Thesis title THE USEFULNESS OF FUNDS FLOW STATEMENTS: AN EMPIRICAL STUDY OF HONG KONG BANKS' LOAN OFFICERS' USE OF PUBLISHED COMPANY ACCOUNTS

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VOLUME ONE

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ABSTRACT

Funds flow statements were part of the published accounts of most companies in most jurisdictions in the last two decades. In the USA and a few other countries, they have been replaced by cash flow statements. Before other countries, including the UK, follow the US lead, it is important to gather and assess evidence on the usefulness of the funds statement to see if the arguments for its replacement by the cash flow statement are well founded. In essence, the usefulness of the funds flow statement is a matter of its ability to enable its readers to make better, or possibly faster, judgments about a firm's changes in financial position than they would make in the absence of that statement. The research reported in this thesis addresses the usefulness of the funds statement to a group of users especially concerned with changes in the financial position of companies with whom members of the group do business. Banks employ loan officers and credit analysts to vet applications for new loans, and this group of people is therefore likely to appreciate information useful to them in assessing the ability of applicants to meet their actual and prospective financial obligations. Such a group based in Hong Kong would be exposed to accounts prepared under all kinds of different national formats and should not be unduly fixated on the format of any one nation. Such assumptions were the basis of the research. A factorial ANOVA research design was used with 116 Hong Kong bank loan officers in 15 sets to see if the provision of funds flow statements and cash flow statements in a variety of formats improved their

speed or accuracy in answering simple calculation-based or judgment-based questions concerning the accounts. Order effects were controlled by shuffling question order. Accounts difficulty effects were controlled by providing the accounts in two matched sets of equivalent processing difficulty. Subject selection effects were controlled through random assignments of subjects to accounts sets. It was found that funds statements marginally improved accuracy but greatly increased processing time. Cash flow statements performed no better than funds flow statements in either respect. An information load explanation is discussed for these results.

CHAPTER 1 INTRODUCTION

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CHAPTER 1 INTRODUCTION

1.1 THE PROBLEM AREA

One of the widely accepted reasons for the existence of accounts is the usefulness of the accounting report to readers in helping them make better decisions in allocating their financial resources. [AICPA 1973].

The two categories of decision maker most generally referred to in discussions of how accounting reports are used are the two types of providers of corporate capital; investors and lenders.

The usefulness of accounting reports to equity investors has been studied especially for signs of capital market responsiveness to new releases of such reports. The subset of usefulness that such studies capture is often described as the information content. Such studies are apt to assume that expressed response in the particular form of buying or selling is a necessary condition for data to be regarded as possessing information content, at least in the arena of equity markets [Fama et al 1969; Gonedes and Dopuch 1974].

The decision making and information using processes of suppliers of loan capital have no direct equivalent of the information content studies of the equity markets. Instead, the major thrust of research into the lending decision has been in the behavioural aspects of accounting fields where individual lending officers, singly or in small groups, have been the focus of enquiry. The behavioural aspect in question is human information processing, which studies the

discrete processes by which information is searched, digested and converted into decisions to take specific action. Work in this area up to the start of the 1980s is surveyed in student texts by Libby [1981] and Ashton [1982]. The most recently published general review of behavioral aspects of research up to 1988 is the American Accounting Association's 1989 book of readings edited by Euske [1989].

The subset of behavioral aspects of accounting that impinges most germanely on the present study is information load and overload analysis. The constructs of this area are helpful in shedding light on the failure of supplementary accounting statements which are significantly useful in theory but of limited or even negative use as currently applied in the real commercial world. Some recent American doctoral dissertations not yet available in article form in the journals are especially good examples of the approach [Chewning 1984; Miller 1986; Volonino 1988].

1.2 SPECIFIC FOCUS OF THE RESEARCH

The specific focus of the present work is the usefulness of funds flow statements to bank staff in making lending decisions in Hong Kong. Prior studies of funds flow usefulness may be classified into the following sets;-

a) critiques of the funds flow statement, often with suggestions for improvement,

b) empirical studies of equity investors market responses to funds flow statements relative to their responses to other reports,

c) empirical studies of small groups of analysts' use of funds flow statements,and

d) studies and critiques whose main focus is cash flow accounting but which extensively review the funds flow literature in making their case.

These sets have a quite extensive literature and it is reviewed in chapters 4, 5 and 6. It is more briefly surveyed in section 1.5 below.

1.3 SIGNIFICANCE OF THE ISSUE

During the course of this research the USA decided to replace its funds flow stement with a cash flow statement for financial years ending after 15 July 1988,[FASB 1988;Mahoney 1988] whilst Canada had already done so in 1985 [Marinucci 1985] and Australia was in the process of adopting its ED 37 [ASRB 1986]. The Scottish Institute recommended [ICAS 1988] a new "Statement of Changes in Financial Wealth". New Zealand's SSAP 10 replaced the funds flow statement with a cash flow statement. South Africa did the same. The IASC expected to issue a cash flow statement standard in 1991 [private correspondence with the IASC]. Finally, in July 1990, the British ASC issued ED 54 which closely mirrors the USA's SFAS 95 in requiring the replacement of the funds flow statement by a cash flow statement divided between operating, financing and

investment cash flows. Never before in modern accounting history has a mandated report been dropped and every country within the Anglo-American accounting paradigm will at some stage in the next decade be likely to consider whether or not they should retain a report that these major accounting nations have eschewed. This present research hoped to establish whether the disappointment with the funds statement is justified by Hong Kong evidence. It was also hoped to gather some preliminary evidence on whether the high expectations some commentators [e g ED 54's writer] have of the cash flow statement is well founded.

Hong Kong bank loan officers are the sampling frame used in this study of the usefulness of funds statements. This group of people was chosen in preference to students, investment analysts or accountants (professional and academic), because the most frequently seen claims in the literature for the usefulness of funds statements particularly stress how the statement highlights liquidity, solvency and ability to manage indebtedness. If the funds statement is effective in the way it highlights such matters, then bank loan officers should be more likely to register this in the way they read accounts than any other user group; since these matters are quite central to their job.

Hong Kong is unique in the world in its combination of low taxation (including the absence of capital gains tax), high economic activity, British accounting influence, stock

market inefficiency, anti-corruption policing of financial transactions and international economic networking. There are no barriers of a fiscal or administrative nature against the import or export of capital. The culture is supportive of financial activity, though speculation is hindered by the continuing illegality of short selling of Hong Kong stocks. All the world's largest banks, stockbrokers and accounting firms actively operate in and from Hong Kong. It is therefore reasonable to base an enquiry into the usefulness of funds statements to bank lending officers in Hong Kong. It is reasonable to suppose officers based in Hong Kong would be familiar with any accounting report formats useful to them in appraising ability to repay debt. In particular, Hong Kong loan officers could be expected not to be fixated on any one country's accounting formats or assumptions.

1.4 CONTEXT OF THE RESEARCH

1.41 INTRODUCTION

While the influence of Anglo multinationals and such British "hongs" as Jardine's, Swires, Inchcape and Cable & Wireless continue to permeate the territory, the importance of such large local business empires as those of the Shaw brothers, Li Ka Shing and Y K Pao make a brief survey of the Chinese cultural context of Hong Kong business indispensable in appreciating decision making processes in the territory.

1.42 MANAGERIAL PHILOSOPHY

Redding and Hsiao [1988] reported the results of 80 taped interviews with overseas Chinese chief executives on their managerial philosophy. Some key quotations from their work are set forth below.

"Insecurity comes into play as a determinant of behaviour because the social history of China for some centuries forced people to come to terms with an aloof and exploitative state apparatus, and to develop defence mechanisms now embedded in their world view...Each family is its own welfare state."
[Redding and Hsiao 1988 p7]

"Christianity, Buddhism and spiritualism were also evident in the cognitive maps of many of these chief executives, but Confucianism more so than any other and commonly in conjunction with another religion."[ibid p8]

"The results of societal insecurity are threefold. Paramount among them is the drive to accumulate wealth, the most obvious security surrogate, and the most direct and obvious determinant of much day to day behaviour, reaching perhaps its most intense levels in Hong Kong where the issue of insecurity is more sharply focussed than elsewhere. The second result is a capacity for deferred gratification, for years of thrifty accumulation of savings in the interests of long term stability. The third norm stemming from insecurity is the passion for education, seen as the key to upward mobility, and the guarantor of access to the reliable, respectable, stable and financially rewarding professions. There is a strong desire for control and to avoid being someone else's subordinate, that explains much about the proliferation of small businesses. Networks are built based on the family, to make business possible in a climate of mistrust of those outside the immediate family. [ibid 9/10].

"This is not entirely a matter of the natural affiliation of those with an origin in common; it also contains more prosaically the fact that a person who is known as part of a wider social group is more likely to be reliable as he has a reputation to lose if he reneges on a deal. *Such reputations are highly significant social and economic currency.*" [ibid 12 italics added].

Another study of Hong Kong Chinese management styles indicated the importance of four features to Chinese entrepreneurs and senior executives:

1.Dedication and diligence,

2.Friendships as the foundation of business networks,

3.Sensitivity to interpersonal relations and

4.The non exclusive nature of business co-operation which was not confined to small groups [Tuan, Wong and Ye 1986 p34].

1.43 CONFUCIANISM

The flavour of the Confucian ethos can be sampled from a few quotations.

Confucius said in *The Analects*;

"N*p+5Xo one properly raised need ever be left to improvise." Choice is thus precluded by right upbringing. Moreover;

"A true gentleman, even in his thought, never departs from what is suitable to his rank."[Analects, XIV 28]

"To learn and at due times to repeat one has learnt, is that not after all a pleasure ?" [1:1]

"When the way prevails under Heaven, commoners do not discuss public affairs."[XVI:2].

To Confucius the goal was *li*, propriety, courtesy, ritual and moral correctness. There were 5 overall virtues: benevolence, righteousness, propriety, wisdom and faithfulness in that order. Ketcham [1987] quoted Arthur Waley, a turn of the century liberal historian, on why Confucianism has lasted; "It contrived to endow compromise with an emotional glamour." Everything about the Confucian system is worldly, social and hierarchical in contrast with western individualism, egalitarianism and transcendentalism. Social harmony is the benchmark of all things and patterns of conduct. There is no such thing as private conscience. Individual liberty is wholly and frictionlessly subordinate

to collective obligation. Transactions, contracts, or even gifts without sincere feelings of benevolence towards the counterparty are immoral [Ketcham 1987, p100]. In Confucian cultures the group; - family/clan, village, work team, school, etc - is the essential defining entity [Ketcham 1987 p115]. One *is* one's relationships.

1.44 LAW AND ETHICS

Ma [1989] compared the "moral orientation" of schoolchildren in England, China and Hong Kong. He found the English adolescents showed a stronger orientation to gratify survival needs and weaker need to belong or to gratify esteem and social needs than either Chinese sample. The English showed a weaker altruism and less tendency to be law abiding. For the English girls, scores were somewhat closer to the Chinese than for the boys. Differences between the Hong Kong and China samples were slight.

Wong [1990] in his inaugural lecture for the Hong Kong University Chair of Sociology, stressed the importance of trust in the Chinese business ethic. Silin [1972 p337] studying a wholesale vegetable market in the territory found *hsin-yung*, or trust, was "the crucial factor in upholding the complex network of trading relations". Wong [1990] concurred from his own work with textile industrialists and small factory owners. There appears to be a fair degree of trust in the legal system, in that over two thirds of a 1662 respondent sample to a social indicator survey reported their confidence in judges, lawyers and the conflict

resolution abilities of legal action [Kuan, Lau and Wan 1990], but over three quarters thought court proceedings were biassed against the poor.

1.45 CONCLUSION

Although the role of trust is subject to some differences of emphasis between local scholars, it is clear that personal relationships and reputation are crucial factors in the local business arena. Families are not only primary social units but also very important business cores. It is to be expected that scepticism of the effectiveness of regulation alone to control business malpractices will be widespread in a culture that puts such primacy on personal networks. The person, rather than the corporate entity or its paper reports, is the critical variable of interest to local business decisions. In these circumstances, truth and fairness are capable of being superceded by harmony, maintenance of reputation and confidence, and, in extremis, by personal fiat of the corporate and family ruler.

1.5 PRIOR WORK

1.51 HISTORY OF FUNDS STATEMENTS

From the voluminous literature on accounting history the single most relevant publication to the present work is the 1969 article by Rosen and De Coster describing the history of funds flow statements [Rosen and De Coster, henceforth RD, 1969]. The earliest example of a funds statement rather than a cash or income statement that they were able to find was a "Statement showing Resources and their Application during the Year 1893" from the Missouri Pacific Railway Company [RD 125] The codification and modern development of the funds statement is apparently associated with the work of William Morse Cole [1908]. Rosen and De Coster show that the historic mission of the statement was to shed light on corporate liquidity [RD 129/130]. This arose from the perceived inability of the balance sheet to discharge this function. Almost from its inception as a mandated statement, however, critics have argued that the light shed by the funds flow statement is not bright enough. One of the most cogent and perhaps most influential attacks was made in the USA by Heath [1978]; whilst in the UK, cash flow accounting advocacy has long been associated with Lawson [1970] and even more with Lee [1972]. The debate about funds flow statements and their shortcomings has taken place within the wider context of the ongoing search for consensus on the purposes and principles of financial accounting nationally

and internationally. In the wider debate, a goal of accounting that is widely held to be desireable is the prediction of the future cash flows of the enterprise [AICPA 1973]. The articulating role of this aim in connecting the wider debate on purposes to the narrower debate on funds flow statements is concisely and persuasively argued by Staubus [1989] who has been one of the few cash flow statement enthusiasts to demonstrate an appreciation of the limitations of cash flow reports as instruments of corporate performance appraisal.

1.52 RESEARCH ON FUNDS FLOW STATEMENTS

Empirical work on the usefulness of funds flow statements has been mixed. Brownlee's American bankers and bank trust officers said they found the statement very helpful in determining the appropriateness of loan applicants' financial policies [Brownlee 1978]. Hiltebeitel's loan officers reported finding the statement useful but their risk assessment decisions were not significantly affected by the presence or absence of the statement [Hiltebeitel 1985]. The changing format of the Statement of Changes in Financial Position from a working capital to a cash focus by 100 Fortune 500 firms was examined by Kochanek and Norgaard [1987] for the half decade 1979-1983. Only two had a cash focus at the start of the period but by the end this number had shot up to 76, although only 36 of them showed cash flow from operations. Sarhan et al [1987] investigated the

reasons for the switch and found that d+5Xeclining growth in inventory or receivables, and emulation of (changed) industry norms of format, were particularly common reasons.

In a thorough review of accounts from 1972-1985, Franz and Thies [1988] found that accrual income and working capital from operations had declined over the period relative to cash flow from operations, due to slower growth in receivables and inventory. From this they concluded that working capital from operations was an inadequate proxy for cash flow from operations. Andrew et al [1985] in Singapore found for 112 local quoted companies, funds flow from operations in 1983 and 1984 so closely correlated with profit that they were unable to claim any incremental information content for funds flow with regard to liquidity.

Barlev and Livnat [1986] used path analysis to assess how far the rate of return on 494 COMPUSTAT sourced companies from 1971-1981 could be explained by sources and by applications of funds disclosed by the Statement of Changes in Financial Position. They found correlations of returns with applications to be positive and significant at p = 0.01, while there were mixed correlations with sources; (the mix comprising positive indirect but negative direct correlations).

Anderson [1981, 1982] surveyed the importance of published accounting information to Australian shareholders, firstly for 2682 individual investors and later for institutional investors. Both sets of investors valued tips, visits,

broker's advice and magazine (sic) reports more highly than the published accounts. The funds flow statement was rated as less important for either the buy/hold decision or the sell decision than the income or position statement. Over 58% of the institutional investing staff claimed to read the funds flow statement thoroughly nevertheless.

In 1982 the Financial Executives' Institute sponsored a study of Statement of Changes in Financial Position formats. Of the almost 1200 respondents only 18% did not define funds to mean cash or cash plus short term investments [Clemente 1982].

1.53 WORK DIRECTLY PRECEDENT TO THIS STUDY

Walker's [1984] study of 200 subjects in 5 categories of occupation, in which he used a 5 item pair of questionnaires to address 6 widely quoted aims of funds flow statements via the testing of 4 hypotheses, is the study most closely guiding the empirical approach of the present work. He used colour coded sets of accounts to gauge times taken to answer 5 calculation, or 5 judgmental, questions on each firm. He found no support of any significance for the claims made for funds statements in the literature. The present work focusses on only one occupation category, bank lending officers, who were not one of Walker's 5 categories.

In a 1987 New Zealand study of 30 financial analysts from 11 institutions using a single full set of financial accounts only, Bradbury and Newby [1989] observed the speed and accuracy with which respondents tackled judgment and

calculation questions. They found the funds flow statement improved neither speed nor accuracy of answers with the exception of a question requiring calculation of working capital. This is the only work available in print that replicates Walker's broad design.

1.54 INFORMATION LOAD STUDIES

Studies of the effects of information load often generate their research hypotheses from the model put forward by Schroder, Driver and Streufert [1967]. They argued that performance, notably performance in making accurate assessments and predictions, would display an inverted U shaped pattern with respect to increases in information load as measured by both the quantity and the complexity of data cues available as input. The results within the accounting information processing area of research have not been wholly consistent. Liu [1982] found accuracy improved as volume of disclosure increased, for Texan financial analysts not under time pressure. Chewning [1986], however, found the inverted U pattern applied to over a third of his student and auditor subjects, and thought the failure of the other two thirds to display such a pattern was attributable to their use on a consistent basis of decision models. Miller found decision accuracy varied inversely with information load, apparently across all levels of information load for her sample of business students in Arizona [Miller 1986]. Volonino's recent work with 100 MBA

students in New York State supported the inverted U approach, albeit in a rather negatively skewed way, and also showed a striking tendency for morale and confidence to improve with extra information even as performance was deteriorating [Volonino 1988].

1.6 THE THESIS APPROACH

The empirical phase of this present research began with the despatch of a request for an appointment to all 114 banks listed in the 1986 classified telephone directory for Hong Kong. Of the 114 banks circulated 72 replied by letter or phone and 53 appointments were made.

At the appointment, which was generally with the chief lending officer for the larger banks or with a vice president for the smaller banks, we discussed the nature of their banking activities, the use made of accounting information generally and funds flow statements more particularly, in considering credit requests from clients. The smaller the bank, the less use it made of accounting data, as a general pattern. Moreover, not all the banks that made explicit use of accounts used standard spreadsheets to input and evaluate the accounts by standard bank criteria. Some used accounts but not funds flow statements.

Since it is not known which firms or auditors are generally regarded as unreliable by local loan officers, it was thought inadvisable to use Hong Kong accounts at all. One would not know when deviant results were due to recognition or suspicion of dubious accounts. In

conversation with several bankers, scepticism about locally published accounts was quite general although not about accounts the banks themselves demanded.

Hong Kong accounts were excluded from those set before lending officers to avoid the danger of subjects' disregarding the face value of the accounting data. A small pilot test with a final year accounting class confirmed this danger.

The banking officers were asked to permit me to spend an hour with their lending officers after work to see if the presentation of funds flow data significantly affected their lending judgements. 23 banks agreed but only 12 kept their agreement so the thirteenth group comprises isolated individual officers, seen one at a time, from different banks. In the end, some 116 bank lending officers participated in the research.

12 published accounts were chosen from a review of over 1000, using the following selection criteria:-

a) the need for representativeness of the sample,

b) the consequent need for variety to capture UK, US and Australian formats,

c) the need to have a wide range of industries in the sample to avoid such industry specific effects as real estate high gearing in the property development industry,

The copies of the accounts were colour coded, all references to names of directors or the reporting firm were removed, and the accounts with funds statements were

differently coloured from their without funds statements complements.

The subjects were assembled in a meeting room at their bank. They were told that the point of the research was to see what matters were important to them when appraising customers' accounts in the course of making a lending decision. They were told only to answer the questions asked and to proceed reasonably quickly through the questions. Each subject was given a set of six accounts, three with funds statements, three without, and six differently coloured question sheets - 3 calculation question sheets, 3 judgment question sheets. They were all asked to begin work at the same time and to raise their hands every time a questionnaire was completed so it could be collected at once. Completions were timed to the second, using the colour codes to record times remotely when several subjects completed within seconds of each other. As soon as a subject handed in his sixth questionnaire, he went home. At the end of a session, I thanked whoever was left, tabulated the speeds before leaving the premises and the accuracy later at my own office.

The results of the study and the conclusions drawn therefrom are recorded in chapters 9 and 10. In essence, it seems that funds statements are not useful to loan officers and that cash flow statements are not quite the major step forward that some had hoped. Information overload is a plausible explanation of these findings for some, but not all, samples of loan officers and of accounts presented to

them. That is, there were some sample groups that displayed information overload symptoms even when presented with relatively simple funds flow statements; and there were two accounting reports that produced overload symptoms in nearly all subjects facing them.

1.7 PRINCIPAL ASSUMPTIONS AND LIMITATIONS

1.71 SELECTION

There was no readily detectable selection bias between the groups on educational, racial or other lines. However, such differences in results as there were could be attributable to such a bias. A pretest to establish accounting knowledge would have been necessary to gauge any such bias. In the absence of such a pretest, it is unsafe to assume low F scores on ANOVA are sufficient evidence of no selection bias. The discussion in Chapters 9 and 10 nonetheless makes this assumption wherever intergroup differences do not exceed intragroup ones.

1.72 INSTRUMENTATION AND MATERIALS

Equivalence of instrumentation materials is assumed between the main sequence set of accounts and the second sequence. The construct and content validities of this assumption are discussed in chapter 9. The criterion validity is at least suggested by the lack of significant differences;-

a) between the scores of the groups using main sequence from the scores of those using second sequence (except for one outlier funds statement perhaps), and

b) between the scores of the two groups on the accounts coded with the letter M which are common to both sequences. (This does not mean the non M accounts are therefore

equivalent, but rather that the differences expected but not found in (a) above are unlikely to be due to selection, instrumentation or their interaction with other contaminants on the single matter of materials content of the sequence sets). In discussing order effects, it is assumed that subjects completed the questions in the order set. Visual inspection of the subjects by the researcher and his assistants in each group seemed to support this assumption. It is implausible, but not impossible, that one or two subjects answered the questions in the same conceptual order each time rather than in the same presentation order. Were this unlikely practice to have been general, then order-instrumentation testing interactions might have contaminated the results.

1.73 REPRESENTATIVENESS OF THE ACCOUNTS

Moving on to broader issues, it is assumed that the set of accounts well represents the types of funds statements the lending officers would encounter in making thier lending decisions. The bias of the officers against accounts prepared in Hong Kong was so great however, that local accounts had to be excluded from the presentations to ensure the subjects took the exercise seriously. The price paid for this is that the foreign accounts do not in fact fully represent the local ones that the officers would normally be dealing with, albeit with considerable scepticism. This problem is put in context in chapter 8.

1.74 CASH FLOW STATEMENTS

A limitation of this sudy that did not seem so important at its outset looks rather more so now. The most insistent and consistent criticisms of funds statements either in UK or US formats, has come from the cash flow accounting lobby. Up until July 1989 it was only possible to test the claims of cash flow accounting advocates using cash basis SCFPs. Since the date mentioned American published accounts will have been prepared to conform with the requirements of SFAS 95 which mandates the replacement of the funds statement by the statement of cash flow. It is of considerable importance to know if the new statement achieves its aims any better than the old statement did. However, the time is not quite ripe for thoroughly testing Hong Kong subjects on this until the overload effects of novel formats and novel information on users in the territory can be either systematically reduced by some kind of training, or unsystematically reduced by the usual effects of history and maturation as the statement becomes more familiar. However, both sequences included an SCFP that was really an SCF in all but name. It cannot be claimed that either SCF was representative of the generality of SCFs available after the financial year 1989, because no survey was done of such SCFs.

1.75 EXTERNAL VALIDITY

A further limitation of this study concerns its external

validity. While Hong Kong bank lending officers might not be very different from Hong Kong investment analysts in their ranking of information sources and information reliability, there is no available evidence to substantiate this. It seems rather less likely that either group is as effective at processing accounting information as local accounting practitioners or post first year accounting and business students would be. It might be more confidently expected that the accounting information that Hong Kong lending officers cannot digest would also not be digested by lending officers in those other Asian countries where accounts were not seen as reliable or not important, or where business was not conducted in English. However, where levels of business sophistication had reached those prevailing in large firm America, such an assumption could not hold, as in Japan. Those countries, therefore, to which the results of this study might perhaps be applicable could be Taiwan, Thailand, Malaysia, Korea, Indonesia, the Phillippines, much of Africa and Latin America. It may be less applicable to the Indian subcontinent where accounting seems to play a leading role in business education.

1.8 VALUE AND DISTINCTIVENESS OF THIS RESEARCH

The contribution to the body of knowledge of accountancy that was hoped for in undertaking this study can be summarised by the list following;-

1.81 establishing the usefulness of funds statements in Hong Kong,

1.82 adding to the store of knowledge globally about the usefulness of funds statements in making commercial lending decisions,

1.83 extending information overload studies into the area of funds statements to record whether poor results are consistent or not with an overload hypothesis, and

1.84 In addition, this study is distinct from other studies in the same field in that:-

i) it addresses accounts use in Hong Kong, and so represents the first piece of academic accounting research whose results are disseminated in and from the territory;

ii) it attempts to refine and sharpen the approach taken by Walker [1984] in his Australian study to the capture and processing of accounts use data; and

iii) it addresses funds statements in all their major formats, whereas previous studies have each focussed only on the format accepted within one country.

1.9 CHAPTER OUTLINES

Chapter 2 concerns the information content of company accounts. It reviews the efficient market hypothesis tests reported in the USA, the rest of the world and in Hong Kong. It relates these tests to the measurement of information content of accounts as pioneered by Ball and Brown [1968]. It concludes by discussing the information content of accounts in the Hong Kong investment context.

Chapter 3 discusses the role of accounts in bankers' loan decisions with a review of the application of human

information processing paradigms to laboratory studies of such (simulated) decisions. It contrasts the operationalising of the construct of information content in stock market studies with its operationalising in banking studies. Finally, it briefly describes the Hong Kong banking and accounting frameworks.

Chapter 4 leaves behind the review of published accounts in general and begins the focus on funds statements in particular. It describes the history of the funds statement from its earliest appearence in the 19th century to its modification and replacement at the end of the 20th century. It reports the geography of the funds statement in its various guises, according to important worldwide accounting surveys undertaken at intervals during the last two decades.

Chapter 5 reviews the criticisms of funds statements and the empirical research available to back them up. It looks in some detail at the studies reported of the predictive validity of the funds statement for future cash flows. Finally, it analyzes the study done by Walker [1981 and 1984], and partly replicated by Bradbury and Newby [1989], in which funds statement processing time and processing accuracy were investigated.

Chapter 6 analyzes the pressures that led to the eclipse of the funds statement by the cash flow statement in the USA and elsewhere. The cash flow statement is exemplified and the claims made for it are described. Finally, the cash flow statement is contrasted with the more fundamental cash flow accounting reporting systems that have come to be especially

associated with the writings of Lee and Lawson in Britain. Their approach is critically discussed.

Chapter 7 briefly reviews the human information processing paradigms used in accounting research and then focusses on reported studies of the effects of increasing information load on information processing accuracy. The potential contribution of these studies to the interpretation of empirical work on funds statement usefulness is assessed.

Chapter 8 describes this study's research design and its rationale. The extent to which Walker's [1984] study has been replicated and modified is discussed. The control of possible contaminants of the experiment is reported, and the selection of statistical procedures is appraised.

Chapter 9 selects the principal results and their statistical analyses from Appendices D and E (which list them in detail). It discusses the inferences that can be drawn from the results and their statistical tests, and highlights the hypotheses they support or refute.

Finally, Chapter 10 contains the concluding portion of the main body of the thesis. It discusses the major findings and their possible interpretation in an information load context. It discusses the limitations of the research in concept and in execution. It reviews the implications of the results both for accounting practice and for future comparable research. It concludes with a review of what the study has accomplished by way of adding to the body of accounting scholarship. That ends Volume One.

Volume Two contains all the Appendices, as outlined below.

APPENDICES

A THE ACCOUNTS

The accounts as presented to the subjects are provided in Appendix A, in alphabetical order of accounts codes. It is proposed that such an order makes for easier reference that alternative orders such as sequence set, accounts type or apparent difficulty.

B THE QUESTIONNAIRES

Appendix B reproduces the six questionnaires, first the three calculation sheets, then the three judgment sheets.

C THE INTERVIEWS

Appendix C reproduces the notes made at the most informative interviews held with senior bank managers at the outset of the empirical phase of the study.

D DESCRIPTIVE STATISTICS

The content of Appendix D is the complete set of descriptive statistics of the results, sorted by sample group, by account, by account type, by questionnaire, by questionnaire type and in overall summary. Summary statistics of mean, median, standard deviation, skew, kurtosis, maximum and minimum values by each sort category are provided together with brief interpretative remarks after each table.

E THE STATISTICAL TESTS

Appendix E lists and discusses the statistical processing of the results in detail. Like Walker [1984], the most obviously applicable nonparametric tests such as Wilcoxon were used, but unlike him, this study also made use of correlation analysis and ANOVA to increase diagnostic power. Scheffe and similar tests were applied to both the parametric and the GLM ANOVA results to keep the experimentwise error rate below an alpha of 5%.

F THE INTERNATIONAL FRAMEWORK OF ACCOUNTING: A REVIEW

Appendix F reviews the main contributions to studies of international accounting and its harmonization, by way of elaboration of the international aspects of Chapters 3 to 6.

G RESEARCH DESIGN: A REVIEW

Appendix G provides the theoretical background to the research method choices reported in Chapter 8, with special reference to the Campbell and Stanley paradigms [1966] and their recipes for controlling contaminants to internal and external validity. The appendix also discusses the epistemological dimensions of the choice between alternative statistical methods available.

Finally at the end of Volume Two, **Appendix H lists all the references in alphabetical order**, including references made in the earlier appendices.

CHAPTER 2

THE INFORMATION CONTENT OF COMPANY ACCOUNTS TO INVESTORS

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CHAPTER 2

THE INFORMATION CONTENT OF COMPANY ACCOUNTS TO INVESTORS

2.1 INTRODUCTION

R S Kaplan once began a conference presentation on the subject of the information content of accounts with these words [Kaplan, 1978]:-

"When I was first asked to do a paper surveying empirical research in accounting, I found it difficult to believe the world needed yet another survey on this topic. I sometimes think there are more surveys on empirical research than there are papers to be surveyed."

Nearly twelve years after Kaplan said those words they still seem timely. This is especially so for empirical work on equity market responses to accounting reports in the United States. To Kaplan's 1978 list featuring Gonedes and Dopuch [1974], Beaver [1972], Hakansson [1973] and Lev [1974] can be added Lev and Ohlson [1982 p261] who conclude their survey with the assertion that earnings have been shown to have information content robustly "across statistical methodologies, time periods, and stock exchanges in which shares are traded."

The thrust of all these studies is that the US market is efficient in the semi strong form, so that the study of accounts will not enable an investor to maintain investment profits beyond the market average. Even in the US there has been some evidence challenging this by now conventional wisdom [Black, 1973] [Jaffe, 1974] [Downes and Dyckman, 1973] but not enough to subvert it.

In this chapter, the main studies of stock market efficiency and information content of equity oriented accounts are reviewed. The rationale for the review is that the term "information content" is embedded in such studies and the "usefulness" of any accounting report has usually been operationalized to mean "information content". The chapter contrasts the American semi strong stock market context with weaker overseas markets. It discusses the consequences of market inefficiency for accounts information content, and concludes with a critical review of Hong Kong work on this topic. The main thrust of this chapter is that it is necessary to establish that accounts in general have actual or potential information content before it is meaningful to consider the more particular question of whether funds statements have such content. The question of how far any information content ascribable to equity readers of accounts is also ascribable to creditor readers is to be considered in Chapter 3.

2.2 INFORMATIONAL EFFICIENCY

The most authoritative definitions of stock market efficiency at its three different levels could well be those given by Fama in his 1970 paper which has become the most cited paper in the Efficient Markets Hypothesis literature.

An efficient market is one "in which prices always fully reflect all available information...

First, weak form tests, in which the information set is just historical prices... Then semi strong form tests, in

which the concern is whether prices efficiently adjust to other information that is obviously publicly available (e.g., announcements of annual earnings, stock splits, etc.) ... Finally, strong form tests concerned with whether given investors or groups have monopolistic access to any information relevant for price formation ... We shall conclude that, with but a few exceptions, the efficient markets model stands up well." [Fama 1970].

Tests of market efficiency are relevant to the general question of whether or not accounts have information content. In a fully efficient market in the strong form, accounts should confirm ex post the anticipatory movements of the disseminating firm's stock price. In semi strong form markets, accounts should do not only that but also prompt further price movement, as some investors will view the accounts as relevant new information while others will use the accounting numbers to adjust their previous expectations of the firm's prospects. In a weak form efficient market and in an inefficient market, accounts constitute new information to all except insiders and prices will react strongly (but not necessarily quickly) to information within the accounts. However, it is possible for a market to be efficient in any form while the accounts it receives are devoid of information content. In such a case the release of new accounts will be largely ignored by the stock market. This implies that tests of accounting information content are valid only if market efficiency has already been demonstrated by some means other than reactivity to accounts. Conversely, tests of market efficiency using accounts are really testing a joint hypothesis both that the market is efficient and that the accounts have information

content. As Boatsman [1977] put it; the EMH is virtually a tautology and hence nearly irrefutable.

Benston [1967] found a significant but small relationship between rates of change in accounting data and rates of change of stock prices. Ball and Brown [1968] tested a null hypothesis that earnings reported in accounts had no information content (because of measurement errors and because of the availability of alternative more timely information sources.) They assumed market efficiency, so prices would incorporate all available information. To find out if accounting earnings were within the description "information", they investigated the association of variation in stock prices with variation in earnings or with the announcements of earnings. Using a simple proxy for investors' expectations, comprising last reported firm earnings and its previous association with an aggregate market index of earnings, they assembled two portfolios. In one were firms whose actual earnings exceeded "expectations" (positive forecast error); in the other those whose actuals fell below "expectations" (negative forecast error). The shares with positive forecast error tended to generate abnormal returns of more than the market average, the negatives generated less. Moreover, such movements were apt to begin well in advance of earnings announcements and to have only a minority of their total movement left in them by announcement time. This implied little benefit would be gained by studying the accounts once they were made public [Ball and Brown, 1968, hereafter BB].

Gonedes [1974] replicated the Ball and Brown study using a set of financial ratios together with earnings per share (EPS) to form the proxy for market expectations. He found that EPS alone captured nearly all of the information content of those accounting numbers in his set.

Patell [1976] replicated BB on a set of firms for which he had management's estimate of earnings for the coming year. The improvement these figures provided over the BB proxy for expectations was only slight, in terms both of the actual earnings level itself and also in terms of basing a trading strategy on actual rather than proxy epectations. However, he also found, as had Beaver [1974] and Niederhofer and Regan [1972] before him,that the magnitude of forecast error was almost as important as the direction of the error in explaining abnormal performance.

Collins [1975] found that the 1970 SEC requirement for sales and profit reporting by product line segment was beneficial to investors in firms that had not previously volunteered such information. Segment based trading strategies were also more profitable than consolidation based ones. Thus it appeared that the new disclosures possessed incremental information content.

With regard to the information content of the earnings announcement itself, Beaver [1968] found stock price change variance was 70% higher, and stock trading volume 30% higher, in the week of the announcement than at other times of the year. This suggests the public announcement itself

has significant information content even with semi strong efficiency. The Beaver findings have found continuing support since their first appearence in 1968. Hagerman [1973], McNichols and Manegold [1982], Morse [1981], Patell & Wolfson [1979] and Bamber [1983] are further confirmations of the importance of earnings announcements on the American market.

Grant [1980] linked the volume of information signals with firm size. The inverse correlation of size with market responsiveness to earnings announcements was supported by the work of Banz [1981], Keim [1983] and Reinganum [1983] .

Basu [1977] found low P/E stocks outperformed high P/E ones to some extent, but did so with a slowness not consistent with semi strong eficiency.

Jaffe Keim and Westerfield [1989] reviewed the studies by Banz, Basu and Reinganum just cited for their contrasting impressions of whether the price earnings ratio (P/E) subsumed size or vice versa, a confusion which they attributed to the relatively short time periods and the failure to segregate January effects in the previous studies. Their study of movements for all months from 1951-1986 (with January segregated) showed inconsistencies with the previous studies just cited. It was, however, consistent with the previously published results of Cook and Rozeff [1984] who found stock returns jointly related both to P/E and to size. However, Jaffe et al [1989] found this joint determination was strong only for January whilst the other months show only P/E to be of any significance.

