refinement and use of vulnerability indexation may help banks, professional advisers and company management to take the necessary steps to avoid failure before it becomes too late.

Facilities provided through modern micro-processors associated with powerful mainframe computers offer unprecedented access to information for contemporary economists, historians, planners and research personnel.

Very extensive databases can be abstracted or disaggregated and analysed both hierarchically, categorically, spatially, longitudinally, alphabetically, numerically and in groupings. Print-outs and graphic displays can be provided at national, regional, and local levels, by economic sector, industrial sector,

and by SIC, thus traversing macro, meso and micro economies.

As timespans elongate within which comprehensive and exhaustive records of economic performance have been maintained, so the spectroscopic possibilities increase. Simultaneous projection of cyclical manifestations can be displayed in two-dimensional graphic form or in three-dimensional holograms.

Idealised model formulae derived from historical analyses can be matched with actual fluctuations in the chosen indicators as they occur, and used to extrapolate into past or future. Feedback can be constantly modified by current data inputs. A new Treasury model incorporating dynamic, phasic inter-relationships between main economic variables is suggested as a distinct developmental possibility.

Another possibility is research into the feasibility of immediate and continuous monitoring of changes in national economic activity, (perhaps on the basis of a refined and adapted version of my own NEA Index). The aim would be to trace crude long-term movements in economic variables and to present these in a comprehensible, composite form for the use of strategic planners in government and general management, and for the interest of historians, economic theorists, forecasters and consultants.

It should as a consequence become more possible to devise policies better adapted to long-term trends in the tempo of development and possessing (pro or contra-) cyclical modules making short-term error more readily available. The ongoing NEA Index is seen in this context as a supplementary management tool.

Other possibilities for INEA devolve from an extension of the application of computer-based techniques to the logging of vast quantities of annual data from all existent historical series of statistics, calculation of their variances by automatic means, with summation of composite, base-adjusted rates of change for each year in which the requisite information is available.

This system would be capable of withstanding constant updating and modification without disrupting theory, the model, or the veracity of the results. Alternative selections of variables with differing ranges of weightings could be tested spatially and longitudinally in order to reveal the implication in contra-history of assumptions which could otherwise not be tested.

Applications may be found, for example, in tracing the diffusion paths of technologies in terms of new and replacement investment decisions in particular industries. Computer-assisted detection of patterns of change may be implemented. Some attempts may be envisaged to generate predictive models from algebraic expressions of the tempi of byegone rates of change in an economic variable or in composite INEA itself.

Finally, this thesis has attempted an enquiry to find an answer to a paradox. It has assembled the available information and conducted research into a number of under-examined areas.

It has produced not so much a set of clear-cut solutions as a number of possibly novel approaches, methods and forms of presentation associated with the process of enquiry.

The economic activities comprising the standard industrial classification orders of today's economy are the aggregated outcome by categorization of the hosts of vulnerable, risk-taking enterprises which have formed in the past and survived to take their place in the industrial structure of the national, regional

and local economy.

Likewise, historians and economists, products of their space-time and of evolving cultural environment, are subjected to those external influences acting upon them from the past and into the present. Paradigmatic long cycles and fashionable short cycles of thoughts may come and go. The rate at which they do so, the changing tempo of change itself, seems a worthwhile aspect of longitudinal study.

5.1.5 Epitome of Conclusions

- The Instability Theorem expounded in the Introduction is decisively substantiated both by minutiae of the decennial accounts of chronological change and crisis in history and by emergent alterations in the tempo of change revealed by my Index of National Economic Activity based upon this evidence.

- The concept of INEA extends the domain of economic activity to include the major influential factors, both external and psychological. Its operationalization provides a fair and accurate reflection of the tempo of economic change.

- INEA is also a fact-sensitive representation affording each time-span its characteristic profile in the delineation of the tempo of change. It possesses interpretative possibilities.

- A novel technique of Congregational Analysis introduced in order to derive an ordered overview from the chaos of two centuries of diversely recorded change has demonstrably been found to work in practice and is capable of wider application in future.

- The rate of company formation is almost always in excess of company de-registration, thus ensuring a persistent but oscillating increase in the national stock of companies.

- Management attitudes to questions of survival related to those concerning organizational strategies, structures, and technological investment show that economic fluctuations are viewed differently according to size and survival longevity of firms.

- Companies' vulnerability to closure can be ascertained well in advance through a circumspect utilisation of financial ratios. This enables alert management, investors, planners and their advisers to take timely remedial action, (although few hold a positively proactive stance).

- Government does not appear to possess the will or means to maintain a cyclically modulated long-term economic policy adjustable to the tempo of change. In consequence, policy prescriptions for both financial and real economies are essentially short-term. *The perspective afforded through historical research provides a means whereby it increasingly becomes possible to devise and adopt more appropriate long-term policies, enhancing economic stability and the prospects for company and industry survival.*

The argument in this thesis has been conducted as far as practicable in the light of reason, but reason backed by all the available and relevant historical information. On this I rest my case.

- Cycles and long-waves are found to be ethereal artifacts mainly produced through statistical treatment and national cognitive pre-conceptions. Their patterned, effects nevertheless suggest recurrent underlying conditions affecting specific variables reciprocally.

- All cycle periodicities not only vary in appearance themselves but between each other over time, very rarely coinciding in turning points, profile, amplitude or duration when graphed together.

- The Bankruptcy Index, itself somewhat of a cyclical character shows partial but nevertheless considerable co-variance with INEA at the discriminant level of decennial averages of percentage differences Greater instability is generally accompanied by higher precipitation rates.

- Insufficient longevity evidence survives to facilitate a sustained longitudinal presentation between company precipitation rates and pulses in the tempo of change, or phases in the cycles of any chosen variable.

- The average life-span from specific samples of established Birmingham companies in the metal industries lies within the range 45 - 50 years. Odds against any firm surviving beyond 7 - 10 years increase rapidly, but vary over time.

- Approximately similar rates of closure affect companies in different locations, time periods and branches of industry, thus broadly maintaining the formations of industrial structure.

An (almost) Anonymous Postscript

The Non-Econometrician's Lament

As soon as I could safely toddle
My parents handed me a model
My brisk and energetic Pater
Provided the accelerator
My mother, with her kindly gumption
The function guiding my consumption
And every week I had from her
A lovely new parameter
With lots of little leads and lags
In pretty parabolic bags.

With optimistic expectations
I started on my explorations
And swore to move without a swerve
Along my sinusoidal curve
Alas! I knew how it would end
I've mixed the cycle and the trend
And fear that, growing daily skinnier
I have at length become non-linear

I wander glumly round the house
As though I were exogenous
And hardly capable of feeling
The difference between floor and ceiling
I scarcely now, a pallid ghost
Can tell ex-ante from ex-post
My thoughts are sadly inelastic
My acts incurably stochastic

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