Harrison [1977] found accounting changes of form rather than susbstance did have significant positive price responses, in contrast to the conclusions of Gonedes and Dopuch [1974, p 91], Kaplan [1978, p 314] both of which were based quite heavily on the empirical work of Sunder [1973]. Stewart Brown [1978 p27] found abnormal returns associated with forecast errors to such an extent and with such a long time lag (almost 45 days) that he felt able to conclude as follows;

"The excess returns from purchasing the qualifying securities at the time of publication of the EPS number substantially exceed transaction costs. The adjustment process, rather than being instantaneous, is rather lengthy. Thus, with respect to this particular sample [of 158 firms] of securities, the market exhibited inefficiencies".

Although studies such as Ou [1984] could be seen as confirming Brown's findings, other studies such as Lee [1987] found transaction costs to exceed gains from fundamental analysis.

Functional fixation has been advanced as a plausible explanation of why some studies such as Harrison [1977], Kaplan [1978] and Brown [1978] described above find cosmetic accounting to be effective in raising stockmarket returns. Abdel-khalek's small sample study of analysts [Abdel-khalek and Keller, 1979] illustrates this. The analysts understood the FIFO and LIFO effects on profits and cash flow but disregarded their own understanding in reacting to the earnings number results of the inventory valuation policy. They were fixated on earnings as such.

2.3 ACCOUNTING and SYSTEMATIC RISK

Defining an accounting beta to be the correlation of the firm's net income with a market index of earnings, Beaver, Kettler and Scholes [1970] found it and other accounting based risk measures to show significant correlation with the market model risk measures including, but not confined to, beta. Accounting beta also seemed to predict future market beta better than the usual beta stationarity assumption did. Assuming the capital asset pricing model's beta is a reliable and valid explicator of the rates of return on shares, this result suggests that accounting numbers are associated with investors' information sets. In other words, accounting is relevant to investors trading decisions in practice as well as in theory.

However, Gonedes [1973] found no such strong association and attributed the association reported in the previous paragraph to those researchers' use of market price to scale the accounting numbers, which introduces a spurious correlation of accounting numbers to market numbers. Brenner [1977] in his thesis argued that Gonedes had mis-specified beta and that all previous work on the accounting predictability of systematic risk was flawed by mis-specification.

Beaver and Manegold [1975] responded to Gonedes's implied challenge by applying a range of different specifications for both accounting and market betas. Again they found

significant correlations between the two betas, especially at the portfolio level where measurement errors of firm accounting beta would largely average out. This result still applied when non market measures were used to scale the accounting numbers.

Gonedes [1975] recast his earlier study with a different index of market earnings, and this time he too found a significant correlation of accounting with market beta estimates although not such a large correlation as Beaver and Manegold had found.

Hammad [1983] found no significant improvement in ability to predict market beta arose from replacing earnings by cash flow.

Collins and Simonds [1989] found events specific to the firm led to changes in the risk measures specific to the firm.

At this point it might be appropriate to sound a cautionary note. The last four studies mentioned show that accounting numbers can generate useful estimators of a share's systematic risk. That is very far indeed from claiming that investors do in fact use accounting numbers for such a purpose.

Brown and Kennelly [1972] applied the BB approach to quarterly earnings announcements and found they possessed incremental information content to the extent of improving by 30-40% EPS's ability to predict stock price changes. Beaver [1974], May [1971], and Kiger [1972] confirmed that interim earnings announcements did display incremental

information content.

Since studies such those already mentioned suggest that accounting is relevant to stock price; and since studies of market movements from Bachelier [1900] to Fama [1970] and beyond suggest a virtually random movement in stock prices irrespective of time lag, then this raises the possibility that earnings themselves follow a random walk over time. Studies by Lintner and Glaubner [1972], Brealey [1969] and Ball & Watts [1972] all found that earnings time series patterns could indeed be approximated by a random walk, since such serial correlation as did exist was extremely small.

2.4 THE INFORMATION CONTENT OF ACCOUNTING CHANGES

The next question addressed is whether investors in the semi strong efficient market find accounting reports to have so much information content that they can be fooled into raising P/E ratios by accounting cosmetics. Even as firm a believer in the efficient market hypothesis as Keane felt constrained to point out that the assumption of market efficiency yields "only limited scope for deciding what information is most useful" [Keane 1983 p141]. Chambers went rather further:

> "The EMH entails that stock prices adjust rapidly to new information as it becomes available. But it says nothing about the quality of that information." [Chambers, 1974].

Efficiency is no guarantee that purely cosmetic data will per se be regarded as useless.

While writers such as Ball [1972] have found merely cosmetic accounting changes failed to elicit share price changes, some [Patz & Boatsman 1972, Jacobs & Kaplan 1975, Hong et al 1978, Abdel-khalek & McKeown 1978, Arbel & Jaggi 1978, Beaver et al 1980, Freeman 1981, Ro 1981] found that even substantive accounting changes also failed to elicit share price changes. Still other writers found that the share price effects of accounting changes wee strictly mediated by any cash flow effects (usually arising from tax burden changes) [Beaver & Dukes 1972, Kaplan & Roll 1972, Sunder 1973, Sunder 1975].

2.5 THE CONTRIBUTION OF AGENCY MODELS

The motivation of firms to attempt to use form to conceal substance has been addressed by the agency theory literature. Ng [1978] found risk averse managers preferred greater noise in the reports they give out than owners would like. This noise was thought by Choi [1985] to increase the variability investors attribute to the firm's performance. This is consonant with the belief that managers have an incentive to manipulate their reported performance as reflected in the earnings number so as to maximise their own subjective expected utilities, as proposed by Gordon,[1964] Williamson [1967] and Watts [1977], inter alia. Smith [1976] found manipulative income smoothing in his 110 firm sample for the period 1954-62 to be significantly higher for manager controlled firms than for owner controlled ones. Other studies which are reviewed in Ronen, Sadan & Snow [1977] indicated that most income smoothing attempts fail to convince the stock market. Salamon and Smith [1979] found the number of accounting changes to be inversely associated with stock price performance for manager controlled firms but not for owner controlled ones. They also found support in their results for the view that investors perceive earnings reports of manager controlled firms to be noisier than those of owner controlled firms. Choi confirmed all of these discriminants between owner and manager controlled firms, and did not find firm size as such to be important.

Foster [1981] showed the earnings release of one firm significantly impacts the stock prices of other firms in the same industry. Such information transfer is most pronounced for the larger earners in the same line of business as the reporting firm.

Reviewing from an agency theory perspective the entire work to date on the impact of new accounting regulations, Chow [1983] concluded new regulations had a weak and inconsistent tendency to transfer wealth from equity holders to bond holders. This tendency was considerably stronger for firms carrying restrictive debt covenants.

2.6 EFFICIENCY OUTSIDE THE USA : PROPOSITIONS

Most of the studies of stock markets outside the US point in a common direction: statistical tests of the efficient market hypothesis have not supported efficiency in most non-United States markets.

Many non-United States markets can be characterized as thin. Trading volumes are small and frequently discontinuous. Exchanges are less elaborately organized technically; information flows are slower; accounting requirements are formally less stringent, causing poorer disclosure processes. Privileged information channels exist along with shares which are poorly marketable because little is known of them by active traders. The net result of thinness is that only a small number of shares may be bought or sold before a price change occurs. Thinness can contribute to return variances by reducing liquidity and by

causing a clientele effect for various stocks [Cohen et al 1976].

Wai and Patrick [1973 p271] found that the average number of exchange members in a less developed country was 128 as opposed to 404 in fully developed countries. The average number of listed companies was 172 in less developed countries and 644 in fully developed countries. The market value of listed shares was one-seventh of the gross national product or one-half the primary money supply in less developed countries as opposed to equaling the gross national product or being twice the primary money supply in fully developed countries. The small size of most security markets makes them susceptible to legal and political factors because governments are often dominant market participants, and to manipulation and speculation because of the monopolistic powers of various financiers.

Both governments and financiers are able to limit the operations of security markets especially easily when the necessary conditions for efficiency are not fully met. These conditions are a culture with an investment psychology, a monetized economy for savings, a large supply of securities and new issues, a pool of buyers and sellers willing to deal, and a network of supportive monetary and financial institutions [Arowolo, 1971].

The results of organic, institutional, technological, structural and expedient deficiencies are market imperfections [Maniatis 1971]. Transaction costs are high

and liquidity problems are manifest. There is an overwhelming lack of public information so that the cost of accurate information is inordinately high. Limited regulation is matched with inadequate accounting standards. Investors are discouraged by the lack of tax incentives for security investments and by the general uncertainty about future events. Finally, of importance to the efficient market hypothesis type of testing is the presence of technically deficient market indices and of interest rates pegged below equilibrium levels.

In the next section, evidence concerning the efficiency of stock markets outside the US is reviewed.

2.7 EFFICIENCY OUTSIDE THE USA : EVIDENCE

A recent study compared the informational efficiency from 1971 to 1984 of the US, Canadian, Japanese and English stock markets in anticipating rather than following the announced movement of measures of real macroeconomic activity. The US was the most efficient in this sense, but Canada and Japan were also leaders rather than followers. England was an inefficient follower [Kamarotou and O'Hanlon, 1989].

In a survey of 3 European countries plus Japan, the USA and the UK, Barrett [1976] found disclosure levels to be positively and significantly associated with market efficiency.

Australian studies show small inefficiencies but in no case do they pass Keane's [1983] exploitability test beyond the end of a single trading day [Praetz, 1969; Officer,

1975; Ball, 1978; Ball,Brown and Finn, 1978; Brown and Hancock, 1977]. A comment by Brown [1970] is borne out by the later Australian studies of accounts usefulness in generating superprofits:

> "There appears to be no point to waiting until the audited details of profits are published..because by then all adjustments have been made and it is too late".[p 282].

Finn [1982] makes the interesting observation that although, in general, security analysts' forecasts do not enable superprofits to be made, this improves significantly when a forecast is revised in the wake of a company visit by the analyst - such a visit presumably generates inside information of a price sensitive nature.

Emanuel [1989] provides recent New Zealand evidence that asset revaluations for current cost accounting purposes do not produce significant share price revisions. He had previously shown that the time series movement of New Zealand earnings numbers is consistent with a random walk [Caird and Emanuel 1981].

In the UK, semi strong efficiency was evidenced in the work of Brealey [1970], Firth [1974 and 1976], Fitzgerald [1974] and Marsh [1977]. Morris [1975] (cited by Maingot 1984) found little information content in the publication of CCA figures while Maingot [1984] found earnings announcements produced sharp price responses with some anticipatory reaction in the week preceeding announcement.

One of the most interesting studies on the impact and use

of accounting data in the stock market, which looked at the share recommendations from thirty five British brokerage firms, was by Fitzgerald [1975]. He found large positive returns on day thirty-two, when returns on brokerage house share recommendations could first be realized. This is not consistent with semi-strong form efficiency because it suggests that the information in brokerage house recommendations was not immediately reflected in share prices. It indicated that high research activity in the English stock markets can succeed in generating returns which significantly outperform the market in the short run.

Pogue and Solnik [1974] used the difference in average betas for daily and monthly returns to measure the importance of adjustment lags. The United States had almost no lags; Belgium and Switzerland had very large lags; while Germany, the Netherlands, Italy, France, and England had smaller lags. They further noted that the data from the United Kingdom and Italy exhibit such interperiod correlations of alphas that it would be possible to earn subperiod portfolio returns greater than the market price of risk by selecting stocks whose alphas have significant t statistics in the price period. Pogue and Solnik [1974] considered that semi-strong form inefficiencies exist in European stock markets either because of thin trading or because of slow information absorption.

Studies of the capital markets in France [McDonald 1973], Germany [Modigliani et al 1972] and Spain [Palacios 1975] found substantial evidence of inefficiency.

In contrast, the market model appeared to be useful as early as two decades ago in forming portfolios from securities traded on the Tokyo Stock Exchange [Lau, Quay, and Ramsey, 1974]. Portfolio alphas were close to zero and the ranking of the portfolios corresponded to their prior period betas [Pinches, 1974].

The Deakin, Norwood, and Smith [1974] study of the Tokyo Stock Exchange found significant volume effects from the release of the firm's tax data but no price effects.

Deakin and Smith [1978] tested for price effects on the Johannesburg and Toronto Stock Exchanges. Only the Johannesburg stocks showed abnormal price changes in the week of the annual earnings announcement. Toronto stocks were devoid of any unusual changes in any week, and the Johannesburg stocks showed neither anticipation of nor adjustment to the annual earnings numher except in the week of release. Fowler et al [1977] reported that Canadian insiders make abnormal profits when dealing in frequently traded securities. Belkaoui [1978] and Drury [1979] offer limited and somewhat massaged evidence in favour of the opposite view; that the Toronto market has no exploitable weak form inefficiencies.

2.8 HONG KONG STOCK MARKET EFFICIENCY

2.81 INTRODUCTION

The annual turnover in the Hong Kong secondary capital market rose from HK$ 11 billion in 1974 to HK$ 123 billion in 1986. In 1986, 97% of the securities traded were equities, 2.7% warrants and 0.3% loan stocks. The most actively traded sectors were properties and conglomerates, each accounting for one third of the turnover [Lau, 1987].

The Hong Kong stock market remains small in a global context, with less than 1% of the total capitalization of all the main stock exchanges in the world [Securities Review Committee 1988]. Although it was the second largest market in Asia through the period to 1988 when the present work's empirical study was conducted, its size remained only about 2% of the Tokyo market. In April 1987 about 260 companies, mostly local, were quoted and traded on the exchange.

2.82 THE SUPPLY OF FUNDS TO THE STOCK MARKET

Amounts in HK$m raised in the local stock market in the period 1979 to 1989 were as under;

1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1056	5548	9789	1677	1666	2463	2464	8895	33640	7923	14076

[Asiaweek 1990 p88].

The effect of the unification of the four stock exchanges on volumes from mid 1986 is apparent from the above. Quoted companies in Hong Kong pump equity investors hard and often (by international standards) through rights issues, new

issues and creative use of warrants. Stagging of new flotations is widespread and hundredfold overscriptions are quite usual. In contrast, there is little activity in, and only a modest supply of, corporate debentures and securitized long term local debt.

2.83 THE IDENTITY OF HONG KONG INVESTORS

Vittachi [1990] reported the results of a stock exchange survey, as at end 1989, as follows. Only 9% of Hong Kongers hold shares, compared with 16% of Americans; but most local investors live in better homes and have higher education than the general Hong Kong population. 53% of those surveyed thought they needed HK$10,000 before they could buy shares, although a board lot for Hong Kong Bank shares for example is only around HK$2500.

Of the 363,000 shareholders in Hong Kong;

* two thirds are male,

* one third earns less than $7000 a month (compared with two thirds in the general population.)

* 29% earn over $15000 a month,

* 54% live in private housing (compared to 30% of the general population).

* Some 30% are in their thirties and some 20% in their forties,

* 28% are business or professional and a further 29% are white collar staff while 22% are housewives.

* 38% said they would take moderate risks to get above average gains,

* 35% said they would opt for fair returns but small risks.

* 19% said they had taken only minimum risks to get acceptable returns

* and only 8% admitted to taking substantial risks to generate substantial returns.

The survey was conducted by the Marketing Decision Research Co on behalf of the Stock Exchange. Its main message is that private investors in Hong Kong are somewhat risk tolerant. This might be associated with a short term, opportunistic, chartist approach to equity trading, but evidence for this is merely anecdotal.

2.84 EFFICIENCY OF THE MARKET

2.841 EARLY STUDIES

Few studies have been undertaken of the efficiency of the Hong Kong stock markets. Law (1980) reported on some pilot tests of weak form efficiency using four companies' annual share price movements during the period 1965 to 1976.

Wan (1980) had earlier tested the weak form efficiency of the Hong Kong stock market using monthly prices of 32 index shares for the period January 1970 to December 1972. Later, Law (1982) used the daily closing prices of 56 shares to test the weak form efficiency of the Hong Kong stock market during the period September 1979 to November 1979. 32 out of 56 stock prices were found to behave non-randomly, and 13

out of the 32 were constituent stocks of the Hang Seng Index. He attributed the absence of randomness to the small size of the stock market, and the fact that only some 20 stocks could be said to have permanently active markets. It is interesting to note that the market was found by Law & Yeung (1983) to behave as if it were semi strong form efficient in its treatment of takeover price announcements. Finally, quite marked effects of interest rate announcements on different stock indices during 1.1.79 to 31.12.81 were found by Mui and Law (1983).

Most of the studies cited in the previous paragraph were based on monthly or annual data, ignoring the available daily information on stock prices. Small samples of stocks were selected, usually focussing on the stocks constituting the Hang Seng Index, and this was justified by claiming that most of the transactions in the market involved 'blue-chips'. As a result, the behaviour of other stocks was neglected.

2.842 SEMI STRONG FORM TESTS

Insider trading was evident in the price movements of 11 firms involved in takeovers in 1980 [Law and AuYeung 1983].

24 blue chips were studied for the years 1986 through 1988 by Li [1990]. He found that in Hong Kong prices anticipate profit announcements by 12 to 14 days and steady the day after the announcement, unless the profits have fallen, in which case the price dropped for some time. This suggests good news is more likely to be leaked than bad news

through oral networks. The dividend movement was insignificant relative to the earnings movement as a determinant of share price changes. Profit-taking after the announcement was common. Insider trading clearly exists.

2.843 MARKET ANOMALIES

Gultekin and Gultekin [1983] explained the January effect in several stock markets by tax loss selling in December. C C Wong [1989] reported a January effect in Hong Kong of about 8% for the Hang Seng Index and noted en passant that as in Australia, the January effect cannot be explained by tax, as there is no capital gains tax in either jurisdiction.

In Hong Kong there is a large extra return on Fridays and a large extra standard deviation of returns on Mondays around below average weekly mean returns. 30% of earnings announcements were on Fridays and over weekends, which may help explain this pattern. Since Friday purchases are settled on Mondays, giving buyers two days interest opportunity, there is an incentive to buy on Fridays.

2.844 WEAK FORM TESTS

Ang and Pohlman [1978] found serial correlation for bi weekly price changes 1967-74. Wong and Kwong [1984] testing 28 major stocks for 1977 - 1980 by serial correlation and runs tests could not support the view that the stock market was efficient in the weak form, despite its being the fifth

largest in the world by turnover in the period. Dawson [1982] thought he found semi strong form inefficiency in the ability of the recommendations of the largest local stockbroking firm to outpeform the market.

Law [1982] chose 80% by value of all the stocks traded on the Far Eastern Stock Exchange throughout 1978 and 1979 in 3 month blocks of daily price changes for weak form testing by runs, serial correlation and regression tests of the market. He found 52% of the market moved non randomly, that is 32 out of the 56 sampled stocks including all the Hang Seng Index constituents and all the property stocks - possibly as a result of manipulation by large operators. Utilities (all regulated by the Government's Scheme of Control) moved randomly.

For the period September 1985 to August 1986 5 out of 14 of the most active stocks moved non randomly, 4 out of 10 middle active and 7 out of 9 of the least active moved non randomly [Chan et al 1989]. Unification of the four old stock exchanges into one new one in April 1986 did not cause any obvious inflection or break in the patterns of serial correlation. Runs tests showed comparable results. The results of the Chan et al [1989] study show that, although the most active sectors approach weak-form efficiency, the normal behaviour of the Hong Kong stock market cannot be considered as efficient in the weak form, especially for those securities with a low volume of transactions. The random behaviour of the stock prices appears to apply only to a few securities. Consequently, it seems that

traditional technical analysis and fundamental analysis will assist short-term investment decision making in Hong Kong, and permit the earning of excess returns. [Chan et al 1989].

2.845 NEW ISSUE EFFICIENCY

Dawson [1987] examined the secondary market price performance of initial public offerings during 1978 and 1984 of initial public offerings. Although the new issues were underpriced at issue by an average of 13.8% in Hong Kong and 39.4% in Singapore, the average market adjusted price changes over the following year were not statistically different from zero, from which he inferred the secondary market in the two countries was efficient.

2.846 EFFICIENCY OF THE FUTURES MARKET

Choi et al [1989] looked at the movement of the Hang Seng Index Futures from June 1986 to December 1988 and found it non random for much of 1986, but random in a martingale form for the rest of the period. The index futures market therefore seems to be weak form efficient. This may be because the index future is extremely sensitive to changes in market sentiment on an immediate basis and is not easily manipulated by any concert parties.

2.846 BETA STATIONARITY

Previous research done on the betas of Hong Kong securities questioned their stationarity [Wan 1980 and Ip 1982]. 62% of the the betas of the 37 [the most active]

stocks studied by Mok et al [1990] for the whole of the eighties showed non stationarity. Market risk explained and constituted 60% of overall stock risk. There was a significant industry effect. The implication is that tests of the capital asset pricing model in Hong Kong would have to deal with error terms possibly large enough to render the tests useless. It follows from that that efficiency tests will be biassed towards an excessive focus on the speed of price adjustments to new information, rather than on the "accuracy" of such adjustment in asset pricing model terms.

2.85 THE INFORMATION CONTENT OF HONG KONG ACCOUNTS

The average annual rise in the Hang Seng Index of 17% from January 1976 to December 1985 was comparable to the average annual growth in GDP of 20.4% nominal and 10.4% real. P/E ratios for the sample of 32 of the most actively traded local companies examined by Whitman [1990] varied little over the period from a cross-sectional mean of 15. Dividend yields varied little from a 4% mean. Average returns on equity per the published accounts were 25.01% compared with returns on the market after accounting for rights, dividends and scrip of 24.91%. This seems to show returns based on stock market measures and returns based on accounts were measuring the same phenomenon. However, the accounting return showed a 14% standard deviation compared to the market's 9%, and the correlation coefficient between the two sets of annual numbers was only 0.087 with no significance

at the 1% level. The coincidence of sequence means was just coincidence. The three companies with the closest match between accounting return amd market return were;

	Accounts	Market
Kowloon Motor Bus (1933)	25.95	24.86
Bank of East Asia	27.39	28.62
Tai Cheung Properties	19.13	22.69

The greatest discrepancies in both directions were;

Cross Harbour Tunnel Co	62.53	14.43
HK Aircraft Engineering	53.76	21.59
San Miguel Brewery	49.97	19.90
HK Telephone Co	19.43	40.77
HK and Kowloon Wharf	13.34	29.59
China Light and Power	16.90	31.28

Whitman [1990] interpreted his findings as suggesting that the information content of Hong Kong accounts for Hong Kong equity investors was not very high.

2.86 CONCLUSION

The Hong Kong stock market combines great activity with great volatility. As an inefficient market, it attracts speculative interest chasing arbitrage profits from time to time. It is comparatively under-regulated in international terms, and many believe such under regulation helps explain its energetic activity levels. Earnings announcements are anticipated by insiders and such anomalies as Monday effects

are consistently perceptible. In these circumstances, accounts constitute information with potential usefulness in obtaining capital gains beyond the market average, especially if the accounts reader is an insider. The information content of true and fair accounts, therefore, is potentially great, for the market is too inefficient to have fully discounted such information before its release. This makes Hong Kong an especially suitable arena for testing the information content of accounts. Whitman's [1990] contrary findings may reflect not absence of information content as such, but rather the energy that goes into speculation and chart based trading in between annual earnings announcements. His results may be conveying the noise such activity emanates to muffle the genuine signalling effects of those announcements.

If any aspect of accounts have information content, sophisticated analysts in Hong Kong will be rather likely to register the fact. They would do this to make superprofits arising from the combination of their insider status, the inefficiency of the market and the *eventual* price sensitivity of the accounts data they were considering. In chapter 3 the way in which analysts, bankers and investors process their information sets is considered.

2.9 CONCLUSIONS

In this chapter, the links between accounts' information

content and efficient market tests has been briefly explored. In the USA, stock markets seem to behave at the semi strong level of efficiency. This means accounts have information content before they are made public but most of the price sensitive data in them has been exploited by insiders before the public dissemination of the accounts. However, stock markets in the rest of the world are markedly less efficient than in the USA. In Hong Kong, the stock market largely fails even weak form efficiency tests. This means studies of quoted companies' accounts would assist the investor to beat the market, and the corollary of this is that Hong Kong accounts have information content. If that is so, then funds statements should also share in that information content, assuming they really are useful to investors. However, if investors turn out to disbelieve Hong Kong accounts, rightly or wrongly, then such information content as accounts do possess would have to be interpreted as, mostly, indirect signalling or announcement effects. That is, the accounts' price effects would have to do more with market interpretation of the message management was attempting to convey in its annual report than any simple and direct response to any accounting numbers. Perhaps the earnings announcement and its accounting context in the risk tolerant Hong Kong milieu are like the croupier's announcement of which number the roulette ballbearing actually landed on after all the bets are in.

CHAPTER 3

ACCOUNTS INFORMATION CONTENT FOR LOAN CREDITORS

3.1 INTRODUCTION

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CHAPTER 3

ACCOUNTS INFORMATION CONTENT FOR LOAN CREDITORS

3.1 INTRODUCTION

In this chapter, attention is focussed on what constitutes accounts information content to loan creditors. The previous chapter concerned information content in a stock market context. It was seen that the market provided comment on information content on an aggregate level, using the language of share price movements. Information content for loan creditors, in contrast, has been largely studied at the small group or individual level. There is no equivalent of share price movements for unsecuritized loans. Most loans are largely bilateral affairs between a company and its banker. Even with syndicated loans and traded debt instruments, it is the bilateral relationship between the borrower and the leading bank in the issue (or placement) that materially determines the terms and capital costs of the loan. Information content in this situation has been studied via consideration of how bankers process information in considering a loan application. Bankers, indeed, have been among the most frequently used subjects in the human information processing experiments reported in the accounting literature. This chapter reviews the two principal models in that literature, the lens model and protocol analysis. It then summarizes the major empirical tests of these models that have been conducted in the banking, finance and accounting fields. One particular

aspect of human information processing, information load, is so germane to this study that it merits its own chapter. It is more appropriate to place that chapter immediately before chapter 8 (on the research design of this work), so that information load concepts are fresh in the mind of the reader when the empirical work is discussed. This chapter opens with a brief discussion of the comparisons made in the empirical literature of lenders' and investors' information needs. It then reports the principal features of the Hong Kong banking scene that seem likely to affect accounts information processing, before moving on to the main body of the chapter and its information processing focus.

3.2 DIFFERENT NEEDS FOR DIFFERENT USER GROUPS ?

Studies in banking, (including Libby [1975 and 1979], Estes and Reimer [1977], Eyes and Tabb [1978], Abdel-Khalek and El Sheshai [1980] Casey [1980] and Zimmer [1980]), have tended to support the view that users' needs are specific and relate to each job, decision making task or environment. No general summary of needs or informational priorities has emerged, with the possible exception of such studies as McCaslin and Stanga [1982].

Libby [1979a and b] in two studies evaluated the communication process between CPAs and commercial lenders and the impact of one type of qualification on the lenders decisions. Later they expressed their findings thus:

"Contrary to opinions expressed by some policy making

organizations, little miscommunication between the two groups was in evidence. Recognition by the bankers of other sources of information concerning uncertainties appeared to make the auditors' qualification redundant in this situation." [Libby and Lewis, 1982, p249].

A study was conducted by McCaslin and Stanga [1986] to determine the similarities in the information needs of financial statement users. Statistical analysis of the responses by the 59 CFAs and 112 chief commercial loan officers disclosed no significant differences in the relevance or reliability judgments of the analysts or bankers for most items. This can be seen as implying that users have similar information needs and that therefore general purpose external reporting is valid. The findings contrast, however, with those of a previous US study by Benjamin and Stanga [1977], but they are consistent with an earlier UK study by Firth [1978]. However, both of these earlier studies focused on disclosure needs rather than measurement needs. The present work, also, is more a study of disclosure than of measurement, so we are not entitled to generalise from findings with investment analysts to the bankers making loan decisions.

In partial confirmation of McCaslin and Stanga, on the specific issue of materiality, Reckers et al [1984] showed within group differences in the evaluation of materiality were very large both for bankers and for CPAs; certainly very much larger than the between group differences.

The question of overlap and contrast between the accounting needs of equity investors and lending bankers is

clearly far from approaching even a tentative set of answers. On the one hand is the view that published accounts are (or should be made to be) general purpose performance reports to all stakeholders in the firm. On the other hand is the view that different users have to make different decisions, so have different information needs arising from the various decision demands. To oversimplify this rather complex matter, the general purpose view is apt to be held by those who (unfashionably) insist on stewardship and accountability as the basic justification for publishing accounts. The specific needs view sits rather more comfortably with the Trueblood inspired decision usefulness schools. The traditional stewardship view has received something of a boost with the rise of the agency theory and Watts-Zimmerman approaches to accounting design in recent years, but it remains broadly fair to say that decision usefulness is the aim espoused by standard setting setting bodies in the Anglo-American accounting communities round the world. Decision usefulness in the lending context critically concerns probabilities of timely and full repayment of cash. The literature fully reflects that concern as will be especially strongly reflected in Chapters 4 through 6. The decision usefulness philosophy of accounts has been adopted in this work, but with reservations that will be expressed at the appropriate points hereafter.

3.3 THE BANKING SECTOR IN HONG KONG

3.31 ITS PLACE IN THE WORLD

Hong Kong is still occasionally designated the world's third largest financial centre, most recently by Lui and Peasnell [1989]. The weekly listings in Asiaweek have New York, Tokyo, London, Frankfurt and Taiwan showing a larger market capitalization than Hong Kong for the last two years, so any residual claim the territory has to the number three position may reflect offshore bookings of trade finance rather than more mainstream measures of financial centre ranking.

Fortune's July 30 1990 issue published its first Global 500 integrating the US with the rest of the world in tables it previously presented separately. No Hong Kong company is in it. It also presented the Global 100 banks, and Hong Kong's only entry was the Hong Kong and Shanghai Bank, at number 30 with assets of just under US$ 132bn, deposits of $118bn (the 27th highest) and loans of $98bn. This compared with the world number 1 Dai Ichi Kangyo Bank with assets of $413bn and deposits of $313bn. The UK's top ranking bank was Barclays at number 17 with assets of $206bn and deposits of $168bn. Suprisingly high up in the world was the Bank of China at number 23 with assets of $182bn, deposits of $74bn and loans of $107bn.

3.32 RECENT DEVELOPMENTS

Three recent trends in corporate finance generally were discerned by McBain [1989 p13];

1. Movement from short term to long term finance
2. Diversification of financing methods
3. Wider distribution of investments.

Regarding trend 1, in 1975 there were no corporate bonds in Hong Kong: in 1989 there were HK$ 8188 million outstanding, including FRNs and longer than 12 months commercial paper. This is still less than 1989's *new* share issue and rights issue proceeds, but it does show that the bond sector of the capital market has begun to develop some significance.

Regarding trend 2, leveraged buy outs began to appear in Hong Kong in 1987; and fixed rate loans have been almost entirely replaced by floaters, transferables and standbys. Hong Kong has one of the most active swap markets in Asia, especially for interest rate swaps. The Hong Kong Capital Markets Association has over 120 members actively involved in loan syndication, of which the largest so far has been HK$ 10 billion for Hong Kong International Terminals. McBain [1989 p19] was probably not alone in viewing the transferable loan certificate as an interim step to the full securitization of loans.

Regarding trend 3, the Venture Capital Association is only two years old but has over 40 members. The move toward loan securitization disperses participation more widely, as in the practice of syndicating bill of exchange facilities. Mortgage bonds have not developed very much, since mortgage loans are popular with banks. There are too many banks competing for the primary generation of mortgages to create

much borrower interest in a secondary market.

By way of perspective, the amounts raised in the Hong Kong capital market in 1989 comprised the following;

	HK$million
New Listings	3,368
Rights Offerings	5,574
Warrant Conversions	3,631
Bond Issues	1,502

The inflation adjusted rate of interest on deposits has never been above minus 1.14% from 1977 to 1988, according to Li and Skully [1990], whereas positive real rates applied in Indonesia, Korea, Malaysia, Singapore, Taiwan and Thailand for virtually every year of the period. Not suprisingly investors preferred stocks and foreign exchange accounts to Hong Kong dollar bank deposits.

3.33 USES OF LOANS BY SECTOR

Quarter end outstanding loans in Spring 1990 were $691bn for use in Hong Kong and $562bn for use outside.

Of the domestic use loans;

	$bn	%
Finance visible trade of Hong Kong	64	9
Manufacturing sector	48	7
Wholesale & retail trades	65	9
Building and propery development	101	15
Purchase residential property*	120	17
Financial concerns	91	13
Stockbrokers	4	1

Other sectors and personals	198	29

*excludes $107bn Home Ownership Scheme Loans.

There were 165 licensed banks, 37 restricted licence banks and 196 deposit taking companies, according to the First Quarter [1990] report of the Hong Kong Government's finance branch.

3.34 LIMITATIONS OF PERSONAL GUARANTEES

Goodstadt [1986] described the mid eighties jolt to Hong Kong bankers' preference for personal reputation over security valuation in the following way. The problems of such families as the Fungs and the Chaus shocked the region's bankers into realizing the limitations of the protection offered by personal guarantees. Guarantees often exceeded the combined assets of the indebted family. In Hong Kong, although some banks have faced near collapse following family failures, they had remained reluctant to insist on Western style credit analysis of accounts partly because of the financial staying power the Chinese family can command in even the grimmest situations.

3.35 BANK REGULATION

The fall of Hang Lung Bank in 1983 and of Overseas Trust Bank in 1985 sensitized the Commissioner of Banking to the inadequacy of the controls preventing banks from extending facilities to related parties or insiders [Li and Leung 1985].

Concern for Hong Kong's stability has been a major factor in government policy since the dollar crash and consequent peg of the HK$ to the US$ in 1983. The 1986 Banking Ordinance, passed in order to supplement the Exchange Fund's stabilizing authority, defined risk assets for the first time, specified a capital to risk asset ratio initially of 5% and laid down guidelines for authorized banking activities [Loong 1986]. Since then, the local newspapers' business pages have quite often reported speeches by local bank directors criticizing the guidelines policy.

3.36 BANKS' ACCOUNTS ANALYSIS

Lending institutions in the US and UK commonly use financial statement analysis to obtain information on a commercial customer's operating and capital investment activities. Results must then be interpreted to identify a borrower's strengths and weaknesses. Techniques used by analysts for financial statement analysis include comparisons, common-sizing and ratio analysis. Bank analysts normally consider liquidity, operating efficiency, profitability, and leverage positions when evaluating financial statements. Cash flow analysis recently has become a very popular analytical tool for dealings with small and medium-size customers. Many institutions also use spreadsheets to transfer a customer's financial statement into a conservative format that meets the institution's policies [Yallapragada and Breux 1985]. These remarks apply to Hong Kong but only as part of an appraisal process where

the question of reputation is researched often more thoroughly and confidently than the numbers.

3.37 CLIENTS' CHOICE OF BANKERS

A student at Hong Kong University [Mak 1985] investigated the process whereby local firms chose their banks. Real estate firms chose their banks for the availability of low interest HIBOR linked Hong Kong dollar loans. More important to trading and manufacturing firms was effective handling of trade finance. Speed of response and genuineness of account officers' concern were important secondary factors. There was hostility to aggressive lenders hustling new business. The most important information sources in choosing a bank were previous experience of the bank, conversations with account officers and references by business associates. [Mak 1985].

A similar project was undertaken by Kan [1985] on small firms' banking decision processes. Kan [1985] was told by 58 owners of smaller Hong Kong firms that they wanted cheap, quick and accurate servicing of their financing needs, especially wth regard to letters of credit and trade bills. British banks, especially the Hong Kong Bank, were regarded as best able to help smaller firms in business development. It was the existence of new banking needs catalyzed by personal relationships that was characterized as responsible for firms becoming customers of new banks. PRC banks were useful for China trade but not otherwise. Small banks were seen as unable to handle project financing "due to lack of

expertise or legal limit restrictions" [Kan 1985, paragraph 1.4] The main reason for leaving a bank was, for 48% of the respondents its inability to meet needs, for 38% bank personnel misconduct, and for 36% slow service.

Also of interest is Carstairs [1988] who reported an increasing tendency for customers to split their custom between a number of banks, because of segmentation of new banking products and because of past bank failures. This could be expected to sharpen competition between banks, and that might in turn reduce the insistence on adequate accounting information on some occasions.

3.4 BANKERS' INFORMATION USAGE AND THE LENS MODEL

3.41 INTRODUCTION

A prime concern of all human information processing research is to map the individual's judgment policy. This is generally done in an experimental setting where the individual is presented with various combinations of values on several input variables which he may use to form a judgment. The individual's policy is inferred from the relationships between the variables and the resultant judgments. Hofman [1960] deemed such an approach "paramorphic", by which he meant such studies do not show exactly how information is processed but only what information it is that gets processed and what is its apparent importance in explaining the ultimate judgment.

Paramorphic judgment modelling is frequently done within the paradigm of the lens model first expounded by Egon Brunswik [1952 and 1956]. In its simplest form it relates an environmental variable to a person's predictive judgment of the size of the variable. Evidence available to make the judgment is wholly partitioned into discrete cues. The correlation between the environmental variable and each individual cue is termed the validity coefficient of the cue, while the correlation between each cue and the personal prediction is termed the utilization coefficient. The closer the two types of coefficient are, the more accurate will be the prediction. Einhorn et al [1979] thought that choices are made more difficult when some cues presented to subjects are redundant. Payne et al [1986] reported the effects of manipulating cue values on processing strategy and confirmed an earlier finding by Johnson [1985] that subjects paid more attention to cues with extreme values.

One element of a lens model analysis is the consistency with which an individual applies his own decision rules to appropriate situations over time. This is called cognitive consistency. Many studies have shown that high cognitive consistency is so rare that nearly any prediction by an individual is outperformed by the least squares linear regression model of the individual's series of predictions of an environmental variable. [Goldberg,1970; Dawes and Corrigan,1974]. The superiority of the individual's longitudinal regression model over any one product of that model is matched by the superiority of the cross-sectional

model derived from regressing the decisions of a group of people at a single point in time. The cross-sectional model is sometimes termed (in lens model research reports) the composite judgement. Ashton [1982 p42] made the following claims about it.

"It can be shown analytically that the accuracy of such mean (i.e. composite across a set of individuals) judgments will be greater than, or equal to, the mean accuracy of the individuals' judgments. Thus the mean accuracy of the individuals' judgments is a lower limit for the accuracy of the composite judgments."

However, empirical research within the lens model framework has shown composite judgments to be substantially more accurate than this lower limit. Hubbard Ashton [1984] found that when predictions by subjects were adjusted for mean systematic bias, the results were more accurate than their regression models on a case by case basis. Libby and Blashfield [1978] found that the majority of the incremental accuracy to be gained by forming composites of all individuals in a group could be achieved by forming composites of only three individuals.

The cognitive consistency of the individual subject is balanced against the consistency with which the environment behaves, and this is referred to as its environmental predictability. The greater the role of random events, accident and genuinely new phenomena in the environment, the lower will be its predictability and the less purpose will be served by model building. The success of a model in predicting the state of the environment is gauged through

the matching index, which relates the ex *ante* optimal prediction assemblable from available cues to the individuals' regression model. In contrast, absolute success in predicting what actually did turn out to occur is gauged through the rather less decision-useful achievement index, which is little more than a record of predictive hit rate. The achievement index absorbs compensatory virtuous error whenever cognitive inconsistency happens to be reinforced by environmental unpredictability - a phenomenon some business people call "gut feel".

Because many cues may be mutually correlated, regression of utilization and validity coefficients may produce distorted final regression equations for the cue make up both of the environmental variable and of its predictive estimate. ANOVA is not distorted by multicollinearity but rather tends to reflect it through the size of interactive effects. Although Ashton [1982 p24] stated ANOVA had been used only for policy capturing studies, which look only at the right side (cognitive consistency side) of the lens model, there is nothing inherent in the technique to perpetuate that limitation. He further maintained [p25] that interactive effects in studies before his had not been very significant. This he linked with the relative insignificance of nonlinear terms in the regression approach to information processing.

Lens model studies have been applied to auditing (eg Ashton and Brown [1980], Weber [1978]), materiality

judgments (Messier [1979],Firth [1979]), and bankruptcy prediction (which is drawn on in subsequent subsections).

3.42 BANKERS' CUE PROCESSING WITH SPECIFIED PRIORS

Libby [1975a] had 43 experienced loan officers use 5 financial ratios to predict if each of 60 actual firms had or had not failed, after being told that the failure rate was 50%. Environmental predictability was 51. That is, 51 out of the 60 firms could be correctly predicted from a discriminant model using only the five cues. 40 of the 43 subjects performed at a better than random level. If the majority predictions for each firm were taken, (the "composite judge" method), 49 out of 60 were correct. The linear regression model of the subjects' individual predictions were 52.9 correct scores; which exemplifies the tendency for the results of a person's decision model over time to outperform any one result emergin*p+5Xg from it. Libby [1976a] suggested some reasons for this phenomenon in the particular context of predicting bankruptcy. First, the environmental variable, business failure, is well defined and reliably measured. Second, bank officers are experts at the prediction task. Finally, the distributions of the actual ratios used were very skewed, which made prediction that much easier.

Zimmer [1980,1981] replicated Libby's study with 30 Australian loan officers, 42 firms and 5 ratios. Environmental predictability was 37 firms, 28 of the officers did better than random with a mean of 32.4 correct while the

composite judge produced 36 firms. He obtained virtually identical results a few months later with 30 students.

3.42 CUE PROCESSING WITHOUT SPECIFIC PRIORS

Casey [1980b] reported results apparently worse than, and inconsistent with, those of Libby [1976a] and Zimmer [1980, 1981]. For 30 firms the mean predictive accuracy was only 17 while the composite judge was hardly any better than this mean. The explanation was that subjects in this study were not told before they started that the sample of firms was equally divided between failed and non failed. It seems as if subjects used their own subjective prior probabilities which were rather optimistic.

Abdel-Khalek and El-Sheshai [1980] asked 28 loan officers to predict default for 32 firms, using cues they themselves "bought" from the researchers' catalogue of 18 possible ratios. Subjects were only told that "some" firms had failed. Environmental predictibility optimised at 90.6% while individual predictive accuracy was 62.5% as was their decision model. This suggests the importance of priors when man is outperformed by his model. This study also reported the surprisingly high predictive ability of a current ratio of over 2 (84%) and of a debt to equity ratio of over one (72%).

Reviewing the Abdel-Khalek and Sheshai [1980] study where cues were purchased from the researchers, and noting the 23% improvement in accuracy associated with replacing subjects

by their regression model, Libby and Lewis [1982 p246] commented: - "[It] suggests that the choice of cues is crucial while the weighting is of lesser consequence. This conclusion is consistent with that of Dawes and Corrigan [1974], Einhorn and Hogarth [1975] and others."

Findings by Danos et al [1989] suggest loan officers reach a high level of confidence early in the lending process based on summarised accounting and other background data. When, later on, factors concerning firms' financial plans or underlying assumptions are varied, then lenders adjust their decision in the appropriate direction even if it goes against an earlier judgment.

Loan officers from eight banks were used in the Danos study. It was decided to focus on their medium sized clients since larger ones could be evaluated from publicly available data, and data from smaller ones was apt to be inconsistent and unreliable.

'Decisions regarding existing borrowers were based heavily on track record and interpersonal relationships, making it difficult or impossible to isolate the effects of accounting information and creating serious internal validity problems.' [Danos et al 1989 p236].

For new clients, the procedure consisted of the following 3 steps:

1) look at public data to form a preliminary impression,

2) make contact with key personnel and visit the borrowers place, to size up operations and plans, and

3) perform detailed credit analysis and evaluation of both historical and forward data, to evaluate the repayment

probabilities.

Danos's team used 2 cases; one strong, one weak. 48 out of 52 bankers agreed on the weak case, 47 on the strong case. Accounting data seemed to be used to signal managerial competence."Providing well grounded forward looking data for lender examination seems to signal creditworthiness." [Danos et al 1989 p245].

In settings without quick and clear outcome feedback, even with experienced professionals, decision makers displayed extreme and inappropriate confidence in the quality of their judgments [Einhorn and Hogarth, 1978; Oskamp, 1965] and ignored subsequent disconfirming evidence [Elstein et al, 1978; Lord et al, 1979; Koriat et al, 1980]. However, bank loan officers do have to defend their decisions before a loan committee. "Such a setting has been shown to enhance peoples' memory of cues and to incorporate more cues in their judgments [Ebbesen and Konecni, 1975]" cited by Danos et al [1989 p238]. It also means they can detect and respond to subtle variances in routinely analysed data [Danos et al, 1984].

Schepanski [1983] claimed studies previous to his show considerable evidence that creditors use financial statements in judging commercial loan applications [Miller and Relkin, 1971; Beckman and Foster, 1969; Cole, 1976; Collins, 1966; Cohen et al, 1966; Beckhart, 1959; Hodgman, 1963]. Since a majority of most auditors' clients consist of small or medium firms with closely held ownership, creditors may

be the main external users of firms' financial statements [Schepanski 1983].

Literature shows the main traits bankers rely on to evaluate prospective borrowers are payment record, financial condition and quality of company management (Schepanski [1983] citing the same references as in the preceding paragraph). Schepanski asked 25 bank trainee subjects to rate on a 19 point scale, for each of the three traits, the prospects of 79 firms. The judgment model emerging from this was non-linear with a geometric averaging rule and conditional monotonicity (whereby the rank effects on the dependent variable of a change in any one cue remain the same, irrespective of the fixed values of the other cues).

An individual's ability to express the relative emphasis he places on cues when forming judgments is called his self-insight in the HIP literature. In accounting and business contexts, research has found relatively little self insight with frequent and large errors in the estimation of important cues [Ashton, 1974; Joyce, 1976; Savich, 1977; Slovic et al, 1972; Wright, 1977 and 1979; Ross and Firth, 1987].

3.44 CONTENT CUES

In an interview, Robert E. Wilkes [1985], executive vice-President of First Jersey National Bank discussed what his bank looks for when evaluating a loan request. For the first loan, the list of priorities includes:

1. adequacy of capital,

2. debt service capacity, and

3. integrity of the people.

When monitoring loans to small companies, factors which are reviewed concern:

1. adherence to repayment schedules,

2. receiving current financial information regularly, and

3. trend analysis.

This probably conforms to a common sense view of what laymen would expect bankers to be interested in. Empirical research on bankers' actual processing of loan requests, however, casts some doubt on the realism of this view.

Hoshower and Versaggi [1985] reacted to a 1983 Wall Street Journal article which had stated that few bankers and investors are sophisticated enough to understand accounting procedures, and may thus make ill informed decisions. They devised a comprehension test of accounting by lenders and investors. Bank vice-Presidents and certified financial analysts were selected to complete a questionnaire on accounting definitions. The results showed that many financial statement users failed to interpret correctly the results of some familiar accounting procedures.

Rogers and Johnson's [1988 p6] study selected the current ratio, the net margin ratio and the debt/net worth ratio to develop their cue model because "a number of studies point out their significance as indicators of loan approval [Miller, 1972; Cole, 1980: Van Horne, 1980]."

Dyckman et al [1978, pp 63-6] reviewed the literature to report that decision makers were not much interested in inflation adjusted numbers. Similar results were reported for bank managers by Eyes and Tabb [1978] and for life insurance investment managers by Benston and Krasney [1978]. Enis [1988] found CCA led to lower accuracy and consensus than historical cost in investor prediction of stock price movements. Finally, Berry et al [1985] discovered US bankers operating in the UK still find HC possesses more information content than CCA but they do not ignore CCA altogether.

Epstein [1975] found financial statements were little used in making investment decisions but respondents to Most and Chang [1979] *felt* they were very useful in such decisions. These differences of result could reflect instrumentation differences only.

3.45 PRESENTATIONAL CUES

3.451 MAIN BODY OF THE ACCOUNTS VS FOOTNOTES

Welsh [1987] found the manner of presentation affected the accuracy of students and analysts in predicting stock prices. Subject achievement was significantly increased by the placement of data in the body of the balance sheet rather than in a footnote, both for the novices and the experienced analysts.

3.452 CHERNOFF FACES

Moriarity [1979] asked 227 undergraduate accounting

majors to classify 22 discount stores 7 of which had failed but this was not revealed to any of the subjects. Instead, half the subjects received their financial cues in the form of Chernoff faces where the size and shape of features represent distinct financial ratios [Chernoff and Rizvi 1975]. Those who received the faces with explanations showed by far the greatest prediction accuracy while those who received only financial ratios performed the worst.

3.46 FUNCTIONAL FIXATION ON CONSTANT CUES

Relevant to the present work are studies of functional fixation. An individual fixated on accounting numbers will be unable to change his utilization of those numbers when the underlying methods that generate those numbers change. Ashton [1976] supplied 106 MBA student subjects with sets of information for setting selling prices of 30 products. Some students were then given data preparedn a different costing basis and so advised. All students were given a second group of prices to set. Multiple regression was used to extract each subject's decision model from the first exercise, and that model was used to predict the prices that a totally fixated student would have used in the second exercise. About half of the students given data on a new costing basis did not change their prices by any more than the students whose costing bases were unchanged. This result meant a "sizeable proportion" of subjects were functionally fixated.

Swieringa, Dyckman and Hoskin [1979] replicated Ashton

with tighter control of confounding influences, and broadly supported his results. They also found, however, that the *more* information that was supplied to the students about the changes, the *less* the extent of the price change, a phenomenon suggestive of an overload effect. A detailed discussion of overload effects is presented in Chapter 7.

Abdel-Khalek and Keller [1979] asked 61 financial analysts and investment officers to evaluate the attractiveness of 6 real but disguised firms as investment opportunities, before and after a FIFO-LIFO switch or the reverse. Results suggested considerable functional fixation.

3.5 PROTOCOL ANALYSIS

3.51 INTRODUCTION

Protocol analysis is the method of detecting how decisions are made, by asking subjects to think aloud as they work out alternative merits and demerits in all the dimensions they deem relevant. Protocol analysis is also known as process tracing in earlier articles.

Byrne [1977] asserted that protocol analysis should be confined to situations where individuals find it easy to verbalize.

Anderson [1985] found a sharp drop in performance was demonstrated by inexperienced analysts when required to verbalize, thereby demonstrating the distortions inherent in protocol analysis.

Libby [1981 p93] admonished thus :-

"It cannot be overemphasized that process tracing is not a substitute for theory or a well defined purpose."

Much of the early process tracing research was done by engineers and computer scientists. They were concerned to build computer programs representative of human information search and processing behavior as part of a project to replace man by his model. Libby [1981] was concerned that such an orientation showed little concern for reproducibility, parsimony, discriminability or explanatory theoretical structure.

3.52 DECISION PROCESSES

Protocol analysis characterizes decision making processes in the following ways;

additive; the *linear compensatory* decision process wherein each alternative is scored for each of its components, which gives rise to selecting the alternative with the highest score.

additive difference: proposed by Tversky [1969], this linear compensatory process compares alternatives directly on each dimension, extracts a difference and sums them (taking one pair of alternatives at a time).

elimination by aspects: also attributable to Tversky [1972], this non-compensatory process begins by selecting an aspect or dimension. All the alternatives that do not possess this aspect are eliminated, and a second aspect is focussed upon for the second round of elimination. This recurs until only one alternative remains.

conjunctive: an alternative must have a certain minimum value on all the relevant dimensions.

Payne [1976] defines the **lexicographic** strategy as a disjunctive, non-compensatory, non-linear strategy that selects the most attractive alternative on the most important dimension.

3.53 REVIEW OF RECENT REVIEWS

Ford et al [1989] have done the most recent review of the protocol analysis literature. Forty five studies were

identified and coded. The results firmly demonstrated noncompensatory strategies were the dominant mode used by decision makers. Compensatory strategies were typically only used when the number of alternatives and dimensions were small, or after a number of alternatives had been eliminated from consideration.

The most important previous review of this literature was by Abelson and Levi [1985]. Most of the studies reviewed reported the conjunctive model to be the dominant mode of processing decision information. A further conclusion that emerged was that as the number of alternatives and dimensions increase, there is a greater likelihood that the decision maker will use non linear processing strategies such as lexicographic or elimination by aspects.

3.54 APPLICATIONS OF PROTOCOL ANALYSIS

Four studies applied protocol analysis to the process of financial analysis. The earliest was Clarkson [1962] who attempted to construct a model of a bank trust officer's portfolio selection process. Then, Biggs [1979] extended Payne's approach using 11 experienced financial analysts who thought aloud as they selected the company with the highest earnings power from a group of five.

Bouwman [1980] used protocol analysis to distinguish expert from novice decision making strategies in analysing financial case studies. Although the sample only consisted of 3 professional accountants and 15 students, some differences appeared pronounced enough to be worth

mentioning. Students appeared to evaluate information in the order it was presented until a problem emerged. Information was evaluated on very simple trends such as sales are up, and a set of simple relations between data items were formed which were internally consistent but not reconciled to other sets. Once something was identified as a problem, novices made little extra effort to gather relevant new information. On the other hand, the experts appeared to use a standard checklist of questions only as a starting point. Data were often examined in terms of complex trends. A general overall picture of the firm was developed and named (such as 'expanding company') based on the initial information acquired. When the stereotype was violated, an in-depth examination to uncover significant causes would be initiated.

Stephens [1979] asked 10 bankers to think aloud while evaluating a commercial lending case. He found they spent a lot of time computing and analysing ratios and ratio trends. Their failure to adjust for differences in inventory or depreciation methods suggested a degree of functional fixation on earnings.

Protocol analysis by Frishkoff et al [1984] lent support to the importance for 12 financial analysts of earnings per share, return on investment, and working capital, but *not* to cash flow. On the other hand, Campbell [1984] reported in his protocol analysis that six bank loan officers found earnings per share not useful.

A protocol analysis by Rogers and Johnson [1988 p18] of loan officers lending decisions found "normal interpretation becomes difficult because verbal explanations do not accomodate the impact of remote causes on loan officers." This is a succinct description of the threat to internal validity of the protocol analysis method, since self reporting accuracy depends so much on conscious self insight and environmental awareness.

3.7 OTHER APPROACHES TO INFORMATION PROCESSING

3.71 INFORMATION ECONOMICS

The Committee on Concepts and Standards for External Financial Reports [1977 p27] noted that information is usually treated as a free good in decision theory. However, information economics "treats information as a conventional economic commodity, the acquisition of which constitutes a problem of economic choice." This means experiments involving information purchase may be inadequately explained without explicit consideration of an information economics approach.

3.72 CEREMONIALISM

March [1987 160ff] argues on quasi anthropological grounds that decision process is more important than decision product. Decision making is said to be a sacred ritual involving highly symbolic activities. It celebrates central values of a society; in particular, the ideas that life is under intentional human control, and that control is exercised through individual and collective choices based on explicit anticipation of alternatives and their probable consequences [Feldman & March, 1981; March & Olsen, 1984]. It reinforces the legitimacy of existing authorities, and provides a basis for interpreting their downfall as appropriate. These sacred values are interpreted and reinforced through the information systems and decision processes of organizations. Individuals establish their reputations for virtue; an interpretation of history is developed, shared, and enforced; dissent is nurtured and contained; new ideas are grafted onto old ones or dissociated from them. These ritual, symbolic and affirmative components of decisions and decision processes are not unfortunate manifestations of an irrational culture. They are important aspects of the way organizations develop the common culture and vision that become primary mechanisms for effective action, control and innovation.

Journalism generates accounts of daily events intended to be sold to readers, ostensibly because they find the accounts worthy of their attention. From a decision point of view, however, most of the information generated by journalism is gossip as far as most readers are concerned [March & Sévon, 1984]. It resolves no immediate decision problems (save perhaps what TV shows are available). And this feature is particularly true of those newspapers that cost the most and have the

highest reputations.

It is perhaps a strange vision of information engineering to say that an accounting report should be a form of poetry, using the language of numbers, ledgers and ratios to extend our horizons and expand our comprehensions, rather than simply fill in unknowns on a decision tree. But it is not an entirely unworthy vision of professions to say that their accounts and reports can be richer in meaning than they are aware or intend, and that they can enrich our senses of purpose and enlarge our interpretations of our lives. [March and Sevon 1984 p165].

This view is diametrically opposite to the Trueblood inspired decision usefulness criterion for evaluating information value.

Lehman and Tinker [1987 p516] quote the suggestion that accounting might be best seen as a "technology of foolishness: a ritualistic kind of playfulness and experimentation" [Cooper et al, 1981; Cooper, 1983]. Their prescription for what they seem to view as a kind of illness on the part of accountancy to date displays a remarkable lack of the qualities Cooper mentioned.

"To be effective", expounded Lehman and Tinker [1987 p517], "A particular discursive accounting string must anchor itself in a discursive field - a complex of sedimented discourses - to warrant itself by resonating with the common stock of knowledge of society [Laclau, 1977: Hall, 1982, 72-80]".

In other words, users need to understand accounts if the accounts are to be "effective." This is perhaps a rather uncontroversial proposition. More seriously, an implication of this passage is that foreign accounting practices and assumptions may be ineffective in other cultures [see Appendix F].

3.8 CONCLUSIONS

This chapter has travelled quickly over a large area of literature, so it will be summarized and integrated at this point. The main purpose

of this chapter has been to review studies of how bankers make use of information in appraising loan applications.

The opening section contrasted the way information processing behaviour is studied in market wide aggregations for equity investors with the single group or single individual focus that prevails in loan information processing studies. Studies attempting to establish that lenders really did have different accounting information needs from equity investors were judged not to have reached their goal. The theoretical reasons why needs differentiation exists are nonetheless persuasive to an advocate of a decision usefulness perspective in accounting, and it is such a perspective that the present study adopts.

The growing importance of debt relative to equity in Hong Kong was reported but it was set in the context of the continuing dominance of the latter. Accounts have begun to have a more than purely ritual role in territory banks' processing of loan applications, following loss of faith in personal guarantees and a climate of increasing tolerance of, if not enthusiasm for, regulation of financial activity.

The essential elements of the lens model were outlined with its distinction between cue validity and cue usage. Analysis of variance is the preferred technique to apply this distinction to actual decision processes, since it better quarantines the multicollinearity of the cue set through its calibration of any interactive effects of the set's elements.

It was shown that cue processing was done much more efficiently when subjects had prior probabilities to work from than when they had not. The choice of cues was suggested to be much more important than the weighting of cue coefficients in their assembly into a decision model. Danos et al's [1989] sample, at least, seemed willing and able to modify

initial judgments in the light of any later disconfirming evidence, but personal relationships and track record far outweighed accounts as such for new loan applications from existing clients, in his study.

For new clients, the procedure consisted of the following 3 steps:

1) look at public data to form a preliminary impression,

2) make contact with the key personnel and visit borrowers place, to size up operations and plans, and

3) perform detailed credit analysis and evaluation of both historical and forward data, to evaluate the repayment probabilities. **Since a majority of most auditors' clients consist of small or medium firms with closely held ownership, creditors may be the main external users of firms' financial statements** [Schepanski 1983].

The presentation of cues in the main body of the accounts improves performance over their presentation in footnotes.

Functional fixation was found in some major experiments in accounts processing by students and by financial analysts.

Stephens [1979] reported his bankers seemed to be functionally fixated on ratios and earnings but indifferent to depreciation and inventory variations. Frishkoff et al [1984] found financial analysts rated earnings high but cash flow low - perhaps because they were concerned with equity investors rather than with creditors. Campbell's [1984] loan officers were unconcerned with EPS. External validity of protocol studies of very small samples is very questionable, but, such as they are, they offer some support to the view that investors and creditors do read accounts for different reasons and hence employ different cues in making their judgments from the accounts.

Information economics treats information as a saleable commodity

whose value could be best represented by its price. Ceremonialism treats accounting as a social ritual whose usefulness for economic decision making is largely irrelevant compared to its role in reinforcing power structures. Neither of these approaches to the nature of accounting information have been employed in this work.

CHAPTER 4

FUNDS STATEMENTS: EVOLUTION AND SPREAD

4.1 INTRODUCTION

4.2 HISTORY

4.3 INTERNATIONAL PRACTICES

4.4 SUMMARY

CHAPTER 4 FUNDS STATEMENTS: EVOLUTION AND SPREAD

4.1 INTRODUCTION

This chapter describes the history and geography of the funds statement. Section 4.2 describes the history of the statement, largely with reference to the USA, since the USA has led and catalysed developments elsewhere in the world in adopting and reforming the statement. In section 4.3 the adoption of some form of funds statement by countries throughout the world is surveyed upto 1989, the year of the most recent published survey. An important observation resulting from the surveys is that the IASC's IAS 7 format with its permitting of either a working capital format or an all financial resources one, is the overwhelmingly dominant format of funds statements around the world. This chapter is the necessary introduction to the critiques of the fund statement discussed in Chapter 5 and to the discussion of cash flow statements and cash flow accounting in Chapter 6. In this chapter, the historical survey may clarify the traditional objectives of the funds statement; the geographical survey may testify to the importance for international accounting of the funds statement.

In this and subsequent chapters, the abbreviation SCFP will be used in two contexts. In the narrow context of accounting in the USA, it will be used to designate the Statement of Changes in Financial Position as required successively by APB 3 and APB 19. In any other context, the abbreviation will be used to signify funds statements

generally, irrespective of their official title in the region under review. Corresponding remarks apply to the abbreviation SCF for the Statement of Cash Flow.

4.2 HISTORY OF THE FUNDS STATEMENT

4.21 INTRODUCTION

The AICPA published a research study on funds statements in 1961 and the resultant opinion in 1963 [APB 3]. This was the earliest official pronouncement on the subject by a major accounting body.

"The prime reason" for confusion in both the interpretation and the preparation of the statement, per Rosen and DeCoster (hereafter cited as RD) [1969 p124], "is that a positive position has not been taken by an authoritative body. Also it seems to the authors that the funds report is being asked to accomplish too much." This view is echoed throughout almost all published views on funds statements from the 1920s to the 1990s. A striking example of the confusion RD mentioned is provided in one of the historical reviews of the funds statement. Someya [1983] opens his history (which largely derives from RD) with the following strange assertion;

"As the problems of income accounting are embodied in the income statement, so problems of fund accounting are crystallized in the funds statement. Therefore, the development of funds flow accounting is that of the funds statement."

This will be pleasing to the followers, if any exist, of Vatter [1947] whose work on fund accounting is briefly described in Appendix F.

4.22 COLE AND FINNEY

The Funds Flow Statement predated Cole's [1908] influential textbook which was the first to note its existence as one of several supplementary statements that were in use. Receipts and payments styles of statement are extant from the Northern Central Railroad (1863), England's Assam Company (1862) and the American Bell Telephone Company (1881). The first "all financial resources" SCFP found by Rosen and DeCoster [p125] belongs to the Missouri Pacific Railway Company and its subsidiary, St Louis, Iron Mountain and Southern Railway for 1893.

At the turn of the century, American firms began to provide subtotals for current assets and current liabilities. The funds statement issued in 1902 by US Steel and its subsisidiaries may have been the first to begin with net profit then add back items like depreciation. In 1903, it began to reconcile profit in the statement to net current assets.

Cole [1908 p132] reported that the funds statement in various forms began to be adopted by railroad companies about five years earlier. In fact by 1903 at least four different forms of funds statement could be seen; cash, gross current assets, working capital and all financial resources. While the first three can be presumed to portray the causes of movements in one of three definitions of a

firm's liquidity, the fourth is argued by RD [p126] to have been "intentionally broadened in scope in order to overcome the narrow perspective of the income statement." Whilst this explanation seems quite plausible, some evidence in the form of contemporary quotations would have have made it much more so.

Apparently, all four of Cole's influential accounting textbooks [1908, 1910, 1915, 1921] illustrated only the 'all financial resources' format. In these illustrations, general solvency, trustworthiness of the books and liquidity are advanced as justifications for the funds statement.

Seymour Walton recognized, in the "students' department" of the Journal of Accountancy in 1914, the need for a liquidity oriented statement to complement the income statement. He thought the only time when an accountant would want to use an all financial resources format was when "he wishes to show that a concern has been increasing its fixed assets at the expense of its working capital" [Walton 1914, p231]. This view is held by RD [p128] to have strongly influenced Finney who led a drive from the war years to the late twenties to adopt as a major report a working capital oriented funds statement. As editor of the students department of the Journal of Accountancy after Walton, Finney provided model answers to CPA questions. When funds statements were called for, the answer was always formatted to explain changes in working capital. He explained that a funds statement provided "a clear and comprehensive

conception of the change in the financial condition caused by the profits of the period, the dividend payments and any financing programme which may have taken place" [Finney 1923, pp460/1]. The working capital orientation of funds statements originated with Finney [1921]. His statement listed funds provided by; (a) net profits before provisions, (b) bond issue proceeds, and (c) asset sale proceeds. The funds provided were equal to the funds applied to (a) asset purchases, (b) dividend payments and (c) itemized increases in working capital and deferred charges. His explicit definition of funds, however, was disappointing. "The term 'funds' suggested something more than cash" [Finney 1925, p507]. He asserted his format was "in more or less general use" [Finney 1925, p497] but concurrent evidence suggests few firms were using any form of funds statement, and the few that were favoured no specific format [Kempner 1956, Anton 1962]. RD [129] comment that;

"There is considerable evidence supporting the simple explanation that many authors of textbooks, CPA examiners and accounting teachers saw the funds statement primarily as an excellent vehicle for testing a student's knowledge of the mechanics of the accrual basis of accounting. Specifically, the working capital format was a better testing device than the "changes in all balance sheet accounts" at this time, because the former eliminated the effects of many "intra-entity" bookkeeping entries, and its definition of funds approximated accrual accounting concepts.... Unfortunately over time the pedagogical benefits of the report may have received too much stress, and very little attention seems to have been given to the empirical testing of the merits of the concept of working capital" [p130].

A brief controversy flared up in the Journal in 1925 between Finney and his critics, particularly Esquerre, who

favoured a format explaing changes in total wealth. The controversy seems to have strengthened the desire for uniformity and this favoured Finney's format for essentially political influence reasons.

4.23 1925 - 1963

By the end of the war, the Statement of Sources and Applications of Funds, also known as the Statement of Changes in Financial Position, was usually presented with the annual report, sometimes in the notes [Most 1982]. The working capital format remained predominant in America through the thirties to the late fifties, although several ameliorations were suggested to overcome a number of criticisms. Bliss [1924] had already counselled against a rigid format insensitive to corporate circumstance or user objectives. Mautz [1951] thought cumulative eight year statements would show changes in solvency and how growth had been financed. Kohler and Morrison [1931 p379] wanted two non current accounts to be in the funds statement since;

"Bonds and stocks issued in exchange for assets other than cash, or issued to replace liabilities, may always be regarded as 'funds' received inasmuch as they are paid out in lieu of cash, and the values received are ordinarily expressed in terms of fair cash value".

This shift in the definition of funds to mean purchasing power was adopted by a number of writers [Streightoff 1932,Husband and Thomas 1935, Noble et al 1941, Binkley 1949, Mauriello 1950]. Paton [1938] wanted to begin the

funds statement with sales rather than profits in order to avoid the confusion attributed to the depreciation add back, but such a presentation repeated too much information already on the income statement, according to the writers of APB 3 [AICPA 1963].

Moonitz [1943] thought inventory increases were an application of funds, not different in kind from increases in fixed assets, rather than being funds themselves. Goldberg [1951] expressed the view that there was no significant difference between acquiring assets by cash or by securities, but the working capital orientation excluded transactions where securities were the financing means. These external transactions were essential to obtain a proper idea of the true change in financial position.

Moonitz [1956] favoured a maximum definition of funds being limited to cash and items only one transaction away from cash, so as to exclude inventory and prepayments. Similar definitions were advocated by Anton [1962] and Pautler [1963]. Still other concepts have been identified by Mason [1961] as short term monetary assets and net monetary assets and by Yu [1969] (who hoped to see an all economic resources input-output copy of national accounts on a corporate scale.)

Cole [1908] had favoured the all financial resources view of funds, Finney [1921] the working capital view, and both APB 3 and APB 19 supported Cole, albeit that the latter wished changes in working capital to be prominently displayed. What can be inferred from this review so far is

that the debate between the working capital school and the all financial resources school goes back to the first quarter of this century, and most of the points in favour of either approach had already been published by 1925.

4.24 APB 3

The AICPA finished its research on the funds statement in 1961 [Mason 1961] and issued "The Statement of Sources and Applications of Funds" *Opinions of the Accounting Principles Board No 3* in 1963. This said a Statement of Sources and Applications of Funds was desirable as supplementary information in accounts but not mandatory. RD disliked APB 3 as "vague", "confusing", and:

> "Unfortunately, the Opinion probably has had the effect of reinforcing the unsatisfactory idea that the "funds" report should be used to fill all gaps in disclosure" [p135]. "This means that the funds statement must report changes in some definition of liquidity, reveal all important inter-entity transactions, somehow reconcile the cash (or near cash) and accrual bases of accounting, be flexible, report different perspectives, and readily communicate with laymen. Surely accountants are asking one report to accomplish too much. Clarity cannot result when incompatible (such as cash and accrual) concepts are meshed into one statement."[RD p137].

In 1962, only 39 out of 100 randomly selected Fortune 500 firms provided a funds statement compared to 89 by 1967. About half used the working capital format throughout the period, about a quarter the all financial resources format and no data is given on the rest [RD 133]. The strong advocacy of funds statements by the New York Stock Exchange and the Federation of Financial Analysts is a possible

explanation of the increase in use.

4.25 APB 19

APB 3 [AICPA 1963] recommended the statement but did not require it. The SEC began to require it in 1970 [SEC 1970 Accounting Series Release no 117] and the APB to do so with its Opinion 19 [AICPA 1973].

The AICPA reported the increasing adoption of the SCFP between the publication of APB 3 and APB 19 as follows:

US COMPANIES USING AN SCFP

Year	No out of 600	%of the 600 sampled firms
1963	271	45.2
1964	387	64.5
1965	458	76.3
1966	503	83.8
1967	524	87.3
1968	535	89.2
1969	548	91.3
1970	573	95.5
1971	597	99.5
1972+	600	100

Source AICPA, *Accounting Trends and Techniques*, New York: AICPA, 1963-1979.

APB Opinion 19, "Reporting Changes in Financial Position" asserted [para 7] "a statement summarizing changes in financial position should also be presented as a basic financial statement". The statement [para 8] "should be based on a broad concept embracing all changes in financial position" and its title should be the Statement of Changes in Financial Position.

APB 19 para 15 restricted the use of the cash concept of funds to situations in which "all non cash items have been

appropriately adjusted." This means each change in each working capital component has to be reported as a source or use of funds. De Ridder [1980] thought this requirement explained the unpopularity of the cash basis thus far.[p37].

Paragraph 13 of APB 19 required individual disclosure of financing and investing activities without netting off or combining.

The objective of the SCFP per APB 19 was;

"to summarize the financing and investing activities of the entity, including the extent to which the enterprise has generated funds from operations during the period."

Wrote Most (hereafter abbreviated to KSM) [1982 p451],

"This last concept is sometimes referred to as self-financing."

KSM believed the meaning of funds which best fulfilled APB 19's goals is "means of payment" from its narrowest denotation as coins and notes to its broadest which includes any resource two transactions away from such a form (one transaction being always the drawing of notes from the bank account).

"It may be surmised that the different forms of funds flow statement arose from specific user needs. For example, the financiers of a company which has executed an indenture in connection with its bonded debt, requiring working capital to be maintained at a certain level, will be interested to see the net change in working capital at the end of each accounting period. The directors of a company which has a chronic shortage or surplus of cash will be interested in a funds flow statement which highlights the net change in cash." [KSM 1982 p453] "It follows from the above that cash flows are a part of funds flows and not a surrogate therefor, or vice versa."

"Given the great variety of different types of cash receipts and payments, this [one similar to SFAS 95]

classification could present as many problems as does accrual accounting. How should a seasonal bank loan received to finance merchandise purchases be classified ? It certainly results from operations, but if the borrowing is an annual event, it could be classified as a recurring loan." [KSM 1982 p455]

Spiller and Virgil [1974] compared a sample of reports before and after the effective date for the implementation of APB 19. Many noncomplying practices were found to persist, attributable to deliberate violations and to narrow constructions of the opinion's requirements.

Rosen [1974] opined that the SCFP of APB 19 was a return to the funds statement of the 1800s except it was now accompanied by financial position and income statements and by notes. He recommended a format variable in content to suit the different needs of different users.

4.26 THE PRELUDE TO SFAS 95

The SEC issued Release Number 117, "Adoption of Article 11A of Regulation S_X", *requiring* cash based funds flow reports to accompany reports filed with the SEC after the end of 1970 [SEC 1971 sic]. This did not affect accounts issued to shareholders or to other arms of government, but may well have facilitated adoption of cash based funds statements by US firms, obliged as they now became to provide them for the SEC.

Arthur Andersen [1976] was one of the earliest elements of the accounting establishment to express a preference for cash over "unimportant" working capital as the focus of the Statement of Changes in Financial Position. However, the

probable turning point came when the AICPA sponsored its council member, Loyd (sic) C Heath [1978a], to produce a monograph criticizing existing funds flow statements as the product of unclear, misleading and unattainable objectives to meet which really needed three separate statements, viz;-

1. a receipts and payments account,

2. a statement of movements on loan and equity financing,

3. a statement of movements on long term asset accounts.

An article called "Let's scrap the funds statement" by Heath [1978b] summarized his criticisms. A riposte by Largay et al [1979] pointed out four main things;-

1. That Heath explicitly adopted the very objectives of APB 19 he had been deeming unattainable:

2. That the replacement of one statement - the SCFP - by 3 new ones was not readily assessable as an improvement:

3. That a receipts and payments account has limited information content and represents a regression to pre accrual accounting:

and 4. That the working capital basis is superior to the cash basis because the former eliminates the timing fluctuations arising from the cash-cash cycle. One might add that this point carries the further implication that working capital is harder to window dress than is any definition of cash.

At the end of the seventies, views on credit analysis were changing, as illustrated by the following quotations;-

"The early emphasis on working capital did have its

shortcomings resulting in a changing emphasis in credit analysis. For example, assuming a firm is a going concern, its working capital probably represents a permanent investment. Thus, repayment of loans will be made from current earnings" [Graci 1982 p23].

This point was earlier graphically elaborated by Arthur Stone Dewing as follows [Dewing 1953]:

'Bankers learned by tragic experience that there was no mystical significance in the two to one ratio. They observed that in many types of business, under the stress of general disaster, inventories could not be sold, and if such an attempt should be made, not a two-to-one or even a three-or-four-to-one ratio would bring them the immediate payment of their debts. If business failed, the relative amounts of current capital in the days before the failure had little significance in the final liquidation of the bankrupt business.'

Sophisticated creditors were alleged by Heath to realize that a firm's ability to repay its debts depends on its future cash generating ability, and future cash inflows do not necessarily depend on profit potential. Heath [1978a p78] emphasized this point by stating;

'..The financial failures of the late 1960s and the early 1970s drove home the point that debts are not paid out of profits in much the same way that the failures of the 1930s drove home the point that current liabilities are not paid out of current assets.' "

According to Barlev and Livnat [1986 p225], "Heath's study made a significant contribution to the FASB Discussion Memorandum [1980]."

Braiotta [1984] reported that as early as 1983 57% of sampled executives planned to use a cash based SCFP compared to 27% in 1980. 56% of the 1982 reports surveyed by Thode et al [1986] used this approach which had been recommended by the Financial Executives' Institute. The professional notes

section of the Journal of Accountancy in December 1978 published three of the "unprecedented number of comments from readers" most of which defended the SCFP. Heath's Statement of Cash Receipts and Payments is a sources and uses format with a supporting schedule showing the build up of cash provided by operations. It looks like this:-

Cash provided by Operations

Cash collected from customers			783545
Interest and dividends received			1417
Total cash receipts from operations		784962	
Cash disbursements:			
For merchandise inventories	457681		
For admin and selling expenses	264577		
For interest		6941	
For other expenses		14963	
For taxes		13273	
			757425
Cash provided by operations			27537

Heath [1978a p104] equated cash and near cash with a firm's debt paying ability. He saw the danger of overtrading increased during inflation and the need for a receipts and payments account was correspondingly greater [p111]. He strongly favoured a direct method of cash accounting for operations and Barber [1981 p69] criticized this on the grounds that it failed to highlight the disparity between cash flow and net income. The indirect method, on the other hand, adds back items to net income to arrive at operations cash flow, thereby explaining the disparity.

Holly Clemente [1982] reported the results of the Financial Executives' Institute survey earlier in the year. Of almost 1200 respondents, 79% adopted a sources and uses format, and 57% defined funds as cash and short term investments.

Nurnberg [1983] pointed out that the pre SFAS 95 exposure drafts had not removed the ambiguities left by APB 19 concerning the boundaries between operating, financing and investing activities of the firm.

An ED from FASB was issued in 1981 proposing a cash rather than working capital focus. Gibson and Kruse [1984] found a majority of their 87 sample firms already used a cash focus, reconciling net income to cash flow. This view was also expressed by Englard and Goodman [1986] who also said most firms were already using the three section (financing, operating and investing) format.

Braiotta [1984] reported 56% of his 66 firm sample were already using the cash basis, something that may be connected with the 1982 Auditing Principles Board statement allowing firms to change from a working capital to a cash basis without thereby incurring an audit report qualified for breach of the consistency principle.

Ketz and Largay [1987] unsuccessfully tried to link SCFP numbers with their equivalents in the income and position statements. In particular, the income statement idea of operations differed from that of the SCFP. They recommended the FASB to fuse the two statements into one or at least to

impose a common definition of operations. The move from a working capital to a cash basis statement during the eighties they attribute to "strong encouragement provided by the Financial Executives' Institute and by publications of the FASB" [Ketz and Largay 1987 p10]. (The publications to which they refer are FASB [1980 and 1981]).

Heath [1978b] wrote;

"The activities of business enterprises may be classified as operating, financing and investing. Operating activities are those activities directly related to the purchase and sale of raw materials, supplies and merchandise, the conversion of raw material and supplies into finished goods and services, the sale of finished goods and services, and the servicing of goods and services sold previously. Financing activities are those activities directly related to obtaining capital including, for example, the borrowing and repayment of debt, the issuance and reacquisition of a company's stock, the conversion of securities into common stock, and the payment of dividends. Investment activities include the purchase and sale of securities of various types (excluding a company's own securities) and the purchase and sale of plant and equipment that is used in production, distribution, and maintenance of other goods and services" [quoted in Ketz and Largay 1987 p996].

Heath conceded the boundaries between the three kinds of activity are unclear. Nonetheless, the FASB [1986] exposure draft that heralded SFAS 95 largely adopted Heath's distinctions and added to them [paragraph 10] the propositions that "gain or loss from early extinguishment of debt is generally part of a cash outflow for financing activities" whilst "gain or loss from sale of assets .. is generally part of a cash inflow from investing activities." In paragraph 60 the FASB decided interest is an operating activity because it is reflected in income whereas dividends distributed are financing outflows because they are not

reflected in income. Gains or losses on asset sales and debt redemptions are non-operating, however, despite being included in income. "The reasons for this disparity", commented Ketz and Largay [1987 p13], "are unknown." Depreciation is uncontroversially a part of operations, but calculation of the gain or loss on disposal is a function partly of the depreciation accumulated to the point of sale. Foreign exchange gains and losses could be argued to be as much a matter of financing or of investing as of operations.

Finally, Adams [1988] expressed, in *Accountancy*, the prophetic opinion that SFAS 95 could influence UK accounting standard setters. The content of ED 54 [1990] soon proved him right.

4.3 INTERNATIONAL PRACTICES

4.31 AUSTRALIA AND NEW ZEALAND

36 out of 120 company reports surveyed by Kenley and Staubus [1972] included some form of funds statement. The General Council of the ASA had specifically mentioned the statement as exemplifying the accounting improvements it then wanted. In January 1971 the Australian Institute issued Technical Bulletin F1 which recommended the inclusion of a funds flow statement with the annual report. Its purpose would be;-

"to materially assist the reader to appreciate the meaning and significance of the reported financial results and the deployment of the resources of the company" when read in conjunction with the two older final accounts. By itself the statement "enables the reader to understand better the effects of the company's policies in relation to such matters as the financing of trading operations, the investment in fixed assets, the payment of dividends and the repayment of loans". As to format, although nothing was specified, the statement "summarises movements in the financial resources, as reflected by successive balance sheets" [Kenley and Staubus 1972].

In January 1971 the Institute of Chartered Accountants in Australia recommended the inclusion of a funds statement in a Technical Bulletin [ICAA 1971]. It favoured but did not mandate an all financial resources view of funds, but excluded bonus issues, movements on reserves and asset revaluations from disclosure.

In 1986 the Accounting Standards Review Board approved Australian Accounting Standard 12 as ASRB 1007 mandating the presentation of a Statement of Sources and Applications of

Funds as a primary financial statement. In response to a number of comments on the exposure draft for that standard, a new exposure draft [ED37 1986] was issued seeking to require supplementary disclosure as a note to the funds statement an analysis of cash flow from operations as exemplified in section 12 of the ED and reproduced below.

Cash Flow From Operations

	19x1 '000	19x0 '000
Operating profit before income tax	250	165
Add: Depreciation	14	10
Long-service leave expense	6	5
Funds from operations before income tax	270	180
Add: Increase in trade creditors	35	15
Carrying amount of noncurrent assets disposed	60	--
	365	195
Less: Incease in debtors (including debtors from disposal of noncurrent assets)125		60
Increase in inventories	75	25
Payment of long-service leave	5	4
Cash Flow From Operations	160	106

"It is not intended to provide a comprehensive list of all accruals that may need to be considered when reconciling funds from operations to cash flow from operations." [sec 12].

In response to my enquiry, the secretary of the AARF, Nareeda Klajn, wrote on 1 November 1989 that no accounting standard had arisen or was expected to arise from ED37. It is not known if comments received about the sample note

reproduced above are responsible for this.

The New Zealand Society of Accountants strongly recommended the funds statement in 1971 [Cowan 1971] and required it in 1979 by its own SSAP 10 by when it had become an SCFP in name but not necessarily in format [SSAP 10]. Funds from operations were to be shown net of tax and of extraordinary items. Asset revaluations and transfers of reserves were not seen as funds flow. As reported later in this section, New Zealand is now one of four countries requiring a Statement of Cash Flow.

4.32 EUROPE

Mielke and Giacomino [1987] reported a cash or near cash emphasis in funds statements was not confined to the US but was also common in Europe in the years 1984-6. Only one of their 45 companies used the all financial resources format and that was an unnamed UK company. Other features are shown in an edited version of their Exhibit 1 below

SCFP REPORTING PRACTICES IN EUROPE

COUNTRY	N	E	C W O	F I B S
France	4	R	2 2 3	0 0 0 2
Germany	5	M	4 1 3	1 0 0 4
Eire	2	R	1 1 1	0 0 0 2
Italy (Fiat)		M	1 0 1	0 0 0 1
Nethrlds	8	P	6 2 7	0 0 1 8
Sweden	7	P	7 0 5	0 0 5 0
Switzld	3	M	2 1 2	0 0 1 3
UK	15	R	12 3 12	0 0 0 10
TOTALS	45		35 10 34	1 0 7 30

GLOSSARY OF ABBREVIATIONS USED ABOVE

N Number of companies sampled

E Extent of statement provision in country
R Required disclosure
P Predominant practice to supply a funds statement
M Majority practice
C Cash definition of funds
W Working capital definition of funds
O Funds from operations separately totalled (all by the indirect method)
F Financing activities grouped together
I Investing " "
B Both the above
S Sources separated from uses of funds

Although none of the countries specify a required definition of funds, there seemed to be widespread consensus that cash or working capital was the appropriate definition. Cash tended to include all bank deposits and also short term securities. The relative absence of the all financial resources format may be attributable to the non occurrence of sales of assets for securities instead of for cash - so commented Mielke and Giacomino [p148] but offered no evidence for this (such as could have been obtained in the notes to the accounts in many cases). They conclude with an interesting reason for inducing the IASC to emulate SFAS 95;

"This article does not suggest that IASC merely react to FASB's current standard by 'rubber stamping' SFAS 95; however, considering the considerable effort applied by FASB and its staff to the cash flow reporting issue, we believe that it is wise to consider seriously each of FASB's requirements" [p149].

4.34 THE UK

Morris [1974] reported a growth from 7% in fiscal 1968/9 to 39% in fiscal 1972/3 of the presentation of funds statements in published accounts.

Effective 1 January 1976 but approved 15 July 1975, the British SSAP 10 required firms with a gross income of over 25000 pounds to present a funds statement. The ICAEW survey of 1978 reported the increasing adoption of the statement by 300 sample firms in the immediately previous years thus;-

Fiscal year	No of firms	% of sample
1973/4	153	51
1974/5	219	73
1975/6	256	85
1976/7	289	96
1977/8	300	100

Source: ICAEW, *Survey of Published Accounts*, London: ICAEW, 179-187,1978.

The 1975 Corporate Report thought the needs of all user groups could not be met by general purpose statements and McMonnies [1989 sec 3.8] agreed adding;

"We believe that so far as possible, reports should be framed in such a way that users can get what they want from them without having to turn for advice to an accountant, lawyer, economist or other specialist."

McMonnies [1989] report for the Scottish Institute recommended two replacements for the funds statement and these are reproduced below:

From McMonnies' Para 7.24

"A Simple Statement of Changes in Financial Wealth"

Financial wealth added by operations	22874
Increase in values of quoted investments	1111
Reduction in deferred liability	4991
	28976
Decrease in value of tangible assets	(9011)
Distributable change in financial wealth in yr	19965
Distribution	(6444)
	13521
New share capital	10000
Change in financial wealth for the year	23521
Movement in market capitalization	48750

The above would comply, coincidentally, with APB 19.

From McMonnies' Para 7.38; A "Cash Flow Statement"

Opening balance	(6016)	
Generated by operations	18320	
Investments in fixed assets and quoted shares	(19833)	
New finance - debentures		8000
New finance - share capital		10000
Closing balance		10471

This statement, on the other hand, would not comply with SFAS 95, in the above summary format.

4.35 CANADA

For Canada 91% of 325 companies surveyed were presenting a funds statement by 1967, and 98% by 1970 [*Financial Reporting in Canada*, p163, Toron+5Xto: Canadian Institute of Chartered Accountants, 1971], following the section 1540 recommendation in the Institute Handbook in 1968. In Sepember 1974 the section was revised to specify that the

SCFP be used rather than a sources and uses statement. It remained a recommendation rather than a requirement. Then in 1975 the Canada Business Corporations Act section 46(1) required the inclusion of an SCFP. From 1972 all sampled firms presented a funds statement. Paragraph 1540 defined funds as working capital for firms whose balance sheets segregated current assets from current liabilities and as cash and cash equivalents for all other firms.

4.36 INTERNATIONAL COMPARISONS

Few countries have specific requirements for the focus of the funds statement but those that do have them tend to prefer net change in working capital. [Gray, Campbell and Shaw 1984 p190].

The following countries required such a statement in 1984:-

Brazil, Chile, Colombia, Finland, Hong Kong, Indonesia, Ireland, Malaysia, Mexico, New Zealand, Philippines, Portugal, South Africa, Thailand, UK, USA, and Zimbabwe. The following countries recommended but did not require it;-

Argentina, Channel Islands, France, Italy, Spain and Zambia. [Gray et al 1984 Table 4.1]

Of the above the following *specified* a net change in working capital focus:-

Brazil, Hong Kong, Indonesia, and Portugal.

However, the following countries recommended such a focus:-Argentina, Chile, Finland, France, Italy, Philippines and Spain. [Table 4.2(a)]. In the Philippines' case, net

change in liquid funds is the preferred idea of working capital [4.2(b)]. Thailand required the focus to be net change in cash; France recommended it while Brazil, Hong Kong, Indonesia and Portugal prohibited it.[4.2(c)].

Only South Africa required separate disclosure of tax paid and dividends paid while only Argentina and Colombia recommended it. All the others mentioned in the lists above as requiring or recommending a funds statement expected separate disclosure of dividends paid but make no mention of tax. [4.3(c and d)]. Most also required or recommended that changes in working capital should be analysed into its component parts. [4.3(i)].

The results of a more recent survey by Lafferty Publications in 1989 are shown below.

Incidence of Funds Statements [Koch 1989 p114]

	AM	EUR	RW	T88	T80
Number of companies	65	100	35	200	200
	%	%	%	%	%
Group funds statement only	85	70	66	73	76
Group and parent company	15	8	3	10	3
Parent only	-	7	17	7	8
Subtotal	100	85	86	90	87
No funds statement	-	15	14	10	13
Totals	100	100	100	100	100

AM=North America EUR=Europe RW=Rest of the World
T88 and T80 = Totals for 1988 and 1980 respectively

The companies which did not produce funds statements were from the following countries:

Country	No of companies	% of country sample
Belgium	5	56
Denmark	1	50

France	1	7
Germany	4	27
Italy	2	20
Switzerland	1	10
Spain	2	40
Japan	2	11
India	2	67
Hong Kong	1	25
TOTAL	21	100

The Lafferty 1980 list was similar to the above except then Singapore instead of India was a partial non producer. It is not known whether the Hong Kong company suffered a qualified audit report for non compliance with the local accounting standard mandating presentation of funds statements.

Most companies placed funds statements pari passu with the balance sheet and income statement. 6 Australian firms (62% of the Australian sample) put them in the notes instead, and all the German firms placed them in the Directors' Report.

Heading given to funds statement [Koch 1989 p117]

Heading given	% of Region Adopting				
	AM	EUR	RW	T88	T80
Sources & Applications or Movements of funds	31	45	12	35	42
Changes in Financial Positn	58	36	74	49	36
Corporate financing	-	3	-	2	8
Statement of cash flow	11	1	-	4	1
No funds statement produced -		15	14	10	13
TOTALS	100	100	100	100	100
Number of companies	65	100	35	200	200

92% of US firms, 80% of Canadian, 85% of Japanese, 85% of Swedish, and 50% of Dutch firms used the SCFP heading.

93% of Australian firms, 87% of UK, 60% of South African and 50% of Dutch firms used the sources and applications heading.

Definition of funds used in funds statement
[per Koch 1989 p123]

Definition	% of Companies Applying				
	AM	EUR	RW	T88	T80
Movement in liquid funds	60	34	11	39	16
Movement in working capital	8	18	66	23	50
Sources=Applications	26	23	6	20	19
Movement in borrowings	6	10	3	8	2
No funds statement produced	-	15	14	10	13
TOTALS	100	100	100	100	100
Number of companies	65	100	35	200	200

Although 39%(78) of the sample firms use a liquid funds (cash and marketable securities) approach, only 4%(8) described the statement as a cash flow statement. This particular inconsistency was exhibited by all the Canadian and Swedish firms, 84% of the US, 73% of the Dutch and 60% of the British firms.

As regards funds from operations, 62%(124) used profit after tax but before dividends, 23%(46) profit before both tax and dividends and 4%(8) various other starting points for showing sources of funds from operations.

Finally, the IASC's own most recent survey [IASC 1988] included the following remarks [p30]: After mentioning that the US, South Africa, New Zealand and Canada now require a statement of cash flows instead of a SCFP, the writer says:

A preference for cash flow information is however not new. A Statement of Cash Inflow and Outflow has been a required disclosure in registration statements in Japan since 1953. Recent proposals have been made, however, to improve these disclosures. A major issue is whether they should form part of the financial statements; the Statement of Cash Inflow and Outflow is presently only supplementary information because of the uncertainty in other countries over the use and status of such information.

In 1985 the Board recognised the growing trend in favour of the preparation of changes in financial position in terms of cash or cash equivalents, rather than in terms of working capital. While viewing this trend with approval, the Board did not believe that the working capital approach should be prohibited at that time."

It is interesting to compare the focus on cash in the above quotations with the views of the IASC a decade earlier, when IAS 7 [1977] adopted the SCFP title but in its paragraph 4 seemed to adopt the cash idea of funds:

"The term funds generally refers to cash and cash equivalents, or to working capital. In a Statement of Changes in Financial Position the particular use of the term is not clear."

7 countries had by 1988 adopted IAS 7 as a national requirement:

Botswana, Cyprus, Malawi, Malaysia, Oman, Pakistan and Zimbabwe.

4 countries used IAS 7 as the basis of a national requirement:

Jamaica, Lesotho, Singapore and Sri Lanaka.

39 countries, most of those surveyed in fact, had national requirements or national practices that generally conform with IAS 7. That left 4 countries whose national practice failed to conform with IAS 7: Belgium, Germany, Greece and Switzerland. This is not wholly consistent with the results of the 1989 Lafferty survey above, presumably owing to sampling bias in either or both. 2 countries, Germany and Switzerland, are very creditor oriented (as is elaborated in Appendix F); whilst the under-regulated Greek situation

results in non compliance with many other standards besides IAS 7. In the other 3 cases, especially Germany's, banks are presumed to get all the information they need by direct access to their clients's books, so there is no source of pressure for general public disclosure of funds flow type information. Still, it seems unlikely that Lafferty picked out the only Belgian, German and Swiss funds statement producers. It is more likely that the IASC survey relied on the reports of national accounting bodies rather than on inspection of actual published accounts. If this is the case, then conflicts between the two surveys should be resolved in favour, provisionally, of the Lafferty results.

4.37 THE SCFP IN HONG KONG

SSAP 10 was adopted by the Hong Kong Society of Accountants as entry 2.104 in its Handbook on 1 January 1978.

2.104 SSAP 4 Statements of Changes in Financial Position

$1 "For a fuller understanding of a company's affairs it is necessary also to identify the movements in assets, liabilities and capital which have taken place during the year and the resultant effect on net liquid funds."
$2 The objective is to show how operations have been financed and how financial resources have been used.
$3 Long term sources and uses should be distinguished short term ones.
$6 exempts from compliance firms with turnover below $1m and section 141D small private companies under the Companies Ordinance (who do not have to show a true and fair view) and all the banking sector.
$8 The SCFP should start with the profit or loss for the period.
$9 It should link successive balance sheets via the profit and loss account avoiding netting off as far as possible.
$12 brings the SSAP into force on 1/1/1978.

2.104 SSAP 4 Appendix

"This appendix is for general guidance and does not form part of the SSAP. The methods of presentation used are illustrative only and in no way prescriptive and other methods of presentation may equally comply with the accounting standard. The format used should be selected with a view to demonstrating clearly the manner in which the operations of the company have been financed and in which its financial resources have been utilised."

Example Statement of Changes in Financial Position

	$000	$000	$000
SOURCE OF FUNDS			
Profit before tax			1430
Adjustments for items not involving the movement of funds:			
Depreciation			380
TOTAL GENERATED FROM OPERATIONS			1810
FUNDS FROM OTHER SOURCES			
Issue of shares for cash			100
			1910
APPLICATION OF FUNDS			
Dividends paid		(400)	
Tax paid		(690)	
Purchase of fixed assets		(460)	
			(1550)
INCREASE/DECREASE IN WORKING CAPITAL	360		
Increase in stocks		80	
Increase in debtors		120	
Decrease in creditors excluding taxation and proposed dividends		115	
Movement in net liquid funds:			
Increase (decrease) in:			
Cash balances	(5)		
Short-term investments	- 50		
		45	
			360

4.4 SUMMARY

"The prime reason" for confusion in both the interpretation and the preparation of the funds statement, per Rosen and DeCoster [1969 p124],"is that a positive position has not been taken by an authoritative body. Also it seems to the authors that the funds report is being asked to accomplish too much." This view is echoed throughout almost all published views on funds statements from the 1920s to the 1990s.

Receipts and payments accounts appeared in some American published accounts as early as 1862, while the first all financial resources SCFP seems to have been in 1893. US Steel was reconciling profit to working capital from 1903 onwards.

Cole's [1908] textbook was the first to identify the existence of funds statements. He illustrated only the all financial resources format, and asserted solvency, liquidity and trustworthiness justified the existence of the statement. Walton [1914] thought the only circumstance justifying the all financial resources format was when it was desired to ascertain whether fixed assets had been increasing at the expense of the investment in working capital. He in turn influenced Finney [1921] who originated the working capital orientation of SCFPs which he saw as helpful in understanding the operating, dividend and financing policy impacts on the balance sheet. His definition of funds as "something more than cash" [Finney

1925, p497] has yet to be bettered, disappointing as it is. The working capital based SCFP remained the norm in the US until APB 3 replaced it with an all financial resources base in 1963. APB 3 recommended the SCFP but did not require it. Nevertheless, from 1962 to 1967 the proportion of Fortune 500 firms publishing a SCFP rose from around 39% to around 89%, but half of these continued to use a working capital format. The SEC began requiring an SCFP (actually a form of SCF) in 1970 and APB followed suit in 1973 with APB 19. This time the APB mandated the all financial resources format, and the aim of the SCFP was said to be to summarize the financing, investing and operating activities of the firm (the last mentioned only insofar as operations generated funds).

The IASC required the SCFP with the publication of IAS 7 [1977] without mandating any particular format, though seeming to prefer working capital.

Loyd Heath [1978] wrote the papers that signalled the start of the eclipse of the SCFP by the SCF. He spoke for many in his exasperation with the ambiguity inherent in the concept of funds, and the lack of focus in the purposes of the SCFP. He did not address Largay's [1979] point about the greater risk of window dressing in a cash flow statement.

In 1982 about half the SCFPs surveyed by Thode et al [1986] already used a cash base. The FASB issued one discussion memorandum and two exposure drafts during the 1980s before issuing SFAS 95 in 1988 which required the replacement of the SCFP by the Heath style SCF.

Four countries mandate the cash flow statement; Canada, the USA, New Zealand and South Africa. The IASC and the UK show every sign of following suit in the near future. Otherwise, all countries with corporate published accounts are using funds flow statements somewhere in their annual reports, and most of these tend towards a working capital format and definition of funds. It therefore remains of current international relevance and interest to conduct empirical work on funds statements rather than on the newer and still not generally adopted cash flow statement. However, the continuing increase in countries adopting the SCF makes it sensible to include a cash based statement in the sample of accounts used in the research, to provide some very preliminary evidence on whether the SCF is likely to outperform the SCFP.

CHAPTER 5 FUNDS STATEMENTS: CRITIQUES AND RESEARCH

5.1 INTRODUCTION

5.2 OPINION SURVEYS AND PUBLISHED CRITIQUES

5.3 FORECASTS AND ASSOCIATION

5.4 THE WALKER STUDY

5.5 BRADBURY AND NEWBY

5.6 CONCLUSIONS

CHAPTER 5

FUNDS STATEMENTS: CRITIQUES AND RESEARCH

5.1 INTRODUCTION

This chapter summarises the critiques of funds statements, the main suggestions that have been made for their amelioration and the findings of empirical studies of the statement's predictive or associative usefulness. Two matters are omitted from this chapter to enable full coverage in the next chapter. The Statement of Cash Flow, and cash flow accounting generally, now has so much material devoted to it that a complete chapter is necessary to cover it. Chapter 6 will execute that task.

5.2 OPINION SURVEYS AND PUBLISHED CRITIQUES

5.21 DEFENDERS OF THE SCFP

Only four articles in the journals of the last decade could be found in unambiguous praise of the SCFP. Siegel and Simon [1981] thought it helps plot the future direction of the company through contrasting earnings with liquidity, and through interpreting management's choice of financial instruments as clues to future earnings stability.

Byrd and Byrd [1986] argued the SCFP can be the most useful statement for small businesses in that it can help predict cash flows, enable a better assessment of income quality, of capacity change decisions, of financial

flexibility and liquidity, and gives an overview of the firm's financing and investing activities.

Gentry et al [1987] argued the usefulness of funds statement elements in bankruptcy prediction. In their sample of 33 failed and 33 non failed firms, investment, dividends and receivables had significance for the failed firms but only size and dividends had any for the successful ones.

Coker [1986] advised loan officers that the SCFP was a useful base from which to project cash flows. The balance sheet was only important if cash flow was inadequate and liquidation might be required.

5.22 CRITICS OF THE SCFP

That funds statements are gravely unsatisfactory is one of the few propositions that appears to be almost universally held by professional and academic accountants alike.

Han [1981] wrote, "In my opinion most of the published funds statements are confusing and misleading." UK critics such as Smith [1985], Holmes [1976], Robbins and Mitchell [1985], Taylor [1979], Mason [1983] and Rayman [1971] all criticized the confused and ambiguous nature and purpose of the funds statement but, unlike Lee [1984] or Lawson [1983], suggested no practical alternatives.

American criticisms of APB 19 for inadequate definition of the term 'funds' and insufficiently clear objectives of the statement itself, can be found, inter alia, in Clark [1983], Swanson and Vangermeersch [1981], Ketz and Kochanek [1982],

Spiller and Virgil [1974] and, rather cogently, in Bryant [1984]. The identification of the most useful definition of funds and the best statement format were discussed without strongly supported conclusions by a number of commentators in the early seventies [Rees and Weygandt 1969, Regazzi 1974, Stark 1975, Warren and White 1975, Rakes and Shenkir 1972, Yu 1969, Roberts and Gabhart 1972, Henry 1975].

In Australia, Clift [1979] produced a wide ranging discussion of the purposes and contents of funds statements that reinforced the criticisms made in the UK, US and Canadian journals.

Smith [1985] thought management should be free to choose the definition of funds flow most appropriate for the company's situation even to the point of eliminating it altogether if funds information is redundant.

Doughterty [1978] asserted that though banks recognized the value of the SCFP for manufacturers, it was regarded as worthless for evaluating the financial condition of a bank. This view was to be accepted by FASB in SFAS 96 which largely exempted banks from SFAS 95.

Some academics feel the confusion as to the exact boundary of "funds" is one of the problems solved by adopting cash flow accounting. Lee [1982] pointed to its objectivity but Rutherford [1982] argued it to be nearly as misleading as accrual accounting, especially when segmental reporting is involved. Clark [1983] quoted various American institutional views favouring a cash flow rather than funds flow focus in the relevant accounting statement but Sorter

[1982] argued that "cash" and "cash flow" are terms no less subject to ambiguity than "funds" and "funds flow". Mason [1961] cites with approval Moonitz [1961] as follows :

"In essence the accrual basis itself developed in an effort to overcome the shortcomings of cash movements as indicators of the results of operations. And yet the newer emphasis on "fund flows" or "cash flows" seems to run counter to the movement to perfect an accrual accounting ... the sophisticated concept is that of accrual accounting, the more primitive one is, of course, the elemental idea of cash movement."

A further discussion of these positions is in Chapter 6.

5.23 CRITCS' SUGGESTIONS

The journals have not lacked suggestions for improving the funds statement. Many of the writers cited above concluded their criticisms with suggestions for reformulated funds statement. Ismail & Roe [1984] wanted funds statements segmented by line of business. Lee [1984], Ketz & Kochanek [1982], Golub and Huffman [1984], Lawson [1983], Swanson & Vangermeersch [1981] and Bryant [1984], all gave examples of reformulated funds statements they argue to be more meaningful than conventional formats. Heath [1978a & b] argued that replacing the funds statement altogether was the best policy and recommended a "statement of financing and investing activities" that separated these two activities clearly. McMonnies [1984] went furthest of all critics in wanting to scrap all published accounts as lacking value for all users and believed narrative reports would be more effective in communicating financial information. This view

had been moderated by 1989 [McMonnies 1989].

Giese and Klammer [1974] criticized the add back format sanctioned by APB 19 for funds from operations and recommended a direct approach.

Henry [1975] noted the purpose of a funds statement was to report the financing and investing activities of a firm, but thought disclosure of operating flows would be better done on a direct basis rather than on an add back one.

Coleman [1979] proposed separating internally generated funds from externally generated funds, reconciling to cash rather than working capital; and categorizing capital expenditures into replacement and improvement, expansion and compliance categories.

Hooper and Page [1979] proposed a new statement beginning with cash increase or decrease over last year end, and adjusting the cash flow at three levels to end with net income. Level 1 adjustments are receipts and payments on capital account, broadly the same as financing and investing activities. Level 2 adjustments are accruals and prepayments including sales not yet paid. Level 3 adjustments are termed accounting allocations and include depreciation, profit or loss on asset disposals (reported gross in level 1), undistributed subsidiary earnings and deferred tax. They held that their statement "clearly distinguishes between real transactions, judgmental transactions, and accounting allocations" which correspond respectively to their three levels of adjustment [Hooper and Page 1979 p55], but failed

to note that such correspondence is not beyond controversy.

Choi and Sondhi [1984], having praised SFAS 52 for enabling consolidated funds statements to reflect changes expressed in each of the currencies of each of the countries in which subsidiaries operate - instead of only in US$ as previously, proposed a funds statement format that would distinguish operations results from exchange rate change effects.

5.24 AUSTRALIA'S TWO ENTITY CONTROVERSY

AAS 12 [1983] defined funds as cash and cash equivalents but its section 102 said "Clearly the concept of funds remains that of all financial resources." McKinnon et al [1983] proposed a two entity test to clarify the ambiguity thus [p83]:

1. The Funds Statement aims to show the flow of resources, capturing the effects of external transactions alone and omitting book entries.
measure of 2. The sacrifice of a resource is normally its recorded cost amount.
3. As not all recorded amounts involve resource flows with external transactions, a two entity test is proposed, namely;
4. A movement of funds occurs only when an event recorded in the accounting records of one entity is recorded also in the accounting records of another entity.

Robb [1985] commented on the practicality of this test by observing that a firm does not usually know whether or not the other firm has recorded the transaction. Moreover the test would exclude tax provisions, dividends, doubtful debt provisions and reclassifications and revaluations of working capital.

In response, Partington et al [1986] accused Robb of using selective and garbled quotations. As to one party's ignorance of the other party's accounting entries, Partington et al blamed this on accrual accounting rather than on their test. They attributed to Robb a belief that funds flows involve movements if they are really external, but performance of a service to extinguish a debt involves no movement although it does reduce the size of liabilities and passes the two entity test. However, they did agree that their test is inadequate to deal with all kinds of changes in the components of working capital but added [p43];

"If a working capital statement is required, then it is best prepared using the working capital concept of funds' (as opposed, presumably, to the two entity concept).

In a possible admission of having lost the argument, they concluded [p44];

"The two entity test was offered as a possible refinement of the conventional external transaction test for resource movements. Perhaps it will prove to be no improvement, but it has stimulated criticism (mostly adverse) from our colleagues, breathing some new life into this ancient unresolved topic."

Robb [1986] in his final comment read the Partington article as tacit acknowledgement of his criticism. However it was perhaps a victory too easily obtained. Had McKinnon et al not specified the other party as having *actually* recorded the transaction in their books, but had instead stipulated that the other party *should in accordance with GAAP* have recorded it, the two entity test might well have been seen as a useful step forward in cleansing funds of

their unnecessary ambiguities.

5.25 SURVEYS OF OPINIONS OF THE FUNDS STATEMENT

5.251 BANKERS VIEWS

Hiltebeitel [1985] found that, for his sample of bank loan officers, there was a significant three way correlation between perceived usefulness, risk assessment and information needs.

Baker [1987] experimented with surrogates for decision usefulness to bank loan officers, and found the most dependable to be certainty and precision.

The importance, but not necessarily the helpfulness, of the Statement of Changes in Financial Position to various users of the statement had been somewhat supported by Summers [1968], Pankoff and Virgil [1970], and Chandra [1974].

Brownlee's [1978] survey found the SCFP to be rated useful both by commercial banks and by bank trusts. The banks used it for determining the appropriateness of a loan applicant's financial policies. The trusts used it to assess the future earnings from the current uses of funds. The statement was seen as a reservoir of information from which users can draw the particular data that suits their needs.

Graci [1982] believed he had found that the SCFP had no incremental information content and did not influence American bank loan officers faced with a short term

borrowing application from a retail firm.

Vicknair [1983] found bank loan officers preferred the APB 19 approach to funds over other alternatives but cautioned [p101];

"Usefulness of funds reporting alternatives is not dependant on the particular funds concept selected by chief commercial loan officers as the underlying basis of the statement."

5.252 SMALL FIRM MANAGERS

Chesley and Scheiner [1982] examined the usefulness and understandability of funds statements to owners of small businesses in Canada and the USA. Their sample was 246 Nova Scotian manufacturers and 250 southeastern US near equivalents. To their 25 point questionnaire covering both Likert scale ratings of the statement's possible dimensions of usefulness and also questions on a specimen SCFP, they received 95 Canadian and 76 US responses. The only non response bias detected in follow up calls was that Canadian non respondents tended to be from slightly smaller small firms.

The most important results are summarized next.

QUESTION AND ANSWER	Canada %	US %	X^2	alpha
Is the funds statement used ?				
Yes	73	82		
No	27	18	1.66	>50%
What statements are prepared ?				
BS, IS, Retentions and SCFP	66	84		
BS,IS, RE only	20	16		
Single statement only	14	00	13.64	<0.5%

How useful is the SCFP ?				
Very	32	30		
Quite	33	14		
Slightly	29	32		
Not	6	4	11.47	<1%
What changes in the SCFP are suggested ?				
None needed	89	80		
Definition of funds	4	11		
Details	6	7		
Price level	1	2	2.11	>50%
Which definition of working capital (sic) is most useful ?				
Cash	30	12		
Cash & 1 liquid asset less c.ls.	34	20		
Current assets less c. ls.	28	63		
Multiple responses	8	5	21.43	<0.1%
Are you familiar with the concept of working capital ?				
Yes	99	100		
No	1	0		
Is your SCFP similar to the specimen supplied ?				
Yes	90	97		
No	10	3	15.01	<0.1%
Is the application of funds to paying dividends and debts equal to cash ?				
Yes	55	64		
No	7	5		
Not necessarily	38	31		
Are funds from operations equal to cash ?				
Yes	31	33		
No	60	48		
Dont know	9	19	24.61	<0.1%

As a result of this study, the authors determined that the respondents understood the concept of working capital in its general sense, namely as cash resources for the working of their business.

"The accounting definition of this term is very specific and includes assets and debts which vary in their proximity to cash. Unless the user understands this point, the working capital funds statement can be misleading.....This study provides evidence that users may be misinterpreting the funds statement as a statement of cash receipts and disbursements. To reduce the confusion, perhaps as Heath sug-

gests, three separate statements should be presented".[Chesley and Scheiner 1982, p58]

5.253 AUSTRALIAN INSTITUTIONAL INVESTORS

Anderson [1981] found that Australian institutional investors rated income and position statements three times more important than the funds statement for sell or hold decisions but only twice as important for buy decisions. The study of annual reports was seen as less important than a range of other information sources like tips, brokers, visits to companies, magazines and even government publications.

5.254 CPAs

Phillips [1984] surveyed CPAs on their preferred construct of funds but was unable to obtain any consensus, except for the weak conclusion that accounts users were more open to revision of APB 19 than accounts preparers were.

5.255 FINANCIAL ANALYSTS

Rakes and Shekin [1972] found 134 out of their 151 chartered financial analyst respondents preferred an all financial resources definition of funds over working capital or cash.

5.26 WRITERS OF TEXTBOOKS

In view of the criticisms that have appeared in the professional and academic journals regarding the vague focus and insufficiently clearly defined reporting objectives of

the funds statement, it might be expected that college accounting textbooks would exercise caution in addressing the uses and benefits of funds statements. In most texts, the calculation of the numbers in the statement is systematically explained, but as the following samples indicate, interpretation of the statement is not.

Bird [1979, p16] asserted fund statements "do shed some light on the nature of the statement and the items that go into it," the nature of that light being [p70]: "The most direct indication of the liquidity and solvency of the company" subject to reservations about the treatment of bank overdrafts.

Reid and Myddleton [1978, p211] declared the aim of the statement "is to show how a company's activities have been financed and the use to which funds have been put". They criticised the UK's SSAP10 for allowing netting off and pointed out that the working capital on the balance sheet may not reconcile with working capital changes on the funds statement.

Rockley [1975, p93] asserted: "A complete analysis of a company's financing strategy will be revealed by a study of several funds flow statements" whose object [p.94] "is to show how a firm's asset/liability status has changed during a specified period". He then moved on to focus on cash flows.

Jaedicke and Sprouse [1965, p78] conceded, unlike the textbook writers cited above, "The term 'funds' flow is

slightly ambiguous" but then explained the statement using a working capital focus, concluding that such a focus [p92] is "perhaps not the most useful" concept of funds. The all financial resources approach is preferred because of its all inclusiveness but its treatment is "beyond the scope of this book" for some unidentified reason.

G Lee [1975, p176] considered "any transaction" carrying a movement in assets or liabilities is a flow of funds. In his opinion [p179], "There is indeed a strong case for drafting the funds statement so as to show directly the effect of the year's transactions on net short term monetary assets" [debtors, quoted investments and cash] but [p181] cash flow accounting "has a rather defeatist ring about it, and savours to many accountants of throwing out the baby with the bathwater".

Briston [1981, p148] only used funds statements to back ratio analysis and regarded the statement as no more than "an orderly presentation of the changes in balance sheet items".

Frank Wood [1975, p801] regarded the statement as "an analysis of the reasons for changes in either the firm's cash resources or its fund of working capital" but only four pages later [p805] the statement has been relegated to "simply a convenient way of describing in concise form the changes which take place over a period of time in those accounts which directly influence working capital and cash flows".

Glautier, Underdown and Clark [1978, p138] had no doubts

on the matter: "to most people the term funds means cash. In accounting the term funds has a restricted meaning and is used to refer to net working capital".

For McNamara [1979, p315] the statement answers the questions "from where did the funds [cash] come and to where did the funds [cash] go during the period," but for Samuels, Rickwood and Piper [1981, p296] "the statement shows the source of all resources and how they have been used".

Sprouse [1971, p168] attributed to the statement "a summary of the transactions resulting in changes in working capital" and exemplified [p170ff] how "the non use of funds is not the same thing as a source of funds".

The Financial Analysts Federation of the US [1964, p9] went rather further. "Valuable insight" is given by the statement into "future dividend policy, the financing of capital expenditures and the extent to which additional debt and/or equities may be issued to finance same, and the ability to meet debt servicing requirements".

For Barton in Australia [1975, p263], "Where management does not have perfect knowledge of the more distant future, long term projections are normally made on a funds flow basis rather than a cash flow basis".

Finally, Bull [1980, p461]: "Fund flow analysis seeks to recast the income statement and balance sheet as prepared in accordance with accounting postulates, and describes the events of an accounting period in terms of sources of additional funds, and the uses to which these were put".

Moreover [p.468] "A good analyst however can often do a fairly accurate job of deducing what probably took place. Fund flow analysis therefore is a useful managerial tool insofar as it can help highlight reasons for changes in the liquidity of the firm".

With such divergent views in the textbooks about the content and purpose of funds statements, it is not surprising that teaching and examination of this topic tends to comprise calculation rather than interpretation or analysis. Pratt and Chrisman [1982] showed how calculation itself was improved by imparting interpretative ability, through the direct method in their particular case.

In conclusion, the personal opinions of journal and textbook writers seems to be an inexhaustible source of confusion about funds flow statements that surveys of professional views have done little to reduce. The next section surveys how far such confusion is underwritten by the results of previous empirical work on the funds flow numbers themselves.

5.3 FORECASTS AND ASSOCIATION

5.31 ASSOCIATION WITH OTHER VARIABLES

5.311 ASSOCIATION OF FUNDS FLOWS WITH MARKET MOVEMENTS

Barlev and Livnat [1986] found a positive association between uses of funds and stock returns for 494 firms included on the Compustat tape for the decade 1971-81. The

information content of sources of funds seemed to be directly negative but indirectly positive, although this result is at least partly an artefact of the path analysis method.

Harmon [1984], however, found earnings were more closely associated with stock price changes than were funds flows. This contrasts with Staubus [1965] who had found funds flows (defined as net working capital from operations less taxes) more reliable than earnings in predicting stock prices. However, it supports Ball and Brown [1968] who found funds flows (net operating income before non recurring items) not as good as EPS or net income in predicting the residual behaviour of stock prices; Beaver and Dukes [1972] who found funds flow (earnings before interest, tax, depreciation and amortization) worse than earnings in terms of a U test of associations with stock prices; and Govindarajan [1980] whose sample of financial analysts' comments on 976 companies showed 86.5% put more importance on earnings than funds flows. None of the above, however, precludes the possibility that funds statements constitute significant *extra* information.

5.312 ASSOCIATION WITH EARNINGS AND CASH FLOW

Research on the ability of other currently reported performance measures to serve as proxies for cash flow from operations was done by Thode et al [1986]. Twelve hypotheses were tested by Thode et al [1986] using data on

cash flow, working capital and income from continuing operations for all firms contained in Standard and Poor's 400 Industrials Index during 1973-1982. They found that cash flow from operations was not easily inferred from, and was not systematically related to, other conventional performance measures or cash flow surrogates.

Seed [1984] performed a ten year correlation of operations working capital flow with operations cash flow. The R Squared was too small for either to be inferred from the other, so the funds statement is providing unique and at least potentially useful information; a conclusion supportive of previous similar findings and inferences by Gombola and Ketz [1983] and Bowen et al [1984]. However, Seed [1984, p55] cautioned:

"We stress the word *potential* because the above studies generally ascertained that it is a distinct measure of performance; not that it is a clear determinant of company value or an obvious essential element in decision models used by investors or creditors. Thus, the relevance of cash flow from operations, such as might be measured by statistical association with stock price movements, has not been demonstrated empirically. Rather, what we have is a belief, shared by the FASB and others, that accounting data should be helpful in assessing the timing and amounts of future cash flows and, by implication, that the cash flows themselves are important.'

Andrew et al [1985] analysed 112 Singaporean firms in 1983 and 1984, finding funds from operations so closely correlated with profit that they conclude it is not a useful indicator of solvency and does not add to the information in the income statement.

5.32 PREDICTIVE ACCURACY

5.321 PREDICTING CASH FLOWS

Easton [1984] found accounting earnings to be about equally correlated as share prices were with the theoretical value of a dividend stream. Cash flow predicted theoretical dividends slightly less efficiently than earnings, but both were far better than current dividends or sales revenue. This was held to support the view that accounting had information content in the prediction of *actual* dividend streams.

Costigan [1985] found working capital funds from operations had a marginally better performance than cash flow from operations in predicting future cash flows.

Wilson's [1985] PhD Dissertation for Carnegie Mellon addressed the information content of accruals elements in funds flows in predicting operating cash flows. He distinguished between current accruals and non current ones; the former being the aggregate of all the working capital changes excluding cash; the latter being the difference between earnings and working capital funds flow from operations [largely comprising depreciation and deferred tax]. He found that the total accrual had positive information content but was unable to establish a consistent allocation of such content between the current and non current accruals.

An analysis by Hassanli [1988] of 29 accounting measures showed that 21 of those variables, mostly funds flow

statement items or ratios thereof, are important in predicting cash flows.

5.322 PREDICTING MERGERS

Ratios derived from the SCFP were slightly superior predictors of whether or not a firm had merged compared to ratios derived from the income and position statements. [Barton 1986].

5.323 BANKRUPTCY FORECASTS

A direct basis for the SCFP resulted in professional analysts and portfolio managers' solvency judgments outperforming their indirect SCFP based judgments. [Allen 1985].

Amy Lau [1982] was one of the first researchers to use multinomial logit analysis (MLA), to predict four different levels of financial trouble from reduced dividends to full bankruptcy, via ranked probability scores for up to 3 years before the event. Her MLA model outperformed and was more

1 the Altman, Beaver and naive models. The

predictive ability of the model was enhanced when operating earnings or working capital funds flows rather than net quick assets or cash flows were input into the model. She concluded [Lau 1982 p143];

> "This empirical superiority of earnings and working capital flow information is contrary to the advocacy of cash flow which is prevalent in current authoritative accounting literature."

Marlowe [1984], however, found no significant difference between net income, working capital or cash based funds flow models in using LOGIT to classify firms between bankrupt and non bankrupt.

Casey and Bartczak [1984] found cash flow data incapable of distinguishing failed from unfailed firms in the five years before failure. Like Casey and Bartczak [1984], Gentry et al [1985b] found cash flow from operations has no incremental classifying information content beyond other cash based funds flows of which dividends were the most significant.

Gentry et al [1985a] showed dividends to be the most effective funds flow component in distinguishing failed from unfailed firms up to three years earlier. Receivables and investments provided reliable signals, but only in the year before failure. They also found cash based statements to be a viable predictor of failed firms but not a better one than funds flow [Gentry et al 1985b].

Barton [1986] found that the classification of firms into bankrupt or merged with ratios derived from the SCFP slightly outperformed ratios from the other two final accounts, but ratios derived from all three were significantly better still. Contrary to expectations, cash flow measures were not superior to working capital measures in merger prediction.

Gentry et al [1987] repeated their demonstration of the usefulness of funds statement elements in bankruptcy

prediction. In their sample of 33 failed and 33 non failed firms, investment, dividends and receivables had significance for the failed firms but only size and dividends had any for the successful ones.

Significant differences between failed and unfailed firms were found by Gahlon and Vigeland [1988] for 5 years before bankruptcy in respect of net cash flow from operations, cash flow after debt retirement and age of trade creditors. These all assume cash flows calculated on the direct basis, as the indirectly based flows will not discriminate quite as well.

5.33 SUMMARY OF THIS SECTION

Evidence on the usefulness of funds flows as leading or lagging indicators of stock market price movements is mixed, but there is quite strong support for the importance of accrual based earnings in such a role.

Funds flows from operations appear to be closely related to earnings but quite far away from operations cash flows; yet funds flows seem to predict cash flows better than do cash flows themselves. Finally, funds flow based variables do at least as well as cash flow, often much better, in predicting or classifying bankrupt firms.

Thus, recently published empirical studies would seem to offer significant support for the notion that conventional funds flow statements have distinct information content.

5.4 THE WALKER STUDY

Walker [1981, 1984] conducted a study, which he termed an experiment, to test hypotheses developed from claims made in the literature about the advantages of presenting data in the form of an SCFP; in particular, the claim that that the SCFP assists readers to interpret a set of financial reports by making the reports 'more readily interpretable'. Assuming readers of full reports adopt a search minimization strategy, it is possible the SCFP might provide a useful initial indication of the key relationships within the financial data, such as that subsisting between accounting profits and cash balances.

> "Hence, scrutiny of funds statements would enable readers quickly to identify matters which they might wish to review in detail. Moreover, funds statements could be supposed to enhance the interpretability of annual reports by reducing information complexity. Since individuals vary in their capacity to handle information complexity [Schroder, Driver and Streufert 1967], it might be supposed that the presentation of funds statements would ensure that a wider range of readers would be able to discern relationships reflected in financial data." [Walker 1984 127].

If SCFPs do achieve these things, then readers should process financial information both more quickly and more accurately than if SCFPs were not available. There should also be more consensus and greater confidence on the part of readers provided with SCFPs compared with those who were not. From these literature based observations Walker formulated four experimental hypotheses, namely:-

H1 There is no difference in the time taken by readers of annual reports to assess a firm's position and prospects

when they are given financial statements which, (a) include funds statements or else, (b) do not include funds statements.

H2 There is no difference in the consensus secured among readers of annual reports who (a) are provided with funds statements or (b) are not provided with funds statements.

H3 There is no difference in the confidence reflected by readers of annual reports who (a) are provided with funds statements and (b) are not provided with funds statements.

H4 There is no difference in the accuracy achieved by readers of annual reports when assessing aspects of a company's financial position and performance when those readers (a) are provided with funds statements or (b) are not provided with funds statements.

200 subjects were given a sequence of six sets of financial reports and questioned on each firm's financial position, performance and prospects.

Financial report pages were colour coded and presented to participants in a predetermined sequence to enable easy recording of the time taken to complete each stage of the exercise. Participants were told it was essential to complete the questions and read the reports in the specified sequence. Responses were so unobtrusively timed that only three of the subjects indicated that they realised that they were being timed at all.

A pilot study with students had shown a considerable learning effect manifesting in considerably shorter

processing times for the later stages of the exercise. Walker [1981 p6] thought this was also strongly influenced by peer performance, since the pilot test had been administered in a group situation, notwithstanding Chervany and Dickson's [1974] report of no such peer pressure existing in their comparable experimental setting. Walker found this aspect of his pilot test sufficiently serious to justify administering his test on a one to one basis. In this, he is imputing external validity to student behavior in a way not necessarily justified for adult accountants and analysts. Moreover, he is treating peer pressure as a contaminant, whereas it could be argued that its presence enhances the representativeness of the setting. In financial and banking offices, open plan multiple occupation is the norm in Hong Kong, even for credit analysts. Thus, insofar as a group of subjects all doing the same task constitutes real peer pressure, it also constitutes a realistic and representative work setting. It is almost as if Walker wished to slow down his subjects' responses by putting them in solitary experimental confinement. As for learning effects, these are only possible if the task content and requirements hardly vary at all from one attempt at a task to the next. Given the great variety present in the real world population of funds statements, it would have been quite possible to minimize learning effects by sequencing the accounts in an appropriate way.

Reports were selected to mimimize the possibility that subjects could base their responses on knowledge of actual

case histories, but all reports were Australian and related to firms of similar sizes of total assets. The reports of the firms included a fictitious name for the firm, an illustrated cover, an index, lists of fictitious officers, and reports from directors and auditors. Notes to the accounts were included but edited down. The financial statements themselves were edited enough to standardize the extent, but not the narrative content, of disclosure. The reports totalled 9 colour coded pages each, exclusive of a one page funds statement.

"To cope with the possibility that the reports of some firms might be more difficult than those of others, the six annual reports were presented to matched pairs of subjects in ten randomly selected sequences, so that within each subject category, a subject provided with funds statements received the reports in the same sequence as a subject not provided with funds statements." [Walker 1984 130].

The questions accompanying the annual reports were developed from a literature review of what funds statements are supposed to achieve. The following table combines and abbreviates Walker's [1984] Tables 6-1 and 6-2;-

Aim	No of supporting references	Associated questions
A	28 [latest Courtis 1976]	c1 c2 j1 j5
B	22 [latest Spiller & Virgil 1974]	c5
C	10 [latest Courtis 1976]	j2
D	9 [latest The Corporate Report 1975]	j3
E	21 [latest Seed 1976]	c4 j4
F	2 [latest The Corporate Report 1975]	c3

AIMS

A To represent changes in a firm's financing policies

B To depict how a firm's resources have been applied during a period

C To represent changes in the pattern of a firm's investments

D To provide an indication of a firm's capacity to maintain an investment programme (or other activities) with resources derived from business operations

E To depict changes in a firm's liquidity

F To indicate the significance of dividend payments vis a vis other distributions, or to represent capacity to pay dividends.

CALCULATION QUESTIONS

c1 Has the firm raised new equity capital during the year covered by the report ?

c2 Is the firm more heavily dependent upon external borrowings than in the previous year ?

c3 Did the firm distribute a higher percentage of its

profits in the last year than in the year before ?

c4 Has the firm's liquid position deteriorated, relative to what it was a year ago ?

c5 Has the firm expended significant sums in the last year on new investments or in replacing productive assets ?

JUDGMENT QUESTIONS

j1 Are the firm's financing and investment policies likely to lead to increasing profitability ?

j2 Has the composition of the firm's assets changed significantly during the last financial year ?

j3 Would the firm be in a position to finance expansion of its activities from internally generated funds ?

j4 Is the firm in a position to pay its debts as and when they fall due ?

j5 Have there been any significant changes in the firm's gearing over the past financial year ?

The c questions need calculations to be accurately answered, the j questions only require judgments to be made.

"Subjects were required to answer yes, no or not sure to each question. This provided a very crude measurement of confidence. Rating scales were not used, since it was considered that they might lead to some hesitancy or vacillation and so affect response times." [Walker 1984 133].

100 subjects were given the c questions, 100 the j questions; but all received 3 reports with and 3 reports without funds statements. There were 20 subjects in each of the following categories;

i) first year students,

ii) advanced accounting students,

iii) academic accountants,

iv) accounting practitioners, and

v) financial analysts.

Financial analysts were chosen for their occupational involvement in the interpretation of financial data and because their information needs are thought to influence the design of accounting reports. The selection of other groups was based on the extent to which they were expected to have received relevant training and work experience, although more senior practitioners would not perhaps be as familiar with funds statements as would recently qualified accountants, accounting academics and advanced accounting students. This is because only in 1973 did Australia require listed firms to produce funds statements. First year accounting students were thought to be a surrogate for unsophisticated investors. Some considerable differences in familiarity with funds statements were expected between these subject groups.

The experiment was administered in six rounds. In rounds 1 through 3, one group received a report without funds statements; the other received the same report (in each round) including a funds statement. In rounds 4 through 6, the first group's reports included funds statements; the second group's reports excluded them. The Wilcoxon matched pairs signed ranks test compared subjects' round 3 scores with their round 4 scores (after the switch from without to

with). Financial analysts took longer to answer c questions, while both groups of students took less time to answer the j questions after the switch. However, no group took less time to answer questions throughout rounds 4 to 6 compared with time taken for rounds 1 to 3. That is, the learning effects feared from the pilot tests were not found in the main experiment. Around 20% of the time spent reviewing the reports in each round was spent on the funds statement, again with no significant change in this proportion from the early rouds to the later ones. Walker acknowledged that these results could be explained by mere sampling variation [Walker 1981 p20].

The mean response time for all subjects answering the c questions was 5.51 minutes and on the j questions 5.48 minutes for reports without funds statements: 6.0 minutes for c questions and 5.16 for j questions for the reports with funds statements. No significant time reduction was associated with the provision of funds statements except for the two student groups on the j questions in a within subject design, but financial analysts showed significant time increases in answering the c questions.

Four of the c questions had right answers based on calculations. The fifth inadvertently introduced a subjective materiality criterion. Funds statements appeared to make no significant difference to judgment accuracy, but did enhance confidence in answering question c4 concerning liquidity deterioration and question j3 concerning

financing expansion from operations when judged by the chi square test, but scarcely at all when judged by the Fisher exact probability test. No consensus effect was found.

Walker thus found all four of his null hypotheses supported but his final paragraph cautioned thus.

> "The results cannot be interpreted as reflecting upon the usefulness of funds statements as a means of conveying information not otherwise obtainable from balance sheets or income statements. It is emphasized that the investigation concerned funds statements in the form of 'all inclusive' statements of changes in financial position, and that the findings cannot be related to claims about the usefulness of funds statements containing, for example, information about realized cash flows. These claims remain unsupported hypotheses." [Walker 1984 144].

Walker's conclusions seem valid as regards their internal validity, since his experiment was designed to minimize contaminants. His study may well also have external validity within Australia for Australian accounting reports, but a mean speed of between 5 and 6 minutes for 9 or 10 page annual reports suggests an average time per page of less than 30 seconds to answer all 5 questions on the question sheets. This seems remarkably fast, especially for calculation questions. Overload effects arising from providing the SCFP on top of 9 other pages could explain the lack of increment in accuracy, but such effects would be hard to isolate when the 9 other pages already contained enough data to overload subjects working at the speeds claimed by Walker. The purpose of providing full reports rather than just balance sheets and income statements is unclear and was not followed in the present study.

Disagreement has already been expressed earlier in this section with Walker's view of the distortions inherent in peer pressure. Apart from these points, however, Walker's approach had some considerable strengths. His derivation of funds statement justifications from a comprehensive literature review is hard to fault. His questionnaire design arising from those justifications is also largely convincing, with some minor reservations to be mentioned in Chapter 8. His use of nonparametric statistics to test his four hypotheses seems appropriate, if a little timid, given the robustness of ANOVA to almost every kind of deviation from normal distribution parameters. This last point is discussed extensively in Appendix E and summarily in Chapter 9. All in all, the Walker study's strengths was judged to outweigh its weaknesses to a sufficient extent to use it as a point of departure for the research design of the present work.

5.5 BRADBURY AND NEWBY

Bradbury and Newby [1989] replicated Walker's work in New Zealand with 3 differences. First, their questions were developed from the local SSAP 10 [1979] rather than from the general body of the literature. Second, they protocol analysed actual use of the fund statement as opposed to Walker's contrast of processing in the "with" and "without" funds statement modes. Third, they claimed to have studied whether use was made of information only available in the

funds statement, whereas Walker had no such information available; this reflecting a difference between the Australian all financial resources statement which simply repackages the other two final accounts, and the New Zealand funds statement which had a working capital approach. They used 30 financial analysts whom they asked the following 2 judgment (j) and 3 calculation (c) questions;-

j1 Is the company likely to default in repayment of the specified loan during the normal course of business ?

j2 Is it likely that the company will pay a dividend next year ? (sic)

c1 By what amount has the working capital position changed over the year ?

c2 State the amount of liabilities repaid during the year.

c3 State the amount of fixed assets purchased during the year ?

Every analyst was given the same annual report, *in full and inclusive of notes,* of "a small New Zealand manufacturing company".

Reprocessing their results, some interesting behaviours emerge as follows:

Qn	Report most time spent reading	Mean total time for the whole report
j1	BS	9.22 min
j2	BS	56.4 secs
c1	BS	1.24 min
c2	BS	1.95 min

c3 BS 1.36 min

It is odd that so much time should have been spent on so called calculation questions that are really a matter of simply retrieving the appropriate published total or subtotal from the report. Question c2 saw the greatest time spent on the funds statement but even here the BS was more extensively searched, and 6 analysts seem never to have used the funds statement at all. Judgment questions were answered on a 5 point scale from 1=very likely to 5=very unlikely. Respondents also had to indicate their degree of confidence on a 5 point scale, thereby implicitly disagreeing with Walker's reasons for not employing such a refinement - its comparative meaninglessness on an intersubjective basis - the well known Arrow impossibility theorem supports Walker in this reservation. Bradbury and Newby concluded from their study that the funds statement did not enhance judgment accuracy or confidence nor did it enable quicker processing, although working capital calculations for c1 were done somewhat faster when the funds statement was used. Surprisingly, only 7 of the 30 analysts gave a correct answer to c2 requiring "calculation" of the total liabilities to be repaid. The study may well be justified in concluding "there is little point in retaining the SOCIFP as a third financial statement", but with results like those from a group of sophisticated users, the doubt arises as to whether the results say more about the analysts rather than about the reports. This is a lesser problem with the Walker

results, since he used 5 different kinds of subject. It is interesting that Bradbury and Newby's results support Walker's but with apparently greater variations in speed for their 30 subjects than was shown by Walker's 200. Indeed it is the speed results in both studies that stretch credulity furthest. Particular care, therefore, was taken in the present study to monitor speed with precision.

5.6 CONCLUSIONS

Throughout the literature, criticisms of the confused nature of the concept 'funds' and the unfocussed purposes of the funds statement abound. Walker [1984] chrystallized the aims of the funds statement as follows;

A To represent changes in a firm's financing policies

B To depict how a firm's resources have been applied during a period

C To represent changes in the pattern of a firm's investments

D To provide an indication of a firm's capacity to maintain an investment programme (or other activities) with resources derived from business operations

E To depict changes in a firm's liquidity, and

F To indicate the significance of dividend payments vis a vis other distributions, and to represent capacity to pay dividends.

Assuming readers of full reports adopt a search minimization strategy, it is possible the SCFP might provide an initial indication of the key relationships within the

financial data, such as that subsisting between accounting profits and cash balances.

> "Hence, scrutiny of funds statements would enable readers quickly to identify matters which they might wish to review in detail. Moreover, funds statements could be supposed to enhance the interpretability of annual reports by reducing information complexity. Since individuals vary in their capacity to handle information complexity [Schroder, Driver and Streufert 1967], it might be supposed that the presentation of funds statements would ensure that a wider range of readers would be able to discern relationships reflected in financial data." [Walker 1984 127].

If SCFPs do achieve these things, then readers should process financial information both more quickly and more accurately than if SCFPs were not available. There should also be more consensus and greater confidence on the part of readers provided with SCFPs compared with those who were not.

Only four articles in the journals of the last decade could be found in unambiguous praise of the SCFP. That funds statements are gravely unsatisfactory, however, is one of the few propositions that appears to be almost universally held by professional and academic accountants alike.

The personal opinions of journal and textbook writers seems to be an inexhaustible source of confusion about funds flow statements that surveys of professional views have done little to reduce. Section 5.3 surveyed how far such confusion is underwritten by the results of previous empirical work on the funds flow numbers themselves, and

found a rather more convincing picture of the usefulness of funds statements than was demonstrated in the expressions of personal opinion of most of the non research based commentators.

Evidence on the usefulness of funds flows as leading or lagging indicators of stock market price movements is mixed, but there is quite strong support for the importance of accrual based earnings in such a role. Recently published empirical studies would seem to offer significant support for the notion that conventional funds flow statements have distinct information content.

Funds flows from operations appear to be closely related to earnings but quite far away from operations cash flows; yet funds flows seem to predict cash flows better than do cash flows themselves. Finally, funds flow based variables do at least as well as cash flow, often much better, in predicting or classifying bankrupt firms.

Finally, Baker's [1987] most dependable surrogates for decision usefulness to bank loan officers were found to be certainty and precision. This means that fuzziness implies uselessness, and "funds" excel in fuzziness. The literature has assumed "cash" is self evidently sharper and more certain than "funds". The next chapter will discuss the problems with such a view, and show how SFAS 95 and its overseas equivalents are introducing fuzziness into the notion of cash with the notions of "near cash" and "liquid funds". It would be rather strange if Finney's [1925] definition of "funds" as "something more than cash" were to

become more than a little appropriate for some of the new approaches to cash itself. The recent history of government attempts in the UK and USA to define money in order to control its supply shows the naivety of assuming "cash", even in its M1 form, is a self-defining, self-evident state of nature. It is perhaps as impossible to draw firm lines round any liquid asset as it is to measure the precise volume of water in, say, the River Clyde at any point in time. It is as if "liquidity" is inherently and irrevocably "fuzzy."

CHAPTER 6 CASH FLOW ACCOUNTING STATEMENTS

6.1 INTRODUCTION

6.2 THE STATEMENT OF CASH FLOW

6.3 CRITICISMS OF THE SCF

6.4 CASH FLOW ACCOUNTING

6.5 CONCLUSION

CHAPTER 6 CASH FLOW ACCOUNTING STATEMENTS

6.1 INTRODUCTION

The American interest in radically reviewing the SCFP was traced by Seed [1984a] to concerns about liquidity and solvency caused by adverse economic conditions, deterioration of the credibility of the income statement caused by inflation, and the efforts of the FASB to establish a conceptual framework for financial statements [Seed 1984a].

FASB [1980] gave four reasons why a cash flow statement should replace the SCFP;-

1. the difference between income and funds flows,

2. the need for information on liquidity and financial flexibilty,

3. the inadequacy of prior practice and

4. the further development of a conceptual framework for financial accounting and reporting. [FASB 1980]. This last reason is amplified in the next paragraph.

The Financial Accounting Standards Board (FASB] issued its Statement of Financial Accounting Concepts 5 (SFAC 5) in an attempt to develop a conceptual framework for business enterprises. The conclusions of SFAC 5 included the view that a full set of financial statements should disclose cash flows themselves, not a surrogate for them.

Nel [1988] Enthoven described the American disillusion with the Income Statement and SCFP in the following words:

"The International Harvester, Massey Ferguson, Penn Central and Chrysler Corporations of this world are only a few examples of how a mask of profitability can easily be superimposed upon a mass of insolvency"[Emmanuel 1988 p19]

"With proper analysis, the interpretation of profit results will show how well the company is performing at the business of making money, whilst cash flow information will tell how real that money is." [Emmanuel 1988 p21].

Against this background, FASB undertook its review of APB 19 and evolved its replacement, the Statement of Cash Flow (hereafter termed the SCF).

6.2 THE STATEMENT OF CASH FLOW

6.21 THE JUSTIFICATIONS FOR INTRODUCING AN SCF

6.211 SHORTCOMINGS OF APB 19

Zega [1988] asserted SFAS 95 was issued for 2 reasons:

1. To resolve disputes over definitions of funds and formats of the funds statement, and

2. To improve the reliability and usefulness of financial reports.

Emmanuel [1988] viewed the SCFP as inadequate relative to the SCF in that the SCFP had failed to address;

1. categories of related cash flows,

2. the capacity to service debt obligations, and

3. the need for external financing. These concerns he thought SFAS 95 had broadly covered.

Using the APB 19 SCFP even on the cash basis, actual cash flowing from operations could only be indirectly and unreliably assessed. [Drtina and Largay 1985].

Cash flow from operations is not easily inferred and is not systematically related to its funds flow surrogates, was the conclusion of Thode et al [1986], after processing the accounts of the companies in the Standard and Poors 400 Industrial Index during 1973-1982. They concluded there was a strong case for separate reporting of operating cash flows.

Maksy [1988] found systematic discrepancies between the SCFP and the balance sheet figures in respect of forex treatments, purchase and sale of business entities, and deferred taxes.

Thompson and Buttross [1988] commended the writers of SFAS 95 for allowing less format flexibility than in APB 3 and APB 19.

6.212 PROFESSIONAL PREFERENCES

The 1980 Discussion Memorandum [FASB 1980] stated that SCFPs had been criticized for being too condensed, for lack of focus on one definition of funds and for failure to quesstion whether working capital was the most useful definition. Sorter [1982] criticized this criticism as inadequately addressing the objectives of the funds statement.

The 1981 Exposure Draft [FASB 1981] provided concepts to guide the presentation of income, cash flow and financial position information. It stated reporting cash flow components will generally be more useful than reporting

changes in working capital, and Sarhan et al [1987] reported responses to the Exposure Draft were favourable. The Financial Executives Institute encouraged firms to report cash flow in their 1982 statements [Golub and Hoffman 1984].

In 1982 the Auditing Standards Board stated that it would not breach the consistency principle if firms switched from a working capital to a cash basis SCFP. 56% of Braiotta's [1984] 66 company sample from 6 industries were already using a cash basis. Gibson et al [1986] surveyed 300 CPA practitioners and 278 accounting professors on the issues involved in the replacement of the SCFP by the SCF. They found the following;-

1. CPAs underestimated both internal and external usage of the funds statement,

2. Support for the working capital definition was roughly as strong as support for a cash definition,

3. Educators preferred a cash focus,

4. CPAs preferred a sources and uses format,

5. Educators preferred the direct operating cash flow format, and

6. CPAs, however, preferred the indirect format.

Ketz and Largay [1987] unsuccessfully tried to link SCFP numbers with their equivalents in the income and position statements. In particular, the income statement idea of operations differed from that of the SCFP. They recommended the FASB to fuse the two statements into one, or at least to impose a common definition of operations. The move from a working capital to a cash basis statement during the

eighties they attributed to "strong encouragement provided by the Financial Executives' Institute and by publications of the FASB" [p10]. (The publications to which they refer are FASB [1980 and 1981]).

SFAS 95 draws heavily on SFAC 1 (*Objectives of Financial Reporting*) for its justification. Adams [1988] quoted two extracts from the latter;

"Since an enterprise's ability to generate favourable cash flows affects both its ability to pay dividends and interest and the market price of its securities, expected cash flows to investors and creditors are related to expected cash flows to the enterprise in which they have invested or to which they have loaned funds.

Financial reporting should provide information about how an enterprise obtains and spends cash, about its borrowing and repayment of borrowing, about its capital transactions, including cash dividends and other distributions of an enterprise's resources to its owners, and about other factors that may affect an enterprise's liquidity or solvency" [Adams 1988 p113].

6.213 COMMERCIAL REASONS

Seed's [1984b] survey of bankers', financial analysts' and investors' opinions found a majority in all groups favouring a cash definition of funds as being by far the easiest definition to understand and to apply.

Seed [1984b] reported the view of some respondents that cash flow was more objective than funds flow, especially when inflation drives up the value of inventory, and cause prudent management to minimize receivables and cash holdings. The working capital funds would be rising but its most liquid elements would be falling, and statement users may be confused as to which signal of managerial stewardship

ability is the senior.

Sarhan et al [1987] stated 5 factors prompted firms to switch from working capital to cash based funds statements:-

1. inventory growth, especially when it begins to slow,
2. receivables growth,
3. industry financial reporting practices,
4. users' needs, and
5. efforts of standard setting and professional bodies.

Studying 20 years of SCFPs to 1985, Franz and Thies [1988] discovered that both operating income and operating working capital funds flow had recently diminished in significance as components of cash flow, due mostly to slower growth in inventory and receivables relative to cash flow. This suggested funds flow had become an inadequate proxy for cash flow.

6.214 INCREASINGLY NORMAL PRACTICE

By the mid eighties, Swanson [1986] could report a widespread move to a cash basis SCFP "due to its clarity." The use of the traditional sources and applications format had declined as more companies used an activity format for classifying transactions as financing, investing, or operating activities.

Kochanek and Norgaard [1987] examined the SCFPs of the Fortune 100 largest companies for the years 1979-1983. Only 2 firms in the sample used a cash basis in 1979 but by 1983 this had risen to 76 firms. Definitions of cash varied

considerably and only 36 firms in 1983 identified cash flow rather than working capital funds flow from operations in their statements.

Gibson and Kruse [1984] reported a majority of their 87 sample companies were already using a cash and equivalents basis SCFP as suggested in the 1981 FASB exposure draft. Four years later;-

"A recent survey of Fortune 500 companies showed about 70% adopted a cash based approach and about 50% currently classify transactions according to operating, investing and financing activities" [Mahoney et al 1988 p27].

'The finding that inventory growth ratio is a significant variable in explaining the change from reporting working capital to cash flow in the funds statement indicates that companies tend to report cash flow rather than working capital in the funds statements when they succeed in reducing their inventory. Users of financial statements may interpret such reporting change as a message from management about the improved liquidity and financial flexibility of the company. Such interpretation may help improve the economic performance of the company.' The same effect was not found very strongly for receivables but it was there to a certain extent. [Sarhan et al 1987, p61]

6.22 THE SCF UNDER SFAS 95

Descriptions of the requirements of SFAS 95, and/or its preceeding exposure drafts, appeared in virtually every US accounting and banking journal in 1988 [Mahoney et al 1988, O'Leary 1988, Boze 1987, Kreuze 1987, Richman et al 1988, Nixon 1988, Ketz 1985, Senatra 1988, Wasniewski 1988, Farragher and Reinstein 1988, Born 1988, Zega 1988, Giacomino and Mielke 1987]. SFAS 95 made the SCF mandatory for firms with accounting years ending after 16 July 1989.

Mahoney et al [1988] exemplified an SCF using both indirect and direct formats for the operating cash flows,

thus;-

STATEMENT OF CASH FLOWS USING THE INDIRECT METHOD

Operating activities			
Net Income		8000	
Adjustments			
Depreciation and amortization		8600	
Provision for losses on receivables		750	
Provision for deferred income taxes		1000	
Undistributed earnings of affiliate	(2100)		
Gain on sale of equipment	(2500)		
Receipt of instalment sale payment		2500	
Changes in operating assets and liabilities net of effects from purchase of XYZ Inc			
Increase in receivables	(7750)		
Increase in inventories and prepayments	(4000)		
Increase in payables and accruals	3850		
Net cash provided by operating activities			8350
Investing activities			
Purchases of property,plant and equipment		(12000)	
Purchase of XYZ net of cash acquired		(7700)	
Proceeds from sale of equipment		6500	
Receipt discharging note for sale of plant	4500		
Net cash used in investing activities			(8700)
Financing activities			
Proceeds from revolving credit line and long term borrowings	14500		
Principal payments on revolving credit line, long term debt and capital lease obligations	(11700)		
Proceeds from sale of common stock	2000		
Dividends paid	(2950)		
Net cash provided by financing activities		1850	
Increase in cash and cash equivalents			1500
Cash and cash equivalents at beginning of year		6000	
Cash and cash equivalents at end of year		7500	

Accounting policies note: The company considers all highly liquid investments with a maturity of three months or less when purchased to be "cash equivalents".

OPERATING CASH FLOWS USING THE DIRECT METHOD

Operating activities

Cash received from customers	144750
Dividend received from equity investee	900
Other operating cash receipts	10000
Cash paid to suppliers and employees	(137600)
Interest paid	(5200)
Income taxes paid	(4500)
Net cash provided by operating activities	8350

In their review of SFAS 95, Mahoney et al [1988] drew attention to the following three other requirements.

An exception to the general rule that financing and investing cash flows must be presented gross is allowed for assets and liabibilities of original maturities up to and including three months.

Flows of foreign currencies must be translated at the rate current at the date of the flow while closing balances are translatable at the closing rate.

Noncash transactions must be disclosed in a separate schedule from the SCF.

6.23 THE SFAS 95 DEFINITIONS

In its definition of cash, SFAS 95 states that;

"For the purpose of this statement, cash equivalents are short term, highly liquid investments that are both readily convertible to known amounts of cash and so near their maturity that they present insignificant risk of changes in value because of changes in interest rates".

When a firm first complied with SFAS 95, it was obliged to reveal its policy on determining what items it regarded as

being cash equivalents. Zega [1988 p55] amplified this;

"Short term, highly liquid investments that are readily convertible to cash and are not interest rate sensitive are known as cash equivalents Money market funds and Treasury bills with original maturities of three months or less are common examples of cash equivalents"..."Reporting gross amounts of cash receipts and payments is required if such reporting facilitates understanding of the firm's operating, investing and financing activities. For instance, a business that issues one-month commercial paper and rolls it over every month would be reporting financing cash inflows and cash outflows twice the size of those of a firm that issues two month commercial paper. Otherwise net amounts of cash receipts and payments may be used."

Zega [1988 p56] added;

"Dividend payments are classified as financing activities because dividends are a distribution of net income (i e dividend payments cause retained earnings to decline)."..."In contrast, the interest cost paid on borrowed funds is a determinant of net income and is classified as an operating activity." The same applies to interest received. Asset purchases financed in mixed modes are in the SCF only at the cash financed value, the balance being in a supplementary non cash financing schedule. Stock splits, bonus issues and appropriations to reserves are excluded both from the SCF and from the supplementary statement of financing and investing because they do not affect cash and "they are not significant financing or investing activities."

Zega [1988 p59] concluded; "Currently, most financial statements are prepared using the indirect method to determine net cash provided by operating activities...The reporting of cash flow per share is prohibited in the financial statements. The FASB concluded that reporting cash flow per share would falsely imply that cash flow is equivalent to earnings as an indicator of performance."

Thus the FASB explicitly dissociated itself from those who regard cash flow as a measure of overall corporate performance.

Carmichael [1988] believed auditors should require restatement of the prior year's SCFP as an SCF in the 1989 accounts or else qualify the audit report on the grounds of

inconsistency. This opinion was published in the CPA Journal.

Heath [1978b] had written;

"The activities of business enterprises may be classified as operating, financing and investing. Operating activities are those activities directly related to the purchase and sale of raw materials, supplies and merchandise, the conversion of raw material and supplies into finished goods and services, the sale of finished goods and services, and the servicing of goods and services sold previously. Financing activities are those activities directly related to obtaining capital including, for example, the borrowing and repayment of debt, the issuance and reacquisition of a company's stock, the conversion of securities into common stock, and the payment of dividends. Investment activities include the purchase and sale of securities of various types (excluding a company's own securities) and the purchase and sale of plant and equipment that is used in production, distribution, and maintenance of other goods and services" [p996].

Heath conceded the boundaries between the three kinds of activity are unclear. The FASB [1986] exposure draft that heralded SFAS 95, however, largely adopted Heath's distinctions and added to them [paragraph 10] the propositions that

"gain or loss from early extinguishment of debt is generally part of a cash outflow for financing activities" whilst "gain or loss from sale of assets .. is generally part of a cash outflow from investing activities."

In SFAS 95's paragraph 60 the FASB decided that interest is an operating activity, because it is reflected in income, whereas dividends distributed are financing outflows, because they are not reflected in income. Gains or losses on asset sales and debt redemptions are non-operating, however, despite being included in income. "The reasons for this

disparity," commented Ketz and Largay [1987 p13], "are unknown." Depreciation is uncontroversially a part of operations, but calculation of the gain or loss on disposal is a function partly of the depreciation accumulated to the point of sale. Foreign exchange gains and losses could be argued to be as much a matter of financing or of investing as of operations.

"Three members of the FASB dissented on the issue of how interest and dividends received and interest paid should be classified in the eventual cash flow statement. According to the above schema they rank as operating cash flows, but the dissenters argue that a more realistic approach would be to classify interest and dividends received as cash inflows from investing activities and interest paid as a financing activity cash outflow. These interpretations would be consistent with the UK/European view which,..computes operating profit before taking interest receivable (and similar income) and interest payable into account" [Adams 1988 p112].

Most [1990] took these objections much further, arguing that the new SCF was at least as misleading, fuzzy and ambiguous as the SCFP had been, especially when the SCF was prepared on the indirect basis. He reviewed the SCFs of 40 of the largest industrials in the Fortune 500, and found that no firm used the direct method and that over half the firms avoided reporting forex rate effects altogether. (See subsection 6.34).

6.24 THE DIRECT:INDIRECT CHOICE

Farragher and Reinstein [1988] thought the indirect basis would be preferred by firms that do not want to disclose their major classes of gross operating cash flows.

"Although the use of the indirect method predominates, commercial lending officers expressed a strong preference in comment letters to the FASB that the direct method be *required*. Whether this method catches on will depend strongly on these banking officials pushing corporate borrowers to use the direct approach." [Mahoney et al 1988 p28].

Mahoney et al [1988] themselves, however, preferred the indirect approach for 3 reasons:

1. It provides a useful linkage between the SCF and the income statement and balance sheet.

2. Statement users are more familiar with it.

3. It is generally the less expensive approach.

On the other hand, supporters of the direct approach argue its gross treatment of operating cash flows is consistent with the approach of the financing and investing sections of the SCF. O'Leary [1988 p22] wrote that Robert Morris Associates [1989] favoured the direct approach because;

"By comparing the accrual based income statement with the direct method cash flow statement, a company's operating cycle could be better understood and more appropriately financed. After all, it is the gap between accrual earnings and the cash collection of those earnings that commercial lenders are called upon to finance."

This was strange, considering only the indirect method spells out depreciation and similar notional costs. [p26]"By a 4:3 vote, the members of FASB defeated their staff's recommendation that only the direct method be permitted."

So there is not much more comparability than under APB 19.

Emmanuel [1988], following up O'Leary's article, pointed out that operating cash flows are direct sources of revenue, unlike financing or investment flows: and it was quite

possible for the former to arise from the latter, as with income from an asset rented out to a lessee. Since the SCF is to explain the income/cashflow disparity, all payments on the income statement should appear on the SCF, in particular, dividends and taxes should. [Emmanuel 1988 p34].

Farragher and Reinstein [1988] thought the indirect basis would be preferred by firms that do not want to disclose their major classes of gross operating cash flows.

Nurnberg [1989], however, pointed out the relevance of depreciation to the SCF, arising from using the absorption costing method instead of the marginal costing method of valuing inventory. He argued it makes no difference whether the direct or indirect method is used; but this is wrong. With the indirect method, depreciation is clearly identified as one of the largest items comprising the earnings cash flow disparity. With the direct method, depreciation should not appear at all, least of all in inventory purchases.

The indirect method has been argued by Drtina and Largay [1985] not to equal actual cash flow from operations because of the many conceptual and practical problems intrinsic to the adjustment processes.

A direct basis for a prototype SCF in Allen's [1985] experiment resulted in professional analysts and portfolio managers' solvency judgments outperforming their SCFP based judgments.

6.25 CANADIAN AND OTHER APPROACHES

6.251 CANADA

In 1953 14% of CICA sampled companies had funds statements, in 1962 31%, and in 1968 95% [Murphy 1979]. So when Canada required a sources and applications of funds statement by the the 1970 Canada Business Corporations Act, as previously recommended by the 1965 Kimber Report [AG of Ontario 1965], most firms already presented one anyway.

Marinucci [1985] described the Canadian adoption of the SCF 3 years earlier than the USA. The Accounting Standards Committee approved the relevant changes to the section 1540 of the CICA Handbook in June 1985, following responses to its November 1984 exposure draft "Cash Flow Information". The new recommendations stated:

The SCF should report changes in cash and cash equivalents and analyse them into their components;

Cash flows should be classified by operating, financing and investing activities;

Cash flow from operations should be reconciled to the income statement or its components disclosed [sic];

Cash equivalents may in some cases include receivables, inventories and even payables, when they are equivalent to cash.

Several respondents to the exposure draft said dividends do not fit well into any of the three main categories and so CICA allows it to be disclosed as a separate category (or as financing or as operating).

An SCF need not be presented at all when it would not

provide additional useful information (such as with some small businesses);

The SCF should include non cash financing and investing activities because such activities affect an enterprise's capital and asset structure-this includes stock dividends;

No mention was made of cash flow per share figures so firms are free to disclose them or not as they prefer.

The provisions noted in the last four paragraphs above distinguish the Canadian SCF from its American counterpart.

6.252 THE UK

Adams [1988] expressed in *Accountancy* the opinion that SFAS 95 could influence UK accounting standard setters.

"Because of the relevance of US financial reporting standards to UK companies and the UK accounting profession generally - but enhanced recently by the 'British invasion' of the middle US corporate sector - it cannot be long before the statement of cash flows becomes a regular feature of the accounts of some UK based multinationals. From there to the ASC and thence to the educational curriculum is but a small step" [Adams 1988 p110].

Adams' prophecy was realized in less than two years with the publication of ED 54 which is detailed in the rest of this subsection.

In July 1990 the Accounting Standards Committee issued ED 54 whose main provisions are described in this subsection. It will be seen that the Draft closely resembles the American SFAS 95.

ED 54's Preface

SSAP 10's funds statement is to be replaced by a cash flow statement in either the direct or indirect formats. This proposal is in line with developments in the USA, Canada and

the IASC. [ED 54 1990, section 1.1]

SSAP 10 was reviewed in March 1989 "because the changing economic environment had led to increasing sophistication in the requirements of users of financial statements, particularly financial analysts." Research revealed dissatisfaction in that some critics thought cash flows were more useful than changes in working capital; some thought increasingly complex decision making and forecasting models needed better information; some thought there was too much variety in the application of SSAP 10 for comparability or usefulness and too much ambiguity of definition in the standard. [ED 54 1990, section 1.3]

"There is general agreement in the frameworks developed on the conceptual basis of financial reporting that users of financial statements would find it useful to have information on the viability, liquidity and financial flexibility of the enterprises in which they were interested. This suggests the need for information on the amount, timing and certainty of cash flows. Historical cash flow can be a useful indicator of these factors. In addition, studies of investor decision making suggest that investors, formally or informally, develop a model to assess and compare the present value of the future cash flows of enterprises. Historical cash flow information could, therefore, be useful to check the accuracy of past assessments and indicate the relationship between the enterprise's activities and its receipts and payments. It also reveals the relationship between profitability and cash generation and expenditure, and thus the quality of the profit earned." [ED 54 1990, section 1.5]

The information provided by a cash flow statement appears to have the following advantages over that provided by a working capital based funds statement.

(a) Cash flows can be a direct input into a business valuation model and, therefore, historical cash flows may be directly relevant in a way not possible for funds flow data.

(b) Funds flow data based on movements in working capital can obscure movements relevant to the viability and liquidity of an enterprise. For example, a potentially fatal decrease in cash available may be masked by an increase in stock or debtors. Enterprises may therefore run out of cash while reporting increases in working capital available. Similarly a decrease in working capital does not necessarily indicate a cash shortage and a danger of failure.

(c) A funds flow statement is based largely on the difference between two balance sheets. It reorganises such data, but does not provide any new data. A cash flow statement includes new data.

(d) As cash flow monitoring is a normal feature of business life and not a specialised accounting concept, cash flow is a concept which is easier to understand than changes in working capital. [ED 54 1990, section 1.6]

The provision of cash flow information is new and the full advantages of it may not be immediately apparent to users

and preparers. It may take time for them to develop the experience and tools necessary to appreciate fully the potential uses of the new statement." [ED 54 1990, section 1.7].

Exemption is proposed for firms with turnover below #25000 and which also do not have to report under the Companies Acts [ED 54 1990, section 1.8]

ED 54 imports the American distinction between operating, investing and financing cash flows into the statement and specifies that cash equivalents are to be treated as cash. [ED 54 1990, section 1.9]

Cash equivalents should be defined as "short-term, highly liquid investments which are both readily convertible into known amounts of cash and sufficiently near maturity that there is no significant risk that they will change in value in response to interest rate variations." This includes short term bank borrowings held as an "integral part of its treasury management."

The firm should specify what it includes in cash equivalents and disclose changes in this definition in accordance with SSAP 6. [ED 54 1990, section 1.10]

Normally dividends should be treated as a financing activity. [ED 54 1990, section 1.11]

The SCF should report every cash flow to and from the firm, except those that are merely changes in the form that cash is held, such as purchase and sale of cash equivalents. All flows must be reported gross. [ED 54 1990, section 1.15]

Non cash tranactions like debt redemption by way of new equity should be reported in the notes to the accounts. [ED 54 1990, section 1.16]

Part 1 Explanatory note

Sections 3 to 8 repeat the preface's arguments in favour of SCFs, but there are some additions.

"A statement of cash flows also gives information on an an enterprise's ability to meet its obligations when they become due, its capacity to command other resources and to adapt its existing operations in response to changes or opportunities by means of the suitable investment of available cash flows. Cash flow statements can also inform users of an enterprise's dividend record in the context of cash generated and expended." [ED 54 1990, section 4]

"The reporting of historical cash flows helps the discharge of the stewardship function of management by making an enterprise's management accountable for its actions in terms of the enterprise's solvency and liquidity performance." Also cash flows are argued to be less arbitrary and more easily verified than accrual based items. [ED 54 1990, section 8]

It is alleged that because interest is contractual, it is

operational, unlike dividends which are a financing activity

[ED 54 1990, section 15].

VAT should be apportioned between operating and investing flows to fit the transactions to which it is attached. [ED 54 1990, section 19]

A firm using the direct method is NOT required to publish a profit reconciliation. [ED 54 1990, section 35]

Forex flows should translated at the rate applicable at the transaction date per SSAP 20. [ED 54 1990, section 43]

Translation differences between year start and year end to forex balances should be SCF adjustments to opening balances. [ED 54 1990, section 45]

ED 54 Part 2 Definition of terms

Cash includes all demand deposits [ED 54 1990, section 48].

Cash equivalents are as defined in the preface subject to the additional condition that "they must also be considered by the enterprise which holds them as equivalent to cash." [ED 54 1990, section 49].

Part 3 Proposed standard accounting practice

ED 54 [1990] section 57 specifies the SCF format including the 3 way classification of cash flows.

ED 54 1990, section 58 permits sub classifications and states;

"Sufficient detail should be given about the cash flows to give a complete picture of the different economic activities of the enterprise." Furthermore, "Operating cash flows include returns from investing and financing".

ED 54 [1990] section 60 (b) specifies as operating flows "cash receipts from interest, dividends and other income arising from investing and financing activities.

(c)cash refunded from Customs or any other tax authority relative to VAT.

ED 54 [1990] section 63 specifies that the indirect format must show the same information as the direct method except where "this is impractical because the information is not available to make the relevant estimates and adjustments necessary to extract the information."

ED 54 [1990] section 65 states tax and VAT refunds in respect of investing activities are themselves investing

activities.

In conclusion and summary, ED 54 reads very much like SFAS 95 except for the VAT provisions, the tighter specifications in ED 54 for cash equivalence and the rather self conscious irresolution concerning the classifications of dividend and interest. It is possible that the accounting standard arising from ED 54 may prescribe only the direct method, since there has been vocal criticism of the indirect method in the articles cited earlier in this chapter and elsewhere. If so, many will see the UK standard as representing an advance on the American one. A few may see it as merely more dogmatic.

6.253 ELSEWHERE

New Zealand and South Africa have replaced their SCFPs with SCFs but Australia only took the change as far as an exposure draft. The IASC is likely to issue a proposed standard before summer 1992.

6.3 CRITICISMS OF THE SCF

6.31 CRITICISMS OF ITS SCOPE AND FLEXIBILITY

There were differences of opinion among FASB members regarding classification of items; such as the treatment of interest and dividends received and interest paid as operating items rather than investment and financing activities. The issue was the classification of cash flows

based on the underlying transaction rather than the cash flow itself. [Richman et al 1988].

Kistler and Hamer [1988] criticized SFAS 95 on 4 points;

1. the diversity of permitted formats,
2. the limited usefulness of the direct method,
3. the incorporation of non cash transactions, and
4. the classification of interest and dividends.

Giacomino and Mielke [1988] thought SFAS 95 should have required more information than it did, namely;

1. long term financing distinguished from short term,
2. "other" operations sources and uses of cash, and
3. a classification for discretionary uses of cash.

Bierman [1988] reported a survey indicating the widespread availability prior to SFAS 95's start date of relevant software, but it would have been still more widespread if more than a third of the vendors surveyed had been aware of SFAS 95's provisions.

O'Leary [1988] reported that most credit officers and lenders would have liked to see more comprehensive details of the various types of cash flow than SFAS 95 mandated.

Arthur [1986] stated that controversy over the proposed SCF centred on three main issues. First, there was no agreement on cash flow format. Second, trend analysis is hard to develop from a cash flow statement. Third, cash flow statements are often used in long range planning (which seems at odds with the previous sentence's view).

Valenza [1989] pointed out that for financial institutions

an SCF was really an inventory report so the FASB was considering specific disclosure requirements for them quite different from a mainstream SCF.

6.32 THE HEATH CRITIQUE

A cash flow statement cannot by itself indicate a firm's performance but nor can the income statement do so, commented Heath [1987]. Arguing which is more important is like arguing which shoe is. SFAS 95 is a step in the right direction but not far enough. It cuts and pastes the discredited SCFP instead of redesigning it de novo. Some financing activities do not affect working capital;- borrowing/repaying of short term debt, issuance of loan stock for plant and equipment, and debt/equity swaps. Reporting these as sources and uses is necessary for activity reporting but is confusing, because these items are a source neither of working capital nor of cash. Although "resources" are often used instead of "funds" to get round that, the bottom line is still working capital or cash. Paragraph 20 of the Exposure Draft preceding SFAS 95 stipulated that all financing and investing activities have to be reported, not just those affecting cash. The secondary objective (all financial resources) is thus in conflict with the primary one (cash flows only). FASB took this point seriously because the final version of SFAS 95 excluded non cash financing and investing activities from the prescribed SCF. Operating net cash flows by the direct method shows cash receivable from customers, dividends etc less cash paid

for inventory, expenses, interest and tax; whereas the indirect method adjusts net income by depreciation, deferred tax and each component change in working capital.

"Cash flow is not the source of income, and income is not the source of cash; they are two different *effects* of buying and selling goods and services..The indirect method is pernicious because it reinforces the widespread belief that both profit and depreciation are sources of cash".
The direct method method makes clear cash comes in from sales and out through expenses to which depreciation is irrelevant. [Heath 1987 p16].

Sondhi, Sorter and White [1988] praised SFAS 95 for requiring financing and investing cash flows to be stated gross, but decried the requirement to separate out non cash financing and investing transactions. Acquiring assets for a mix of cash and securities would be fragmented in the reports and the cash flow effects of the transaction be thereby obscured.

6.33 STUDIES EVIDENCING THE INFERIOR PREDICTIVE ABILITIES OF CASH FLOW STATEMENTS

Amy Lau [1982]'s finding that funds flows were more helpful than cash flows in enhancing the predictive accuracy of her MLA distress prediction model was mentioned in section 5.5 in the previous chapter. A number of other studies which have shed further light on the matter are mentioned in this subsection.

Casey and Bartczak [1985] examined 60 failed and 230 nonfailed firms reports for 1971-1982 using multivariate

discriminant analysis and conditional stepwise logit analysis. They found operating cash flow data do not provide incremental predictive power over accrual based ratios.

Costigan [1985] found working capital funds from operations had a marginally better predictive ability than cash flow from operations in predicting future cash flows.

FASB's SFAC (Statement of Financial Concepts) 1 reported the view that information based on accrual accounting provided a better indication of ability to generate favourable cash flows than information about cash flows themselves. Greenberg et al [1986] used 1963-82 COMPUSTAT data to test that assertion and found it well supported.

In the 1986 Supplement to the JAR, two papers reported on cash flow information content. Easton and O'Brien [1986] found accrual elements of earnings and cash elements both have incremental information content for equity price movements beyond that possessed by the earnings figure alone. Noncurrent accruals however lacked such content. Rayburn and Jennings [1986] supported these findings from their own research but found inconsistency in the information content for the different accrual components, thereby casting doubt on Easton and O'Brien's failure to find content in the non current accruals.

On a contrary note, Jacob [1987] found in some years beween 1971 and 1984 cash flow data for firms possessed incremental information content beyond that contained in earnings whereas working capital from operations did not. This supports the 1986 exposure draft preceding SFAS 95 in

Jacob's view.

Bracken and Volkan [1988] mentioned three reasons why the SCF will not necessarily improve forecasters' ability to predict cash flows;

1. Despite making formats more comparable, no new content of any importance appears in the statement,

2. Reports are still annual rather than quarterly, and

3. The new rules do not mandate segmental cash flow reporting.

Finally, Most [1990] reported research showing the failure of many firms to apply the prescribed SFAS 95 treatments of cash equivalents and forex to their SCFs. There was a diversity of practices concerning the gauging of cash equivalence, the arranging of the cash flows into the financing-investing-operating classifications, the treatment of extraordinary items and the treatment of leases. Moreover, a quarter of the firms did not present cash flows on the gross basis in the financing or investing sections, and the balance sheet figures for opening and closing cash balances often failed to match the figures in the SCF. Most [1990 21/22] wrote in conclusion;-

"According to the FASB, the SCF was intended to clarify information about liquidity and solvency that was obscured in the SCFP. However, the so-called direct method that was supposed to accomplish this objective has not been followed. Analysis of the text of SFAS 95 and my own research have shown that it has created its own problems of interpretation, preparation, and presentation that rival those of its predecessor. These include both practical and theoretical difficulties involving acquisitions and disposals of assets, noncash transactions such as monetary exchanges, and the effects on cash balances of foreign currency exchange rate changes. Finally, the information

required by financial analysts - operating cash flow, free cash flow, and cash flow per sharte, are not more readily computed from the SCF than they were from the SCFP, leading inevitably to the conclusion that SFAS 95 should never have been promulgated."

6.4 CASH FLOW ACCOUNTING

6.41 ORIGINS

The trigger for the emergence of cash flow accounting was the series of debates in the late sixties and early seventies over accounting standardization generally and accounting for inflation in particular. Conventional accounting was under widespread criticism. Income statements were widely agreed to be unable to disclose real operating profits as opposed to mere holding gains from inflation. Survey evidence [Lee & Tweedie 1977] was available to show that neither individual nor institutional investors widely understood or relied on published accounts. Balance sheets were criticised as disclosing costs rather than values and were hence of little use to investors. Accounting, it seemed, had lost its way. The American profession issued the Trueblood Report [1973] and the British issued the Corporate Report [1975] in an attempt to specify the kinds of statements modern companies should produce. Both of these were largely ignored at the time. The more limited question of correcting accounts for inflation-sourced distortions was, however, faced up to, and current cost accounting was forced through in many countries with varying degrees of resistance from the members of the

accountancy profession. Nobody publicly expressed the views that CCA, CPP or any mixture of the two adopted as accounting standards were perfect. The strongest doubts concerned the subjectivity of some of the relevant adjustments such as that for backlog depreciation and the arbitrariness of such other adjustments as the notorious gearing adjustment in the UK. Against such a background it was only to be expected that nostalgia would be felt for a legendary golden age of accounting simplicity when cash was cash, prices were stable and owners controlled managers. The focus of this nostalgia was, and is, the cash book. In the cash book, payments and receipts are recorded without any subjective judgment being necessary. Posting to the ledgers to complete the double entry involves classification of cash flows but, as will be seen, even this is dispensed with by the extreme fundamentalists in the cash flow accounting ranks.

The earliest advocacy of cash flow accounting was by Lee [1972a], Lawson [1971] and Thomas [1969]. Thomas's main argument was that cash flow accounting avoids the arbitrary allocation inherent in accrual accounting. Lawson's main argument, later echoed by Ijiri [1980], was that cash flow accounting would match the way firms did capital budgeting. Thus in Ijiri's words;

"Investment decisions are made on a cash flow basis but the results of those decisions are reported on the earnings basis and the two are often not reconcilable".

Lee's arguments included those mentioned above but to those he added the following:-

1. "Cash flow accounting emphasizes the businesses capability and potential to survive in terms of cash". (Lee 1972B)
2. Personal judgment involved in preparation of accounts is greatly reduced. [Lee 1972a]
3. Since the business firm is only a vehicle for the individual consumer and since a company lacks human qualities, the proprietorial approach of conventional accounting is quite unsuitable, and so the allocation of transactions to categories to suit the proprietor is inappropriate. [Lee 1979]
4. Scottish chartered accountants responding to a survey on the desirability of cash flow accounting were not opposed to it (49% of respondents - 90 accountants - were opposed in fact). [Lee 1981b]
5. The conventional UK and Australian funds flow statement is almost valueless to users as a report on the firm's liquidity management, and its replacement by a cash flow statement would be a clear improvement in this respect. [Lee 1984a]

Following on from argument 5 above, it is important to realize that cash flow accounting is not merely a reformulation of funds flow statements but a replacement of the income statement itself as a minimum, and of both it and the balance sheet in the later Lee writings. In his own

words [Lee 1981c p.63];

"CFA (cash flow accounting) is the term used to denote a system of financial reporting which describes the financial performance of an entity in cash terms. It is based on a matching of periodic cash inflows and outflows, free of credit transactions and arbitrary accounting allocations. As such, it is a measurement and reporting system which avoids time lags and distortions".

6.42 PRESENTATION OF STATEMENTS

The presentation of cash flow accounts varies slightly between the two main advocates, Lee and Lawson. Lawson's approach has been consistent over time while Lee has developed his model somewhat.

Lawson's format (for which the glossary is given below) is O - R - T - I + E + B - C = D and the distributable cash flow to shareholders is D - E, this being Lawson's main concern.

Lee's 1972 format was O - R - I - T - D + E + B = C but by 1980 this had become O - I - T - D + E + B - R = C and his focus remained the period end cash balance, C.

The complete key to the above equations is :-

O - operations' net cash flow

R - replacement and growth investment cash outflows

T - tax cash outflows

I - interest paid

D - dividends and distributions paid in cash

E - cash proceeds of new equity issues

B - cash proceeds of new borrowings

C - cash resources (possibly including liquid paper beyond pure cash)

It can be seen that the presentation in the equations above attempts to replace both the funds statement and the income statement but not the financial position statement. Lee is the only cash flow advocate to have formulated a detailed presentation of a cash flow linked balance sheet so as to complete the replacement of conventional reports with cash flow ones. Lee [1984] bases his balance sheet on immediately realisable values - what the assets would fetch

if sold piecemeal without delay. For reasons that are not explained he denies that this violates the going concern assumption of accounting in that the firm can somehow continue even if each of its "activities" is immediately terminated. This is rather like saying a car would continue to be a car even though it had been stripped of its wheels, engine, camshaft, bodywork and every other tangible component. It would be left with some memory or "goodwill" but that can scarcely be identified with the car. Similarly a firm with no assets or activities is merely a name with an incorporation certificate. Chambers [1966], the originator and populariser of exit value (realisable or sales value) accounting for assets has always insisted on retaining the going concern basis for valuing assets. It is odd that Lee's adoption of Chamber's valuation philosophy should be rendered difficult to accept as fair by its unsolicited, and arguably unnecessary, insistence on forced sale values for its assets. It is as if Lee's preoccupation with cash over the last two decades has led him to distrust any valuation criterion other than liquidity. Indeed, his proposed balance sheet presentation reverses the traditional British marshalling order in favour of the American, thus :-

Statement of Financial Position

Cash Asset

Bank accounts

Readily Realisable Assets

Debtors

Finished goods stocks

Motor vehicles

Property

Less short term liabilities (creditors, taxation and "distribution")

Not Readily Realisable Assets

Work in progress

Plant and machinery

Total Net Assets

Less

Long Term Liabilities

Represent

Owners' Equity

Capital

Retained earnings

The last item above, retained earnings, is not to be understood as "retained cash flow", nor is it quite the

traditional "retentions" of the traditional appropriation account. Rather it is the bottom line of Lee's income statement, which he renames the "statement of realisable earnings". This is exemplified below :-

Statement of Realisable Earnings

Realised Earnings

Operating cash flow (cash flow from customers less cash outflow to suppliers and creditors)

Unrealised Earnings

(Increases in working capital and readily realisable fixed assets less decreases therein)

Total Earnings

Less tax provided

Less distribution provided

Plus retained earnings of prior periods equals

Gives

Retained Earnings

(which are carried forward in position statement)

There is no question here of recognising ONLY cash receipts already received. By acknowledging the role of

working capital changes as "unrealised earnings", Lee is acknowledging that there is a need for a concept called "earnings" that goes beyond the simpler concept of "net cash flow." The Statement of Realisable Earnings displaces only the traditional income statement.

Replacing the traditional funds flow statement, Lee has this :-

Statement of Realised Cash Flow

Cash Inflows

Operating cash flow

Additional borrowing

Decrease in cash asset

Cash Outflows

Capital expenditure

Tax paid

Distribution paid

Increase in cash asset

[Lee 1984, 66-69]

The above statement of "realised cash flow" is nothing more nor less than the familiar receipts and payments account. Many critics of traditional funds flow statements (for example, Drtina & Largay 1985, Holmes 1976, Lau 1982, Clark 1983) have recommended such a format to replace the

"net liquid funds" layout of most published funds flow statements. Surveys by Lee & Tweedie [1975] in the UK and by Anderson [1981] in Australia discovered that readers of published accounts both used the funds statement less and appreciated the significance of fewer of its terms than the income or position statements. Rosen & De Coster [1969] showed that the historical justification for the introduction of funds flow statements was to shed light on a company's liquidity position. Lee [1984a] argues that this objective has not been achieved but his "statement of realised cash flow" would achieve it. It is here that the cash flow accounting advocates are met with most support and fewest objections.

6.43 THE BRITISH CONTROVERSY

The two writers who have objected most cogently to the Lawson and Lee justification of cash flow accounting are Eggington [1984] and Rutherford [1982]. Rutherford, objecting to the assertion that cash flow accounting avoids arbitrary allocations, wrote (p.47):

> "Any cash flow which arises in connection with a transaction which affects at least one period other than that in which the flow occurs may be subject to interaction". For example, debtors would have been cash at the period end but only if a big cash discount had been given. "The advantage of not actually having to offer the cash discount in practice is an interactive effect attributable to the joint existence of the entity in both the period of sale and the period of collection." So it is misleading to claim that liquidity is coterminous with cash. Moreover, (p.48): "Individual cash flows which are subject to interaction are uniquely determined by the economic events (real resource flows) with which they are

associated. When interaction crosses the boundaries between categories in a disaggregated cash flow statement (whatever the basis for the disaggregation), some degree of discretion to make distributional allocations much inevitably reside with management".

In response to this, Lee [1982] concedes that no accounting system can be entirely allocation free, but insofar as allocation to various accounts follows from classification of various transactions, the accountant should not bias the user towards his particular model; for, (p.351) "Who is to say what is capital, what is extraordinary and what is non recurrent ?" Here we have the fundamentalist nature of the Lee position undisguised. He is saying that the statement user is no less qualified, willing or able than the accountant to make such classificatory distinctions as capital/revenue or ordinary/extraordinary.

Eggington [1984] argued that cash flow accounting cannot avoid either allocating or classifying. This is illustrated by the example of a firm paying once for a continuous supply of a resource such as electricity. The point of payment and the points of consumption of the resource paid for are different. The choice of one point to debit the books rather than another is itself an act of allocation. He goes on to attack the idea that cash flow accounting can avoid window dressing or payment-and-receipt year end manipulation by presenting multi year cash flow reports and forecasts, on the principle that the distortions of one year will be ironed out the following year.

"Such a view," (p.103), "Would ignore the fact that timeliness is crucial to accounting information; the interpretation of this year's figures cannot await next year's results." More seriously, cash flow is simply not a measure of corporate performance in the way that earnings or profit are."

Surprisingly perhaps, Lee [1985] agreed with this and asserted that his statements of realisable earnings and of financial position represent concessions to this view of earnings as central performance indicators. Lawson's [1985] response to Eggington is more obdurate. His system of cash flow accounting, he claimed, fully measures performance on a basis enabling comparison to be made with previously forecast project present values of cash flows. Ignoring Rutherford's arguments, he further asserted that cash flow accounting "does not arbitrarily allocate because receipts and payments are empirically determined facts" (but their nominal ledger completions of the double entry are not, and Lawson may prefer returning to single entry bookkeeping if he follows his ideas to their natural conclusion).

Eggington [1985, p.109] expressed satisfaction that

"Lee is now more cautious about equating entity cash flows with distributability and avoids the phrase 'allocation free' but Lawson is not so inhibited".

In the balance sheet, Lawson prefers market values to Lee's forced sale values but Eggington objects that feeding asset market values back to the stock market is circular and conveys no new information.

There the debate rested. As far as the present review is concerned, the last word goes to Tweedie [1977] who questioned UK students attending their first accounting

lecture on their "intuitive" understanding of accounting concepts. Most students thought not of matching but rather of cash flow, not of replacement prices for assets but rather of exit values for them. Most students, in other words, in their uneducated state, are cash flow accounting thinkers on the Lee model. Lee and the cash flow accounting advocates would prefer the students to remain in that state. It is interesting that neither Lee nor Lawson have decided to quote Tweedie's uneducated students in support of their claims for the superiority of cash flow accounting over conventional accounting.

6.5 CONCLUSION

Sorter [1982] had been research director for the Trueblood Committee and wrote to correct the misapprehension that the committee had been against accrual accounting. Nonetheless, the Trueblood principle of 'usefulness to decision makers' has become generally cited by the protagonists of cash flows replacing funds flows.

In this chapter we have seen that the SCF sanctioned by SFAS 95 is not the wholesale replacement for the SCFP that it promised to be. Firms still have to specify, albeit in a separate supplementary statement, their not-for-cash sources and applications of funds. Moreover, the indirect method of reporting operating cash flows results in a reconciliation of profit to cash flow very little different from the previous SCFP reconciliation of profit to funds flow. We have seen that that a majority of US listed firms were already using a cash basis SCFP by the time SFAS 95 became operative in July 1988. Finally and most importantly we have seen that the ability of cash flows to predict their own future seems, on the whole, inferior to funds flows' ability to predict the selfsame parameter. From all this we conclude that the SCF can be regarded as a special form of the SCFP rather than an entirely new departure. Certainly it is not a form of cash flow accounting in the way Lee or Lawson envisaged.

Cash flow accounting, as advocated by Lee and Lawson, has been argued to be of little use as a performance measure. It may well be more transparently understandable than the

conventional accrual based statements, including the SCF prepared under the indirect method. However, what is understood by the receipts and payments account cannot be regarded as the same set of constructs as lie behind an income statement. Whether or not such an account can be regarded as equivalent to the SCF prepared under the direct method is also dubious. Critical to the SCF is the division of cash flows among the headings; operations, financing and investing. Such a division structures how the SCF is read and interpreted. It has no place, explicitly or by implication, in the Lee or Lawson scheme of things. Cash flow accounting is not sanctioned by Trueblood, far less by the Corporate Report [1975], as the Sorter [1982] citation explains. In sum, what is more easily understood by a pure cash flow account, is something far less worth understanding in a Trueblood 'usefulness' perspective than what could be understood from a conventional set of accounts.

There are as yet no readily available articles in the journals testing the SCF itself for predictive ability, and since SFAS 95 only became operative in the later phase of this present study, and then only in the USA itself, it has not been judged appropriate to revise the empirical work done in this study to use all SCFs instead of SCFPs. It was judged necessary, however, to include an SCF in each of the two sets of six accounts presented to subjects, to represent the worldwide use of SCFs in the still largely SCFP world of 1987 and 1988. This was quite easy to do, since a material

number of so called SCFPs were really SCFs even before SFAS 95 came into force.

CHAPTER 7 INFORMATION SEARCH AND INFORMATION LOAD

7.1 INTRODUCTION

7.2 INFORMATION SEARCH

7.3 INFORMATION LOAD

7.4 SPEED ACCURACY MODELS

7.5 ACCOUNTING DIMENSIONS

7.6 CONCLUSIONS

CHAPTER 7 INFORMATION SEARCH AND INFORMATION LOAD

7.1 INTRODUCTION

Early discussion in the accounting literature of the relationship between financial data and individual data usage tended to focus on the merits of data expansion as a vehicle for the provision of decision useful information. Fertakis [1969 p 681] questioned the process of increasing disclosure without research directed at an understanding of "the problems and limitations inherent in the statement user...which influence his ability to act rationally on the basis of financial information." His concern was with the individual's ability to locate and incorporate decision relevant information from financial reports. This hypothesized inability was attributed to various psychological and communication processes that possibly limit or impair an individual's search for, and use of, financial data.

In particular, Fertakis hypothesized the decision maker may be limited in his ability to perceive and organize data useful for a particular decision. Also, since accounting is a one way feedback process [concrete events within the firm are reported to users in abstract financial terms], users may lack the mechanism necessary to fully relate the abstract communication with the real world event. Finally, the cognitive dissonance literature revealed to him a potential for financial information users to reject dissonant information in favour of more consonant elements

in financial reports.

This chapter discusses studies of the way people search information sets, with special reference to studies of the effects of increasing information volume on information processing accuracy. The purpose of the material in this chapter is to provide methods and constructs that can be used to elucidate the results of funds flow experiments akin to those of Walker [1984], Bradbury and Newby [1989] and the present work. In such experiments, accuracy in answering questions about accounts (with and without SCFPs) is measured for, inter alia, its association with the speed with which such questions are answered. The two previous studies lacked a theoretical paradigm for explaining their results, except one provided by accounting itself. Walker [1984] mentions the inverted U model which is adumbrated below, but he does not discuss it or use it as a possible explanation of his results. When experiments show that SCFPs do not significantly add to accuracy or speed, it is too easy to blame the statement for intrinsic uselessness. The models and ideas discussed in this chapter provide the possibility of alternative explanations focussing on the nature of information overload. Essentially, these alternative explanations boil down to two;

Either,

1. SCFPs cause information overload wherever and however they are presented to accounts users, since it is impossible to prepare an SCFP, in accordance with GAAP, devoid of overload.

Or,

2. SCFPs are no more overloaded than other final accounts, but may cause overload behaviour when they are presented on top of an accounts information set already at (or near) the point of overload.

7.2 INFORMATION SEARCH

7.21 GENERAL STUDIES

Payne [1976] found the proportion of information searched declined both as the number of alternatives available in a decision situation increased and as the number of dimensions (such as cost, revenue, time, energy and personalities) per alternative increased. Also, for 11 of his 12 multi alternative decision situations, the amount of available information searched was as great or greater for the alternative chosen than for any other alternative in the choice set. This suggests that subjects may have been reducing the amount of information they had to search by eliminating some alternatives on the basis of only a few dimensions: an imperfect elimination by aspects strategy. This in turn suggests the possibility of subjects' eliminating alternatives on the basis of only partial information. The verbal protocols appear to support this view.

Biggs et al [1985] used 11 loan officers to see how they processed loan candidates, in particular how they conducted

information search. They found "task complexity" was related to depth and variability of search, and the use of noncompensatory strategies. The percentage of information searched was greater for tasks with similar alternatives while variability of search decreased.

Jacoby et al [1984] observed how 17 security analysts chose stocks for buying. They found the analysts' performance level to be related to the amount of information searched. Depth of search decreased over trials as high performers examined the same amount of information across task trials but low performers looked at fewer pieces of information.

Gul [1987] showed how bank officers' perception of company risk increases when disclosures add 'subject to' qualifications, and such qualifications elicit higher levels of information search. These results are consistent with the previous arguments of Bertholdt [1979] and Schultz [1979].

Findings by Danos et al [1989] suggest loan officers reach a high level of confidence early in the lending process based on summarised accounting and other background data. When, later on, factors concerning firms' financial plans or underlying assumptions are varied, then lenders adjust their decision in the appropriate direction even if it goes against an earlier judgment.

Loan officers from eight banks were used in the Danos study. It was decided to focus on their medium sized clients since larger ones could be evaluated from publicly available data and data from smaller ones was apt to be inconsistent

and unreliable. 'Decisions regarding existing borrowers were based heavily on track record and interpersonal relationships, making it difficult or impossible to isolate the effects of accounting information and creating serious internal validity problems.'[Danos et al 1989 p236]. For new clients, the procedure was:

1) look at public data to form a preliminary impression,

2) make contact with key personnel and visit the borrowers place of business, to size up operations and plans, and

3) perform detailed credit analysis and evaluation of both historical and forward data, to evaluate the repayment probabilities.

7.22 PATTERN RECOGNITION

Pattern discovery is a necessary but not sufficient condition for prediction or extrapolation of data based on other information [Simon and Kotovsky, 1963]. Patterns are discerned immediately if the stimulus is familiar: otherwise, the various features of the stimulus must be grouped together to define the recognized patterns [Anderson, 1980]. Walker [1984] mentions that funds statements are claimed in the literature to aid pattern recognition.

Tversky and Kahneman [1971,1973], Hogarth and Makradakis [1981] and DeZeeuw and Wagenaar [1974] suggest that individuals experience considerable difficulty when working

intuitively with quantitative data, and the resultant heuristics usually yield results worse than those prescribed by normative rules.

Bouwman [1985, p78] wrote: "The present study confirms the tendency of decision makers to select a small set of hypotheses in the early stages of the analysis, and to use these hypotheses to guide the decision making process." This confirms earlier studies (Elstein et al, 1978; Shields, 1980). The study also confirms the heuristic nature of the analysis. There is a strong tendency to use the initial hypotheses as anchors which are adjusted as little as possible, a heuristic strategy which has been documented by Tversky and Kahneman, [1974]; Swieringa et al, [1976]; and Joyce and Biddle, [1981].

Chi et al [1989] used protocol analysis to detect distinguishing patterns between good students and poor ones solving mechanics problems. They found good students learn with understanding. They generate many explanations which refine and expand the conditions for the action parts of the problems' solutions, and relate them to the principles in the text. These self explanations are guided by accurate monitoring of their own understanding and misunderstanding. Such learning results in "example independent" knowledge and in a better understanding of the principles presented in the text. Poor students do not generate sufficient self explanations, monitor their learning inaccurately and subsequently rely heavily on examples. Poorer students are thus more susceptible to functional fixation.

7.23 DECISION FORMULATION (THE ACT OF SELECTION)

Stewart [1988] found a gain in accuracy and reduction in processing load only when elimination by aspects or when two dimensional conjunctive strategies were applied.

Ford et al [1989] showed decision makers generally preferred noncompensatory strategies, unless the number of alternatives or dimensions were small or had been eliminated from consideration.

Newell and Simon [1972] stated that if a subject exhibits a style of behavior demanded by the task situation, then the behavior tells more about the task environment than about the decision maker (whose information processing behavior would be different in a different task environment). However, exactly what task characteristics evoke exactly what information processing strategies is not yet established. Their research showed that in performing complex tasks, individuals utilize different heuristics that keep the information processing demands of the situation within the bounds of their limited capacity.

7.3 INFORMATION LOAD

7.31 PROCESSING UNDER PRESSURE

There have been a number of studies of the effect of the amount of information available on judgment behavior (Hayes,

1964; Hendrick et al 1968; Einhorn, 1971; Jacoby et al, 1974). In general, the results from these studies seem to indicate that increasing the amount of information increases the variability of the responses and decreases the quality of the choices, but also increases the confidence of the decision maker in his judgments [Slovic and Lichtenstein, 1971].

Beach and Mitchell [1978] defined task complexity as not only the number of dimensions or alternatives in the decision problem *but also* the degree to which the outcome of the decision task influences how future decision problems are tackled. From a cost/benefit perspective, Onken et al [1985] suggested that this increase in complexity results in an increase in the amount of cognitive strain, and an associated increase in the value of reducing that strain through simplifying strategies. This is a stress reduction explanation for the use of heuristics.

Beach and Mitchell [1978] built up a model which suggested that when decisions are irreversible, decision makers will tend to use more complex analytical strategies. A similar effect results from the decision maker perceiving himself as personally accountable for the result of the decision [MacAllister et al, 1979]. This implies that experimental studies are likely to find simpler decision making strategies than the subjects would use in a real world situation where they felt themselves accountable for their decisions.

7.32 THE SDS MODEL

7.321 NATURE OF INFORMATION LOAD

The purpose of the SDS (Schroder, Driver and Streufert, 1967) model is to show how judgment accuracy is affected by increases in the volume of available information. Volume of information in this particular situation is called information load. The controversy and scepticism surrounding theory building in this area of cognitive psychology is neatly expressed in the following quotation:

> "Mental workload is a gyrating vector
> In multidimensional space.
> With an input detector and output selector
> One can fit any possible case." [Senders, 1988].

7.322 THE MODEL

Brightness, saturation and hue are dimensions of light to human beings, but the amoeba recognizes only brightness. It cannot differentiate between different dimensions as fully as humans can. The larger the number of dimensions that exist, the more likely is the development of integratively complex rules or connections. Highly integrated structures have more connections between dimensions and between rules. They contain more degrees of freedom and are more subject to change as complex changes occur in the environment. The more integratively complex the information processing structure, the more the 'self' enters as a causal agent to generate new perspectives. Less integrated structures have categorical black and white thinking and avoid cognitive dissonance.

Simple structures are adequate for coping only with simple environments. Environmental properties captured in the simple-complex continuum include information load, information diversity and the rate of information change. Properties affecting the degree to which a person explores his environment are noxity (severity of adverse consequences of behavior), eucity (the opposite), degree of interest in the task environment, and the degree to which environment refutes or disorientates a person.

Hunt [1963] deduced from his observation that since novel situations are sometimes positive and sometimes negative, it can be inferred that [p 73] "there must be an optimal level of something involved somehow in the organism's relationship with the environment". The 'something', according to Berlyne [1960], is arousal, optimised between boredom and panic. The earliest approach to the inverted U hypothesis was the Yerkes-Dobson Law [1908] that performance at a task is optimised at moderate, rather than high or low, levels of motivation. SDS replaced motivation with task complexity and replaced optimal performance in general with conceptual performance in particular.

The inverted U shaped curve seems to apply to all kinds of input processing. SDS cite Grant and Phillips [1956], for example, who found a single cerebellum cell would respond to inputs with increased speed up to 180 cycles per second after which it slows down. Until it is swamped, the cell marshalls more and more of its parts to facilitate

information utilization; then it cuts out a progressively higher proportion of the input. Further examples of the widespread occurrence in biology and psychology of the inverted U include the existence of an optimal rate of input for the transmission of information by key punchers [Klemmer and Muller, 1953], the curvilinear reaction of key punchers to steady increases in input signal to noise ratios [McGill, 1957], the optimality of 3 dimensions for information on colours and of 4 dimensions for information on numbers [Sumby et al, 1958; Anderson and Fitts, 1958].

The SDS model, then, argues that information processing accuracy shows an inverted U curve with respect to information load. Chewning [1984] used students and auditors in a simulated bankruptcy prediction task with the load varying from 4 cues to 8 on 80 firms. 34.5% of subjects showed the expected shape but the other 65.5% did not.

Miller [1986] asked 18 MBA students and 57 senior finance undergraduates to predict financial distress for 68 firms using sets of either 6 or 9 cues. Prediction accuracy decreased monotonically as load increased.

Volonino [1988] used 100 MBA students in capital budgeting scenarios to test the impact of information overload with cue sets varying from 3 to 15. Performance suffered when load was increased by changing the number of alternative projects, criteria or both from 3 to 15.

These studies support the SDS model's right hand side where greater load means lower performance, but offer no evidence about the left hand side. This is a less serious

lack than it first might seem; for it is usually to be supposed that performance will improve from the provision of each extra cue starting from a zero base. In other words, that it is possible to have too little data to make a good decision is both obvious and familiar. It is not so clear that it is possible to have too much data, since excess data could either be ignored or else extend overall processing time AND processing accuracy. It can be argued, therefore, that the SDS model is sufficiently tested by testing only its right hand side. If this view is accepted, then the above studies largely support the validity of the SDS model's inverted U for performance as load increases. Alternative models of the relationship between load and performance are considered in the rest of this section.

7.33 THE DIFFERENTIAL PEAKING HYPOTHESIS

Differentiation refers to the individual's ability to locate stimuli along dimensions; integration to the individual's ability to utilize complex rules to combine these dimensions. Someone high in both these abilities is said to be an abstract; someone low, a concrete: both being at opposite ends of the integrative complexity continuum. [Goldstein 1978].

Schroder and Harvey [1963] stated that concreteness manifests itself in one or more of the following ways;

poor differentiation and incomplete integration,

a bifurcated view of the environment,

reliance on authority,

rigidity under low levels of stress,

collapse under high stress,

inability to see alternative solutions to problems,

poor ability to role play or think in hypothetical terms,

and, a poorly defined self concept.

Optimal abstract performance is said by those who support the idea of differential peaking to peak above and to the right of optimal concrete performance. With respect to the same input, the differential peaking hypothesis (hereafter referred as to the DPH) asserts that the information processing curve of abstracts rises earlier than that of concretes because of the formers' lower arousal threshold. Moreover, the concretes' curve reaches its optimum and begins to fall while the abstracts' curve is still rising (because abstracts can handle more data through more complex conceptual rules). The rate of fall of the abstracts' curve is slower and its peak flatter, in most formulations of the hypothesis. However, SDS data had both curves peaking at the same input with no tendency for concretes to peak earlier. SDS did find that in the overload zone past the peak, concretes requested more information than abstracts, perhaps because concretes are less sensitive or less aware of information load increases.

Streufert et al [1965] found both types of subject reduced information search as information overload occurred, while Suedfeld [1964] found abstracts to be more stressed by underload.

Sieber and Lanzetta [1964] found stress to affect both types equally but abstracts increased their information search under increased uncertainty relative to concretes.

Tuckman [1964] used a stock market game to measure tracking of information by group members (who were competing against the market rather then against each other), using 4 tracking indices; viz,purchase of and/or use of sales index data, use of the dividend rate and estimations of future levels of sales indices. The first mentioned require differentiation and search; the last differentiation and integration; while dividend tracking required no special processing behavior. The higher the integrative complexity of the group, the greater the level of tracking and search activity. This phenomenon was confirmed by Driver [1960] who also found higher integrative complexity meant paying more attention to complex information and less to simple information.

7.34 ACCOUNTING AND THE DPH

Revsine [1970] hypothesized that expansion of data could lead to reduced decision effectiveness along the lines of the SDS model. During the fifties and sixties, a number of alternative theoretical models of accounting were proposed and discussed. Revsine attributed the impetus for data expansion to the lack of general acceptance of any one particular income model. Data expansion thus compensated

for the shortcomings in the application of any one particular income model. Revsine reasoned that increased data availability led to increased environmental complexity which, in turn, negatively affected users' levels of information processing. As a result of this process and the need for abstract conceptualisation in business and economic decision making, less effective business decisions emerged.

Miller [1972] further developed Revsine's analysis. He suggested that a highly abstract group of information processors, such as financial analysts, should perhaps become the target information group. That is, the decision model of a highly abstract group of financial information users could be employed to determine the appropriate amount of disclosure. This choice was based on evidence that investment advisory services are widely used by most investors. Thus, more concrete information processors may avail themselves of the services of abstract information processors without depriving the latter of decision useful information. This assumes that financial analysts are properly characterized as abstracts, but such an assumption in an Asian context at least, is somewhat unsafe.

However, Miller's speculation was based upon the empirically unsupported differential peaking hypothesis. Wilson [1973] noted the lack of evidence supporting the differential peaking hypothesis, and so disagreed with Miller's speculation.

7.35 COGNITIVE STYLE and THE DPH

Accounting studies of cognitive style largely have the purpose of designing information systems to more closely fit the decision maker's style and personality insofar as they are reflected in how he processes information. Lusk [1979] argued that only an interaction between cognitive characteristics and information stimuli can justify individualised information systems - such an interaction is of course assumed in the DPH. However Lusk's own study found no support for this phenomenon in that both abstracts and concretes did better with simple reports than complex ones, and there was no interaction between cognitive style and information complexity.

Benbasat and Dexter [1979] did find evidence of differential peaking in their study which showed abstracts did better with structured reports while concretes did better with an open data base enquiry. Commented Libby and Lewis [1982 p271], "Presumably, low analytics (i.e. concretes) were unable to "break up" the structured reports."

7.36 OVERLOAD

Schneider [1987] defined organisational information overload as a condition in which the information-processing requirements exceed the information processing mechanisms available so that the organization is unable to process information adequately. A similar definition would fit individual information overload. Overload can occur when the nature of the information is: 1. uncertain, 2. ambiguous. 3.

novel, 4. complex, or 5. intense; in the perception of the user.

Keller and Staelin [1987] showed that too much information caused consumer assessments of alternatives to deteriorate.

Kim [1986] found "novel" information easily increased load to the point of overload but relevant "old" information did not.

Craft [1984] looked at the interaction beteeen cognitive style and the effects of information load. The decision style inventory was used to categorize subjects into 4 basic decision styles (analytic, behavioral, conceptual and decisive/directive - these styles behave as their names would suggest). Each style group was subclassified into high analytic (field independent) and low analytic (field dependent). Directive types receiving simple reports showed above average performance in below average time. The same group receiving complex reports did badly (with low analytics within the group doing worse in both accuracy and speed). Analytics and conceptuals did much better than directives across all levels of load, on both accuracy and speed.

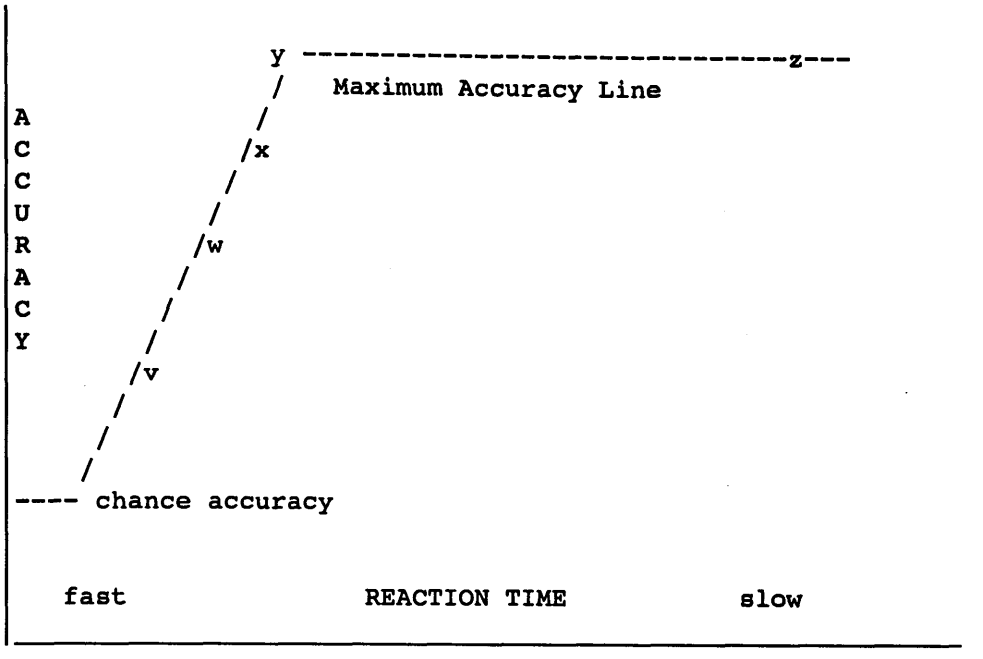
Dolinsky [1984] studied the interaction between overload and the presentation of data in a second language in which subjects were proficient but not native. Cue sets of 16 to 256 data points were used on American and Hispanic students in a house buying simulation. Accuracy was gauged by the closeness with which their first choice matched their ideal

specification, relative to other available house choices. The results indicated that individuals made worse choices as information increased from 16 up to 256 cues, and choices were better when data was presented in the native rather than the second language with significant overload effects occurring somewhat later.

Cook [1987] found that overload caused switching from compensatory to noncompensatory search strategies and from searching alternativewise to searching dimensionwise.

7.37 PACHELLA'S OVERVIEW

Pachella's [1974, p59] idealised speed accuracy operating characteristic, after Pew [1969] is pictured below.



POSITION GLOSSARY

v extreme speed emphasis

w moderate speed emphasis

x normal instructions

y theoretical definition point

z extreme accuracy emphasis

The theoretical definition point, y, is 'the fastest reaction time at which maximum accuracy is maintained.' Since even experienced performers show at least 3% error rates in most speed tasks, this point is rarely achieved in practice. Some error is inevitable if time pressure exists as a result of the trial and error process people put in

hand to optimize the speed-accuracy balance. Different experimental conditions can vary subjects' view of where this optimum lies. Small differences [Pachella, 1974 p60] in error rate can lead to large differences in reaction time, especially at the top end of the accuracy continuum. "This [ibid, p61] means, of course, that what may look like relatively meaningless error differences might contaminate reaction time values extensively."

Almost all tasks performed by individuals involve a higher than zero error rate. For example, Theios [1972] found even such a simple task as naming a visually presented digit evoked a 3% error rate.

7.4 SPEED - ACCURACY MODELS

There are 3 main models of the speed - accuracy relationship, the fast guess model [Yellott 1971], the accumulator model [Broadbent 1971] and the random walk model [Audley 1973]. They are all explained and compared in Pachella [1974].

The fast guess model holds that the fall off in accuracy produced by emphasizing speed is due to a failure of stimulus processing for some proportion of trials. While some responses will take the necessary time to produce accuracy (stimulus controlled responses): others are much faster but have only a chance percentage of being accurate (fast guess responses). The greater the emphasis on speed, the greater the proportion of fast guess responses.

The accumulator model assumes responses depend on central

decision processes based on evidence acquired over time. All evidence on an alternative is stored till it reaches a critical value which triggers a response - high critical values mean high reaction times. Stress on speed lowers critical values which lowers accuracy.

The random walk model is similar to the accumulator model except that the decision to respond is based on a relative criterion rather than an absolute one; viz, that the accumulated evidence favouring one alternative exceeds that favouring any others by some critical value. It is called random walk since the state of the evidence at any moment is a random walk among the alternatives.

All 3 models are macro trade off models, dealing with totals and averages. Within them micro models are possible [Lappin and Disch, 1972 and 1973].

In the studies Broadbent [1971, p276] surveyed, it was "broadly true that the average speed of reaction was proportional to the average information per signal."

Wright [1974], and Wright and Weitz [1977], demonstrated that people under time pressure accentuate negative evidence and use less information in judgment situations involving personal investment. Ben Zur and Breznitz [1981] showed that subjects under time pressure make choices with lower risk, where lower risk is defined as choices of gambles with lower variance, and spend more time viewing negative dimensions (amount of loss and probability of loss). Rothstein's [1986] study using a task of predicting heights of lines on a

computer screen, showed accuracy to be hardly affected by time pressure but consistency significantly deteriorated - though only markedly so for more complex tasks.

These studies are consistent with Pachella's overview which was depicted in the previous section, but do not provide sufficient evidence to decide which of the accumulator, fast guess or random walk model offers the most realistic explanation of that overview.

7.5 ACCOUNTING DIMENSIONS

7.51 DIMENSIONS AND CONTEXTS

The accountant can vary information loads for decision makers by aggregation, summation, use of models, exception reporting, explanatory footnotes and multiple reports. Libby and Lewis [1977] and SDS [1967] caution that the effects of load on decision quality may vary with context, so it is important to specify the nature of the decision task. Iselin [1988, p148] commented on the importance of such specification being placed on Mason amd Mitroff's structured/unstructured continuum [1973]. Iselin's own study was of a highly structured task.

7.52 ACCOUNTING LOAD, DECISION SPEED AND ACCURACY

A very few accounting studies addressed the question of the relationship between information load and decision making quality. Two of these studies involved bank loan officers' predictions of bankruptcy [Casey 1980] and

estimates of cash flows by subjects differing in accounting expertise [Snowball 1980]. In both these cases the information load manipulation may have failed [Libby and Lewis 1982 p271].

Casey [1980a] asked experienced loan officers to make predictions of bankruptcy for each of 10 firms using one of three levels of information;

Group 1 used a 3 year set of 6 financial ratios;

Group 2 used the same as group 1 plus balance sheets and income statements; and

Group 3 used the same as group 2 but were also given notes to the financial statements. Loan officers in group 2 were more accurate than those in group 1 but spent no greater time doing the analysis, while those in group 3 spent more time than those in group 2 but were no more accurate. Casey noted that considering time spent by subjects as well as predictive accuracy, there seemed to be [Casey p45] "negative returns to processing the additional note information". He wondered [p47] if the group 3 subjects perceived more information in the data as data supply increased even though its predictive content remained the same. Libby and Lewis [1982 p271] commented that the notes to the accounts ".. may have merely lacked information content." This is perhaps a tautology if information content is equated with information usage. As Sterling has pointed out, however, because heroin is used it does not thereby become useful [in Kaplan 1978].

Snowball [1980] addressed the effect of financial information user expertise in addition to information load in a cash flow prediction task. Five subjects were assigned to each of 18 conditions, comprising;-

3 levels of expertise defined in terms of accounting education and experience,

2 levels of financial disclosure, and

3 levels of time restriction.

The last two dimensions were researcher controlled and varied to test the effects of information load. The low disclosure condition consisted of a set of financial statements with outline notes; the high load condition had the same set but with very detailed footnotes. The time levels were 14 minutes, 25 minutes and unlimited. None of the three time variables had a significant effect on subject predictions. With respect to other dependent measures tested, variance of predictions and prediction confidence intervals, only the expertise level resulted in significant differences. The effect of varying disclosure level was negligible.

Subjects were asked to respond to several questions concerning their perceptions of the data and the task. No significant differences for the amount of relevant data, usefulness of data, or the complexity of the task were perceived by subjects across time and disclosure conditions. Perceived task prediction difficulty did differ significantly between high and low disclosure groups. This raises the possibility that the information load manipulations were not

completely successful.

7.53 ISELIN'S STUDY

Information load has been most commonly measured in the literature (e g SDS 1967; Streufert, 1973) in terms of the number of inputs or cues to the decision maker. Some cues may represent different dimensions, others repeat dimensions. For example, a simple specification of an NPV problem has the three dimensions of time, annual cash flow and cost of capital, but a 5 year project will repeat the time and cash flow dimensions five times to make eleven cues altogether. Iselin [1988] hypothesized that repeated dimension cues like cash flow are digested far more easily by a decision maker than cues in any new dimension. The number of different dimensions in a cue set is that set's 'absolute diversity', while 'relative diversity' is the number of dimensions divided by the number of individual cues throughout all dimensions. The quantity of repeated dimensions is the number of total cues less the number of dimensions. He says n different dimensions may be harder to process than n repeated dimensions. His is the first research to address the overload problem in this way.

Casey [1980a] had manipulated load over three levels. His dependent variables were bankruptcy-prediction accuracy and decision time. Iselin accused him of confounding four other variables with information load - irrelevant data, uncertainty, diversity and information value. It is probable

that as load increases, irrelevant data would increase, uncertainty would change and so would diversity. Information value would increase in the particular circumstances of Casey's study where profit was the measure of information value. Casey's findings about the optimality of moderate loads were not supported by Iselin who found both accuracy and speed to be level initially, then to decline instead of accuracy displaying an inverted U. Also, Iselin's subjects started to lose speed well before Casey's turning point of 15 cues. Iselin attributed the inconsistencies to Casey's confounding variables.

Based on a model of Berlyne [1960], Iselin hypothesised an inverted U for accuracy against volume of repeated dimension cues - a boredom effect. Conversely, he expected a U curve for time against repeated dimension cue volume. These were his first 2 hypotheses. The remainder were as follows;-

3.Both curves in the first two hypotheses will show turning points between 9 and 15 cues (partly derived from SDS and partly from Streufert, 1973).

4.Information of higher diversity will result in lower accuracy,

5.and take longer to process.

6.Higher experience should result in greater accuracy and

7.shorter processing time.

8.Higher task learning should result in higher accuracy and

9.shorter processing time.

Decision accuracy was measured by grading each decision as

correct or incorrect. A correct answer not only correctly calculated NPV but also correctly specified accept/reject in consequence. Decision time was measured with a stop watch in full view of the subjects, and this created a certain amount of pressure. In the analysis, reliability was gauged with Cronbach's [1970] alpha and found satisfactory (from 0.62 for accuracy under low diversity to 0.93 for accuracy under high diversity). Face validity was measured by having subjects rate on a seven point scale the degree to which they believed the experimental task represented structured practical decision making. The mean result of 4.86 "is regarded here as satisfactory" [Iselin, p157].

Confirmed effects were the following. There were repeated dimensions effects at only the lowest learning level and without any accompanying boredom effects. There were diversity effects, experience effects, and learning effects at the two lowest levels. The turning points of the accuracy curve and the time curve were as expected. Unpredicted results were that both time and accuracy failed to display any boredom effects.

The conclusions drawn were that learning and experience greatly increased ability to digest repeated dimension cues but they have a much weaker effect on ability to absorb increases in the number of dimensions. This has considerable bearing on the question of the incremental information content of funds flow statements. If the funds flow statement merely juggles information already present in the

other two final accounts, then it does not provide any new dimensions of information. The funds flow statement would then not increase information load, and should not cause any symptoms of information overload. Iselin [p162] counselled the accountant to limit the number of dimensions in any one report, and;

"Also greater concern should be held if the use of explanatory footnoes or multiple reports results in a considerable *increase* in information diversity."

He further recommended that learning effects should always be gauged in overload research because of its importance on the speed and accuracy involved in processing repeat dimension cues. Finally, he pointed out that inexperienced decision makers have been shown to be poor substitutes for experienced ones in this type of research.

7.54 OTHER EMPIRICAL STUDIES

San Miguel [1976] investigated the relationship between the level of environmental complexity and the level of information processing. The focus was on information processing rather than on predictions. In his study, the subjects were asked to make decisions about the level of operations of a plant, prior to the actual outcome of a large government contract bid by the firm on behalf of this plant. The results were consistent with the SDS model. Information purchases graphically exhibited the inverted U shape. It is not clear, however, how rigorous a test this was of the SDS model, in that;-

a) the experimental manipulation may not have been neutral with respect to purchase behaviour since subjects were first told the quantitative probability of losing the government contract, then they purchased information, then they decided by how much (if at all) to scale the plant operations. Environmental complexity, surrogated by the probability of losing the contract, may be interpreted as first increasing then decreasing, as the possibility of losing increases. Greatest uncertainty exists when the probability of winning and losing are equal. As the probability of loss increases beyond 0.5, the uncertainty connected with the contract diminishes. It is plausible to expect information needs to be greatest at the point [equiprobability] where uncertainty is greatest.

If the environmental complexity measure is accepted as appropriate, then it still remains unclear how well the process of information integration in the SDS model is represented by information purchase. The content, criterion and construct validities all seem shaky.

Dermer [1973] studied information preferences of managers differing in tolerance for ambiguity. The findings indicated that individuals intolerant of ambiguity preferred a greater volume of information than individuals tolerant of ambiguity. Dermer suggested these results supported the findings of Schroder et al [1967] that conceptually concrete subjects preferred more information than conceptually abstract subjects.

Chervany and Dickson [1974] studied the effects of data

aggregation on subject performance, decision confidence, and decision speed. Student surrogates were asked to make operating decisions for a simulated manufacturing operation. One group received raw data, process reports and status reports similar to a typical managerial report. Another group received the information statistically summarised. The results indicated those receiving summarised data performed slightly better, were slightly less confident, and took significantly more time in reaching decisions than those receiving raw data. However, it could readily be argued that both load conditions represented data overload. For the ten decisions made by each subject, the raw data users received a total of 1040 data items, while the summarised data users received 449 data items.

In another simulated production environment experiment, Benbasat and Schroeder [1977] varied the number of reports available for selection by decision makers [who also happened to be students]. One group received a "necessary" set of eight reports; the other group received an overload set of the necessary eight and also a further eleven reports. Those with the overload set selected significantly more reports than those with the necessary set but failed to demonstrate any difference in performance. The researchers interpreted this to indicate that subjects did not know what reports were needed but instead relied on what was available. They fell short of interpreting the additional information requests by the overload group as additional

information incorporated into decisions.

7.6 CONCLUSIONS

The main foci of this chapter were the SDS model, the DPH and Iselin's study. The SDS model proposes that as information load increases, processing performance at first rises to a peak but then falls at an accelerating rate - there is clearly the idea of optimum information load for any one task within this model.

The DPH assumes that the world can be divided between abstracts and concretes (in its concrete form); or at least, that everybody's information processing ability can be placed on a continuum for any one task context between abstracts at one end and concretes at the other (in its abstract form). The DPH proposes the two types show different shapes and sizes of inverted U as load increases - itself a rather concrete proposition perhaps.

Evidence to support the SDS model is considerably stronger than the evidence to support the DPH. Indeed, the support for the DPH is even weaker than the evidence from non American market studies to support the EMH. Both remain hypotheses only.

Iselin's particular contribution, which is used in the present work, is his analysis of the ingredients of information load. Absolute diversity is the term he uses to indicate the number of dimensions in a data set. Relative diversity is used to mean total dimensions divided by the total number of data points. The quantity of repeated dimensions he characterizes by subtracting the number of dimensions from the number of data points. He hypothesized

that information load effects were more dependent on absolute diversity than either of the other two quanta. His own study supported this hypothesis. The present work applied Iselin's constructs to the processing of accounts, using three alternative possibilities to operationalize the notion of dimensions, while treating every number on the accounts presented as a discrete cue or data point. In this way, the relevance of an overload explanation to the speed and accuracy results of the experiment would hopefully become evident; and any conclusions that might be drawn about the usefulness of SCFPs would be that much more strongly grounded.

CHAPTER 8 THE EXPERIMENTS

8.1 THE SUBJECTS

8.2 THE ACCOUNTS

8.3 THE QUESTIONNAIRES

8.4 THE ADMINISTRATION OF THE EXPERIMENTS

8.5 CONTROL OF CONTAMINANTS

CHAPTER 8 THE EXPERIMENTS

8.1 THE SUBJECTS

8.11 INTRODUCTION

Chapter 8 describes the data capturing processes used in this research and the means adopted to control infection by contaminating variables. It describes the processes and rationales for the selection of subjects, accounts, questions and settings for the experiments. It also analyzes the accounts in some detail, to make explicit the reasoning used in each case for deciding the marks to be awarded for all of the alternative answers to the multiple choice questions.

8.12 THE LOAN OFFICER SAMPLE

Necessarily, the selection of subjects was in the hands of their bank employers, and the participating banks were by definition a volunteer sample. The reason for the choice of bank loan officers as the population of interest was that they are the accounts user group most likely to be sensitive to the solvency messages of published accounts. Indeed, if funds statements do not work for them, the prospects of them working for any other occupational group may be rather slight.

8.13 LETTER SENT TO ALL BANKS

The empirical phase of the research began with the

despatch of the following letter to all 114 banks listed in the 1986 Hong Kong classified telephone directory.

Dear Sir,

Usefulness of Funds Flow Infoirmation to Lending Officers

I am currently researching the use made of company Statements of Sources and Applications of Funds (also known as Statements of Changes in Financial Position). It is particularly of interest to know the extent to which bank lending officers make use of such statements when making decisions about granting loan or overdraft facilities to corporate clients.

I am writing to seek your permission to meet and discuss with you for up to twenty minutes my research strategy. It would also be valuable later to arrange to convene half hour meetings of your lending officers in small groups of six or so to test directly the use they make of funds statements in a hypothetical case I have prepared - this is something I hope I may discuss with you at a preliminary meeting.

Could you possibly let me know if I may contact you again to arrange a meeting along the lines decribed above ?

Yours sincerely,

G D Donleavy, Director - Research Centre, Department of Accountancy, Hong Kong Polytechnic.

Of the 114 banks circulated 72 replied by letter or phone and 53 appointments were made.

At the appointment, which was generally with the chief lending officer for the larger banks or with a vice

president for the smaller banks, we discussed the nature of their banking activities, the use made of accounting information generally and funds flow statements more particularly, in considering credit requests from clients. The smaller the bank, the less use it made of accounting data, as a general pattern. Moreover, not all the banks that made explicit use of accounts used standard spreadsheets to input and evaluate the accounts by standard bank criteria. Some used accounts but not funds flow statements.

For examples of the detailed content of the interviews, see Appendix C.

8.14 GROUP CODES

Code	Bank Name	Size	Cumulative size
A	Hong Kong Bank	8	8
B	Hang Lung Bank	21	29
C	Std Chartered Bank	6	35
D	Far East Bank	7	42
E	Wing Lung Bank	10	52
F	BCCI	6	58
G	Wing Hang Bank	8	66
H	UBS	5	71
I	First Chekiang Bank	15	86
J	Hua Chiao Bank	6	92
K	Shanghai Comm'l Bank	12	104
L	Sanwa Bank	7	111
M	Individuals	5	116

M group is not a true group but comprises senior managers from Commonwealth Bank of Australia, Commercial Bank of Chicago, American Express, Bank of East Asia, and Hang Seng Bank. It was not possible to obtain representation from the territory's third largest bank, the Bank of China. It is estimated that non response bias exists to cause the sample used to be somewhat more trained and sophisticated (and "abstract") than the generality of Hong Kong loan officers. However, the absence of China mainlanders may, to a degree, be offset by the absence (and non co-operation) of the presumably sophisticated Citibank and Chase groups and by the absence of any Bank Paribas staff who are sometimes regarded as the sharpest analysts of all in the territory. Even so, the number of responses achieved is higher than most other financial researchers in the territory led the writer to expect.

8.2 THE ACCOUNTS SELECTION

8.21 THE CREDIBILITY ISSUE

Since it is not known which firms or auditors are generally regarded as unreliable by local loan officers, it was thought inadvisable to use any Hong Kong accounts at all. One would not know when deviant results were due to recognition or suspicion of dubious accounts. In conversation with several bankers, including most of the people mentioned in Appendix C, scepticism about locally

published accounts was quite general although not about accounts the banks themselves demanded.

8.22 SUMMARY OF THE ACCOUNTS SELECTED

Over 1000 published American, Canadian, Australian and British and other published accounts were scanned, most of which were in the Polytechnic's departmental library. It is only a very slight overstatement to claim that no two funds statements are presented or narrated identically. The accounts review exercise demonstrated two useful things;

1) Companies in countries such as Japan, that are not yet obliged by law or local accounting standards to produce funds statements, tend to use the American rather than the British approach, and tend to name the statement as one of change in financial position rather than of sources and applications of funds.

2) Little purpose would be served by artficially varying the format of any one funds statement in the empirical phase, as the American APB 19 approach is naturally more comprehensive than the British SSAP 10, and those statements that are formatted to conclude with a calculation of cash and near cash or net liquid funds are self evidently more sharply focussed and more easily understood than those that are not thus formatted.

However, the British accounts are permitted so much flexibility under SSAP 10 that there is an unbroken continuum to be found ranging from the APB 19 all resources format to the proto SFAS 95 cash flow statement and most British accounts are in the middle of the range. For that reason it was thought that British accounts should make a major contribution to the sample. It was also felt necessary

to include a cash flow statement (in substance if not in name) and to choose accounts that were of markedly *unequal* difficulty; in order to represent the real world better and in order to distiguish accounts difficulty effects from funds flow effects. Hong Kong accounts were excluded from those set before lending officers to avoid the danger of subjects' disregarding the face value of the accounting data. A small pilot test with a final year accounting class confirmed this danger.

The interviewed banking officers were asked to permit me to spend an hour with their lending officers after work to see if the presentation of funds flow data significantly affected their lending judgements. 23 banks agreed but only 12 kept their agreement, so the thirteenth group coded M comprises isolated individual officers seen one at a time from different banks. In the end some 116 bank lending officers participated in the research.

11 published accounts were chosen from a review of over 1000, using the following selection criteria:-

a) the need for representativeness of the sample,

b) the consequent need for variety to capture UK, US and Australian formats,

c) the need to have a wide range of industries in the sample to avoid such industry specific effects as real estate high gearing in the property development industry,

The copies of the accounts were colour coded, all references to names of directors or the reporting firm were

removed, and the accounts with funds statements were differently coloured from those without funds statements. All these accounts can be viewed in Appendix A.

The subjects were assembled in a meeting room at their bank. They were told that the point of the research was to see what matters were important to them when appraising customers' accounts in the course of making a lending decision. They were told only to answer the questions asked and to proceed reasonably quickly through the questions. Each subject was given a set of six accounts, three with funds statements, three without, and six differently coloured question sheets - 3 c question sheets (calculation based), 3 j question sheets (judgment based). They were all asked to begin work at the same time and to raise their hands every time a questionnaire was completed so it could be collected at once. Completions were timed to the second, using the colour codes to record times remotely when several subjects completed within seconds of each other. As soon as a subject handed in his sixth questionnaire, s/he went home. At the end of a session, I thanked whoever was left, tabulated the speeds before leaving the premises and marked the accuracy later at the Polytechnic.

8.221 FINAL 1987 ACCOUNTS SELECTED

CODES (+/-scfps)	NAME OF COMPANY	CUURENCY	STYLE
KX/K	Legal & General	Sterling	S&A

KY/KZ	GKN	Sterling	S&A
L/LX	Smith & Nephew	Sterling	S&A
LY/LA	Rowntree	Sterling	S&A
M/MX	Tesco	Sterling	S&A
N/NX	Mitsui	Yen	APB 19
NA/NY	Union Carbide Aus & NZ	Aus	R&P
O/OX	New Jersey Bell	US	S&A
*OA/OY	*Goodyear*	*US*	*SCF*
P/PX	Broken Hill Proprietary	Aus	R&P
*PA/PY	*National Gypsum*	*US*	*SCF*

*OA and PA are SCFs rather than SCFPs. They are italicized in the remainder of this thesis to aid the reader in readily identifying the SCF results.

8.222 SEQUENCE SETS

The accounts were presented in 2 sets, one called the main sequence, the other called the second sequence. Each subject received a full set of six accounts from either sequence. The purpose of having two sequences was to reduce any selection biasses inherent in any one set of accounts, and it was expected that the overall speed and accuracy results for both sequence would be broadly equivalent. The allocation of coded accounts to sequences was as under.

MAIN	SECOND
Withs Main	Withs Second
KY LY M NA O PA	KX L M N OA P

Withouts Main	Withouts Second
KZ LA MX NY OX PY	K LX MX NX OY PX

8.223 ACCOUNTS COLOUR COMBINATION CODES

Each accounting report was colour coded to make for immediate identification when subjects raised their hands on completion of a question sheet for any one report. It was thus easy to record exactly when each subject completed each report and which report it was that had been completed. The colour codes were as under.

Main sequence with; KY LY M all blue, NA orange, O pink, PA green

Main without; KZ yellow, LA white, M pink, NY yellow, OX blue, PY white

Second sequence with; KX yellow, L white, M blue, N orange, OA pink, P green

Second without; K blue, LX green, MX blue, NX yellow, OY blue, PX white.

8.23 ANALYSIS OF THE ACCOUNTS SELECTED

8.231 REPORTS COMMON TO BOTH SEQUENCES

MX/M **TESCO**

The Profit and Loss Account

VAT is shown as a deduction from gross sales but it is not stated whether this is output VAT or net VAT.

Profit appropriated to employee profit - sharing is the final deduction before profit before tax.

Otherwise the Profit and Loss Account is normal and clear, with a slight increase in sales being accompanied by a much greater relative increase in all levels of profits.

The Balance Sheet

The fixed assets are divided between tangible assets and investments, which might prompt respondents to search for intangibles which they will not find.

Net working capital is negative in both years but is some 80% worse in the later year - an extreme case of illiquidity and the consequent danger of technical insolvency.

Long term liabilities increase by over 15% from one year end to the next, but the reader in a hurry may miss this, because of the heading for this item being creditors rather than deferred or long term liabilities.

Provisions for liabilities and charges are shown as non current which is unusual, but since the figures are small, this should not delay the reader.

The narrative "called up capital" is unusual but relatively slight in amount and it is expected most readers would read called up as more or less fully paid.

The Statement of Sources and Applications of Funds

In contrast to the foregoing statements the funds

statement is quite conventional, with the more unusual narratives relating to trivial amounts only.

Working capital decreases in the review year of 1987, and the increase in cash closely matches the decrease in debtors. The reader will answer the liquidity questions wrongly by reading these movements to mean good year end liquidity.

However, it is clear that operations funds at 218 are too small to finance tangibles growth of 312. This can be read rapidly and directly from the SSAF but not readily from the other two statements.

The novice reader may be confused by the final block which is an explanation of the business disposal proceeds, but the experienced reader will simply ignore this block.

The only pieces of information in the (not supplied to subjects) notes to the accounts that would have been helpful to readers in answering the questions are the analysis of the long term provisions into deferred tax sources and the clarifying of the fact that long term creditors are two tranches of loan stock and obligations under finance leases, so their increase does indeed constitute an increased reliance on loan creditors. However, this is deducible from the Balance Sheet or SSAF even without the notes.

Difficulty Rating - Moderate

8.232 MAIN SEQUENCE ACCOUNTS

KY/KZ GKN

The Profit and Loss Account

Sales are down but group profits and earnings are up.

This P&L is very easy to read and should not have given subjects any trouble.

The Balance Sheet

The Balance Sheet is also easy to read with fixed assets clearly having fallen, but the overall asset structure not having changed much. Current ratios are over one, but deteriorating, while liquid ratios are not large enough to ensure trade creditors, tax and dividends can get paid from liquid funds. Loan creditors fell by more than shareholders' funds, irrespective of whether minorities are included or excluded.

The Sources and Applications of Funds Statement Statement

Since assets have decreased, the firm can clearly finance growth from retentions, even if growth is seen as referring to the capital expenditure and acquisition of subsidiaries, both of which are exceeded by profit before depreciation, although not by profit after tax and dividends.

This statement is deceptively easy to read and care has to be taken over the following lines:

"Profit before taxation, depreciation and share of profits less losses of related items" [not the usual first line of a

funds statement],

"Debtors less creditors" [this confounds two different fund streams]

The statement has a cash base and the movement on borrowings will probably be more readily understood than the more usual [in the UK] movement on working capital

Rating - Moderately Difficult

LY/LA Rowntree

The Profit and Loss Account

Sales and all levels are up. All the narrative is straightforward and no subject was expected to have trouble reading the account.

The Balance Sheet

This is straightforward except for the printer's omission of the 1986 comparative figures, which renders impossible the answering of any of the comparative questions any other way than "not sure". This will provide a check on the seriousness with which subjects presented with the LA accounts (without funds statement) considered their answers. It can be said, however, that liquidity ratios are healthy and the firm should face no difficulty paying its debts as they fall due.

The Sources and Applications of Funds Statement Statement

Reading this funds statement correctly and critically depends on realizing that brackets round a figure mean asset decreases and liability increases. Given that, it is apparent that cash is up, borrowings down and that debtors rise more than creditors; all adding up to picture of improved liquidity and technical solvency.

It is apparent that operating profit would have covered asset growth and that long term creditors have fallen.

The LY account is regarded as a particularly good test of funds statement usefulnes, given its conventional layout, its cash focus and its monopoly on certain information as a result of the omission of the 1986 figures from the Balance Sheet in both the "with" LY set and the "without" LA set.

Rating - easy

NA/NY **UNION CARBIDE AUSTRALIA AND NEW ZEALAND**

The Profit and Loss Account

Turnover is not an obligatory disclosure on the Profit and Loss Account in Australia and it is absent here. All levels of profit are clearly up, however, even after accounting for extraordinary items.

The Balance Sheet

The Balance Sheet follows the American format rather unusually for an Australian firm but it is clear and easy to

read anyway.

Current and liquid ratios are both healthy for both years and 87 is better than 86 in this respect. Current borrowings are down, equity is up and no long term debt is disclosed, so the firm can be said to have become less reliant on its loan creditors over the year.

The asset base has risen and its structure has significantly changed with the selling off of all the non current investments and the relative increase in the importance of both gross and net current assets.

The Statement of Sources and Applications of Funds

The funds statement follows a British sources and applications format with the reconciliation of profit to operations funds flow shown as a note to the statement. It is quite easy to read and some subjects will find its avoidance of brackets (in favour of spelling out whether an asset or liability group has increased or decreased) quite helpful.

Profit can easily finance expansion of facilities, the liquidity improvement is fairly easy to see as is the reduction in borrowings.

However, the 5 million reduction in investments is shown current on this statement whereas the Balance Sheet shows it non current. This discrepancy does not affect the answers to any of the c or j questions but it does not help. In the full report, note 10 to the accounts explains the disposal

as being of "shares in unlisted non-related corporation" and explicitly deems it non current. The same note shows current investments "in unlisted non related corporations" constant across the two year ends at 5 million - the coincidence in size is explicit. *It would seem the funds statement has misclassified this item.* The auditors, KMG Hungerfords, give the accounts their full support and the "directors statement" explicitly claims the funds statement gives a true and fair view.

Rating - Moderately Easy

O/OX NEW JERSEY BELL

The Income Statement

The very slight rise in net sales accompanied by a major rise in expensed depreciation has meant static profits where the fall in operating profit is compensated by a fall in tax to cause net income to stay virtually the same as it was in the previous year. The statement is informative and easy to read.

The Balance Sheet

The small rise in equity accompanies a small decline in long term debt, rendering the firm slightly less reliant on loan creditors.

The asset base has slightly risen but the asset structure has not materially altered.

Both year ends show a deficiency of working capital and liquid assets will not be able to finance payment of payables plus maturing debt; a situation that has deteriorated over the year 1987.

"The Statement of Sources Supporting Construction Activity"

The O accounts set has the most aberrant SCFP of either sequence in that funds flows are tied not to working capital, cash or all assets but only the special asset "construction" which does not tie in with equivalent figures on the other accounts. Only some of the working capital changes are specified and the increase in debt maturing within one year is noted under external financing activities rather than under working capital. Internal funds are large enough to finance construction but profit alone is not. All in all, this statement is unhelpful and subjects are not likely to show any improvement in speed or accuracy from its perusal. It is included in the set to exemplify how a number of firms, especially in the USA, use the SCFP to conceal rather than reveal the deteriorating liquidity inferred from the Balance Sheet.

The full annual report avoids any discussion of liquidity problems, preferring to comment on sales and cost trends. The auditors, Coopers and Lybrand, give the accounts a clean report but tackle the problem of the SCFP's non conformity

with APB 19 in these words;-

"In our opinion, the financial statements referred to above present fairly the financial position of New Jersey Bell Telephone Company as of December 31, 1987 and 1986, and the results of its operations and sources of funds supporting construction activity for each of the three years in the period ended December 31, 1987, in conformity with generally accepted accounting principles applied on a consistent basis." There is no hint that a statement of funds supporting construction activity is not a generally accepted form of an SCFP.

Rating - Difficult

PA/PY **NATIONAL GYPSUM**

The Income Statement

Sales are up, as are gross earnings, but the effect of the massive rise in interest expense is to turn all levels of net earnings from a 1986 profit into a 1987 loss that nonetheless is not allowed to prevent the dividend level being maintained. The extraordinary items both relate to refinancing of debt and do little to assuage concern that might be felt as a result of the huge rise in interest expense. It will require an unusually observant reader to spot the probable explanation for the interest rise in the 1986 heading, namely its 8 month duration instead of the

expected full year. Nevertheless, interest has made a loss out of what would otherwise have been a profit.

The Balance Sheet

The asset base has declined slightly both gross and net of goodwill.

The structure of fixed assets has not materially changed but cash has risen and raw materials inventory has grown while the other current assets have slightly shrunk, so that one would be inclined to say the asset structure has changed significantly over the year - just.

Current and liquid assets have declined while current liablities have risen, so liquidity is declining and doing so from a satisfactory current ratio start but from a liquid ratio that is clearly too low in the first place.

Long term debt is down by 52 billion while equity is down by 25 billion as a result of this year's loss; a relative and absolute decrease in reliance on loan creditors.

The Statement of Changes in Financial Position

Here is an American SCFP that is laid out like the new SFAS 95 SCF requirements, using the indirect method for operations flows and separating dividends from the main categories of flow. However, it contains some items which will be unclear to some readers;

a) "accretion of original issue discount" in operations flows

and b) the strange juxtaposition of the extraordinary loss on debt refinancing with the extraordinary gain on the early extinguishment of debt.

Moreover, the replacement of 575 billion old debt with 430 million new debt in the financing flows block causes a net deduction of 145 billion which is far greater than the debt differences shown in the Balance Sheet. One has to subtract the 81 billion issue discount from the SCFP reduction to approach the 52 billion reduction on the Balance Sheet. *Here then is an example of the new SCF being just as able to confuse readers as the old SCFP was.*

Since the firm made a loss, there is no possibility of profit financing growth, although total operations cash flow is large and positive. Since the asset base has shrunk in the year, there has been no growth for operations to finance.

Receivables have *decreased* by twice the increase in payables and by more than twice the net cash inflow after dividends, reinforcing the Balance Sheet picture of deteriorating liquidity - albeit in a format whose use of brackets will confuse some readers of the SCFP.

This SCFP, really an SCF, will help few readers read the other accounts better or quicker, partly through its contrary use of bracketing logic, but more because it is concealing an in substance debt defeasance that gave rise to an extraordinary gain which in turn is matched by a refinancing loss. This is largely explained by the full annual report and its notes, which state the new debt

largely consists of junk bonds at 11.375% and credit lines for trade financing with Morgan Guaranty floating "at approximately 9%" and linked to LIBOR. The debt already issued and still outstanding at end 1987 carried interest rates of of 14.5% and 15.5% fixed. However, on page 6 of the report is stated the following:-

'On April 29 1986 the Company was acquired by Aancor Holdings Inc in a leveraged buy-out transaction. As a result of the merger, the Company's financial results, other than net sales, are not readily comparable to prior periods because of a substantial increase in interest expense and the depreciation and amortization of acquisition related items. For discussion purposes, eight month data ended December 31 1986 has been annualized, except net sales, for comparison with 1987 results." The Income Statement, however, has kept the 1986 figures on an 8 month basis and this is the reason interest has increased.

Rating - Moderately Difficult

8.233 SECOND SEQUENCE ACCOUNTS

KX/K **Legal and General**

The Profit and Loss Account

Although insurance terminology may be new to many subjects, it is clear that all levels of profit are down and this is principally due to the 42 million "hurricane loss". In these circumstances,raising the dividend to a payout ratio of some 85% could be grounds for concern.

The Balance Sheet

There was little change in the asset structure over the year and a slight but definite shrinkage in asset base.

Deferred liablities consist of insurance fund liabilities which have have risen some 5% thereby making the firm more reliant on its loan creditors absolutely as well as relatively. However, since this balance sheet does not distinguish current assets or current liablities from the generality of assets and liabilities, and since the insurance liabilities are not described on the Balance Sheet using a term like "deferred liabilities" or "non current obligations", some readers may form the impression that this firm does not have loan creditors at all. A high error rate was expected for the question whether the firm had become more reliant on its loan creditors to which, strictly speaking the right answer would be "not sure," as is of course the case for the liquidity questions - if answers are based only on the Balance Sheet.

The Sources and Applications of Funds Statement Statement

The statement makes quite clear the increased reliance on loan creditors left obscure by considering the Balance Sheet

in isolation.

Debtors rise by slightly more than creditors (use of brackets on the statement to signify decreases in both assets and in liabilities will confuse some readers); borrowings fall, investments rise significantly and cash slightly. All of these suggest an improving liquidity, given the reasonable assumption that investments would mostly be securities or remortgagable property, and the firm should be viewed as "likely" to be able to pay its debts as they fall due even though balance sheet reinforcement of this judgment is deficient.

Rating -- Moderately Difficult

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Rating -- Moderately Difficult

L/LX Smith and Nephew

The Profit and Loss Account

Turnover and all levels of profits are up and no obscure or unusual narrative appears to confuse this simple picture.

The Balance Sheet

This Balance Sheet is probably the easiest to read in the entire set.

The asset base, current and liquidity ratios and the absolute level but not the relative level of long term creditors are all up. To answer the question about increased reliance on loan creditors taking care to check the change in relative as well as absolute dependence, the funds statement is needed - otherwise the ambiguity in the term "dependence" renders both yes and no answers arguably correct.

The Sources and Applications of Funds Statement Statement

Net borrowings are clearly shown as decreasing by 4.7 million and the fact that short term borrowings are included in the calculation of this figure is irrelevant to the question of increased reliance on *loan* creditors. This resolves the ambiguity in the Balance Sheet and there is now only one correct answer to the increased reliance question, namely "no".

Internally generated funds clearly cover expansions and

acquisitions though the latter were actually financed by shares.

The liquidity improvement already clear on the Balance Sheet is confirmed by the straightforward layout of the funds statement.

Rating - Easy

N/NX MITSUI

The Income Statement

The US $ translations in the far right column are irrelevant in anwering the questions, but obviously help American readers represented in the subject sample.

It is also important for subjects not to be distracted by the 1985 figures since the 85-86 trends are in some cases opposite to those in 86-87.

Gross trading profit, operating income and income "before income taxes and equity in earnings" are all down, but after tax income and group income inclusive of associates are both up (due to the lower tax and interest burdens and the increase in sundry income). All in all, it would be fairer to say the firm's policies are reducing rather than raising profits, as the factors causing the down-the-line increases are not the results of board decisions so much as loan maturity timing and taxation.

The Balance Sheet

The Balance Sheet follows the American marshalling order with cash as the top line of assets.

Net current assets are slightly down and the current ratio of unity is too low for liquidity to be assured. Taking liquid assets as the first five lines only of the current assets block (down to "Accounts") there is a small net decrease from the 3 billion odd in 1986 which is too small to cover the current liabilities in either year end, even after excluding the figure for "advances from customers" from the current liabilities. The firm cannot be said on this evidence to be able to pay its debts as they fall due. Referring back to the Income Statement this view is somewhat reinforced by the significant rise in provision for doubtful receivables coinciding with a significant *fall* in turnover.

The asset base has fallen a little but the relative asset composition has not changed much, the biggest relative change being the jump in marketable securities by nearly 80% to represent 0.5% (one two-hundredth) of total assets which is still not a material contribution to the overall asset structure.

Net long term debt has shrunk by some 50 billion yen while shareholders' equity has grown by over 32 billion so the firm has become less reliant on loan creditors both absolutely and relatively.

The Statement of Changes in Financial Position

Despite its SCFP title, this statement follows the British

sources and applications format, with a cash base. It takes some effort to sort through this overcrowded statement, which was, unfortunately, quite a usual situation for the Japanese reports in English reviewed for this research.

Since the asset base has shrunk and no major facilities or trade investment expansions appear to have taken place in the year, the meagre profit that was made could well be said to be capable of financing future growth.

The remarks made above about loan creditors and liquidity are confirmed in the SCFP but in a far harder to read format than applies on the Balance Sheet. Some readers will have their attention drawn to the massive increase in receivables exceeded however by the even greater increase in payables.

It was expected that subjects provided with the N (with) set would be outperformed, especially on speed, by the subjects provided with the NX (without) set.

Rating - Difficult

OA/OY **GOODYEAR**

The Income Statement

The clear and consistent picture is of rising sales and all levels of profits. An interesting aside is the line under the costs and expenses heading called "unusual items"

which, however, is too small to support suspicions of income smoothing.

The Balance Sheet

Current liabilities have gone down by only 5 million while current assets have gone down by 355 million and liquid assets are down by over 400 million, a story of deteriorating liquidity, but not a worrying one in the context of near unity liquid ratios and current ratios of over 1.5 in both years.

Long term debt is up by over 350 while equity is down by over 1100, so there is a marked increase in reliance on loan creditors.

The asset base has shrunk and the asset structure has changed not by very much but certainly by more than a little. Inventories, investments, long term accounts and deferred pension costs have all significantly risen against a background of other assets shrinking.

The Statement of Changes in Financial Position

The SCFP has a cash basis and *in fact is a simple cash flow statement per SFAS 95 in every respect bar the title.* (*PA* is also an SCF but rather a difficult one). The individual items are grouped by operating, financing and investing activities and with the sensible extra step of gathering dividends and forex adjustments outside of these three categories instead of arbitrarily assigning them to any one of them in the way the British ED 54 is proposing.

Profit is too small to fund capital expenditure but profit plus depreciation is big enough.

Long term debt shows a clear net increase in the financing block, but the liquidity changes are not so clear, as the change in payables seems to be swallowed in the "other items" figure in the operations block; while inventory and receivables changes are clearly stated. Nevertheless the SCFP is presenting a picture of enhanced liquidity in respect of all the items it does explicitly reveal.

All in all, most readers will find this format easier to handle than the older style formats, but it is regrettable that trade payables were obscured.

Rating - Moderately Easy

P/PX BROKEN HILL PROPRIETARY

The Profit and Loss Account

Profits are down by just under 10% although sales are slightly up.

The Profit and Loss Account is easy to read and contains no important items of an unusual description

The Balance Sheet

Share subscriptions receivable may be unfamiliar to some readers but the figure is not material to answering any of the questions. Similarly the figure for non current assets although just large enough to be material, changes too little over the two year ends to affect the answers to any of the questions by a reader who may have been confused by this particular term.

Working capital has improved and technical solvency would be seen by the application of the current or liquid ratios that most readers would use to answer the liquidity questions.

Loan creditors have increased by some 1.1 billion while shareholders funds have increased only one billion, so both absolutely and relatively the firm has become more reliant on its loan creditors over the year. However, the holding company figures give the opposite picture and the subjects were explicitly told to use group figures only.

The Statement of Sources and Applications of Funds

This is note 32 to the accounts in the original report but is presented to the subjects without drawing attention to its subordinate status in these particular accounts. Only group figures are given, so anyone answering the question using holding company figures from the main accounts would realize his error if he read the SSAF at all carefully.

The SSAF follows a sources and applications format with cash balances (including their equivalents) opening and closing the statement.

Loan capital of 950 odd was paid off but 2432 in new long term loans were raised, making the firm more reliant on loan creditors, as indicated above.

Working capital has increased but by enough to finance the 1.29 repayment of the maturing loan which is half the amount of the new loans raised. It was expected that only the most sophisticated readers would be able to work this out from the SSAF.

Rating - Moderately Difficult.

8.24 REMARKS ON FORMAT VARIATION

Many of the funds statements reviewed both used a sources and applications format and presented working capital changes in a confusing way that only distinguished current asset changes from current liability changes by the use of brackets rather than sub headings. This variation in numerical presentation could interact with information load in many subjects. Processing accuracy, in such instances, would only be partially explained by any main effects of information load even if the Pachella [1974] or Iselin [1988] explanations were otherwise adequate.

8.25 RAW DATA ON INFORMATION LOADS

In this subsection, the Iselin [1988] constructs of information load are operationalized; first, as totalled and

subtotalled rows on the account; second, as the total number of rows on the account; and third, as the number of columns. Accounting reports high in all three load measures, such as the set coded NX, would be more likely to evoke overload responses from subjects than reports low in all three measures such as the set coded LA.

The following tables first give the load measures for the type N reports (no funds statements), then the extra load carried by the type F sets (with funds statements).

TYPE N

ACCOUNT	TOTALS	ROWS	COLUMNS	NUMBERS
K	14	44	2	88
KZ	12	49	2	102
LA	10	35	1.5	41
LX	12	37	2	74
MX	14	38	4	108
NX	12	74	3	212
NY	13	35	4	134
OX	17	55	2	110
OY	12	53	2	124
PX	14	42	4	164
PY	15	52	2	104

TYPE F

INCREMENTAL LOAD FROM THE FUNDS STATEMENTS

ACCOUNT	TOTALS	ROWS	COLUMNS	NUMBERS
KX	7	26	2	52
KY	5	26	2	52
L	7	27	2	54
LY	7	27	2	54
M	6	31	2	62
N	5	32	4	128
NA	8	31	2	62
O	6	23	3	69
OA	4	25	3	75
P	11	59	2	118
PA	7	40	2	80

8.3 THE QUESTIONNAIRES

8.31 SOURCE OF THE QUESTIONS

It was not felt necessary to extend the scope of the questions used by Walker [1984] given the comprehensiveness of his literature search to extract the principal claims that have been made for funds statements. However, it was felt possible to refine some of the questions along the lines described next. First the Walker questions were assessed against the questionnaire criteria listed in Appendix G. Then they were sharpened up and piloted with Chinese colleagues. Here are the Walker questions with brief accounts of their review.

Throughout this subsection the Walker version of the question is given first followed by its equivalent in the present work and some brief remarks. Walker's questions are coded either c for calculation or j for judgment. This work's equivalents are coded y for yellow sheets and o for orange sheets, and can be viewed, as presented to subjects, in Appendix B.

c1 Has the firm raised new equity capital during the year covered by the report ?

y1 Has the business raised new equity capital in the financial year 1987 ?

The report could be said to 'cover' two years.

c2 Is the firm more heavily dependent upon external

borrowings than in the previous year ?

y2 Did the business finish 1987 more indebted to outside creditors than it was at end 1986 ?

The revision avoids the questions begged by the word "dependent" in Walker's version and enables trade creditors role in financing the firm to be included.

c3 Did the firm distribute a higher percentage of its profits in the last year than in the year before ?

y3 Has the business retained and ploughed back a higher proportion of its net earnings in 1987 than it did in 1986 ?

The revision specifies the relevant level of profits to be used in calculating the retention ratio change.

c4 Has the firm's liquid position deteriorated relative to what it was a year ago ?

y4 Has the business improved its ability to pay debts as they fall due (as shown by its net liquidity position) from the end of 1986 to the end of 1987 ?

This deliberately retains the fuzzily bounded concept of liquidity rather than specifying net working capital or net cash equivalents, since to define liquidity would be lead the responses in an experiment whose focus is the seriousness of such fuzziness in the concept liquidity and its allied construct, funds.

c5 Has the firm expended significant sums in the last year

on new investments or in replacing productive assets ?

y5 Has the business allowed its net investment in fixed assets, subsidiaries and associates to shrink in 1987: in other words, has the asset base of the business (excluding working capital and intangibles) fallen in monetary terms ?

The revision removes the subjectivity inherent in appraising what is 'significant.' Also it replaces a gross investment concept by a net one to simplify the calculation and to avoid the ambiguity of situations where large investments coincide with similar sized disinvestments.

j1 Are the firm's financing and investment policies likely to lead to increasing profitability ?

o1 Are the firm's financing and investment policies apparently creating greater profitability ?

The revision eases the judgment task by moving it from forecasting to reviewing.

j2 Has the composition of the firm's assets changed significantly during the last financial year ?

o2 Has the composition of the firm's assets changed much in 1987 ?

The revision reduces the ambiguity and subjectivity in j2 by substituting 'much' for 'significantly'. The marking scheme allowed for borderline cases to cope with the subjectivity inherent in 'much.'

j3 Would the firm be in a position to finance expansion of

its activities from internally generated funds ?

o3 At the end of 1987 did the firm appear to be able to finance its further growth from internally generated funds ?

The intent of these questions is that net asset growth is compared with net funds flow from operations. It involves assuming that depreciation is NOT a measure of asset shrinkage. It also involves assessing whether net funds flow result in a comparable increase in net working capital. As such, it is perhaps both the most important question of all ten and the most difficult. With hindsight the response task could have been eased by asking the question relative to the growth actually achieved by the firm, if any, rather than relative to an unpredictable further or future growth.

j4 Is the firm in a strong position to pay its debts as and when they fall due ?

o4 Is the firm likely to be able to pay its debts and commitments on time ?

The pilot test indicated problems with the meaning of "strong position" in this context, so the rewording was adopted and understood by the pilot subjects.

j5 Have there been any significant changes in the firm's gearing over the past financial year ?

o5 Has the firm become more reliant on loan creditors in 1987?

This change removes the ambiguity from the gearing

construct as to the appropriate parts of current liabilities, especially overdrafts, to be included.

8.32 CALCULATION ANSWERS

Summarised in this subsection are the answers to the "c" questionnaire items, based on the discussions in the preceding subsections. The question order is the order applicable to the questionnaires coded yellow.

1. Raised new equity in 1987 ?

No for OA OY NA NY O OX PA PY

Yes for KX L N PX MX KY

Not sure for LA [no 86 information given]

2. More in debt end 87 than end 86 ?

No for KX N KY NA NY O OX PA PY

Yes for L OA OY PX MX

Not sure for LA [no info for 86]

3. Higher retention ration 87 than 86 ?

No for KX L, N [must use the ff statement for this], PX NA NY

Yes for OA [must use the ff statement], KY LA MX O OX; PA and PY [of the loss]

Not sure for OY [no appropriation account]

4. Better net liquidity end 87 than 86 ?

No for KX [must use the ff statement], N OA OY PX KY MX O OX PA PY

Yes for L NA NY

Not sure for LA [no 86 information]

5. Investment in non current tangibles end 87 down on 86 ?

No for KX L PX MX O OX

Yes for N, OA [only slightly], OY KY NA NY PA PY

Not sure LA [no 86 information]

8.33 JUDGEMENT BASED QUESTIONS

ORANGE SHEET ORDER

1. Finance and investment creating greater profit ?

No for K P O PY

Yes for LX, NX [just], OY KZ LA LY M MX NY

2. Asset composition changed much ?

No for LX L O OX PA PY

No not much for K KX

No or not sure for N NX P

Not sure for PX LA and LY [insufficient analysis of assets]

Yes or not sure for KY KZ

Yes for OY M MX NY [but not very much]

3. Could firm finance growth from internally generated funds end 87 ?

No for K O PY

Not very likely for KZ [but no depreciation figure given]

Yes for LX NX OY P KY, and LY [ff statements needed for both], M and MX [just], NY

Not sure for LA [no 86 assets given]

4. Likely to be able to pay debts on time ?

No for NX [judged on working capital] M and MX [negative working capital] O

Yes for LX KZ KY LA LY NY PY

No or not sure for K [no working capital given]

Yes or not sure for P PX

5. More reliant on loan creditors in 87 ?

No for NX KZ KY LY [must use the ff statement] NY O PY

Yes for LX OY P M MX

Not sure for K [insufficient analysis of liabilities]

Not sure for LA [no 86 information on the Balance Sheet]

8.34 COLOUR CODE EQUIVALENTS

There were two sets of questionnaires in Walker's [1981] experiment, a calculation s et for the 'c' questions and a judgment set for the "j" questions. In the present experiments, each set was subdivided into three different question orders so as to minimize any order effects. "C" questions were presented in the original order on the yellow sheets and that order was rearranged, as shown in the table

below, on the green and dark blue questionnaires. "J" questions were presented in their original order on the orange sheets and rearranged on the pink and light blue sheets. Under the heading "orange" below are two columns of numbers. The right hand column shows the original j question order; the left hand column shows which c question on the yellow sheets is closely equivalent to the j question. For example, j 2 is closely equivalent to c 5, both concerning overal expansion or contraction of assets.

COLOURED SHEETS QUESTION EQUIVALENCE KEY

CALCULATIONS			JUDGMENTS		
YELLOW	GREEN	DARK BLUE	ORANGE	PINK	LT BLUE
c1	5	5	NIL; j1	5	5
c2	4	2	c5; j2	2	4
c3	3	1	c3; j3	1	3
c4	2	3	c4; j4	3	2
c5	1	4	NIL; j5	4	1

8.35 ANSWERS DEEMED ACCURATE

Column 1 gives the account code, column 2 the colour code as above (yellow or orange), and column 3 the 'model' answers to the 5 questions for that colour and that account for questions 1 to 5 respectively. This table was used for data entry into the statistical processing of responses for

accuracy.

K	O	nnnNp (N=n or p)	NA	Y	nnnyy
KX	Y	ynnnn	NY	O	yyyyn
KY	Y	ynyny	O	O	yyyyy
KZ	O	yYnyn (Y=y or p)	O	Y	nypny
L	Y	yynyn	OA	Y	nyyny
LX	O	nnyyy	OY	Y	nnynn
LA	Y	ppypp	OX	Y	nnynn
LY	O	ypyyn	OY	O	nnnnn
M	O	yyyny	P	O	npyYy
MX	Y	yyynn	PX	Y	yynnn
N	Y	yNnny	PA	Y	nnyny
NX	O	yNynn	PY	O	nnnyn

8.4 ADMINISTRATION OF THE EXPERIMENTS

8.41 RESEARCH DESIGN AND SYMMETRY

Campbell and Stanley's [1966] design paradigms are discussed in Appendix G. Using their terms, the treatment, X, is the provision of a funds flow statement. The observations, O, are the speed and accuracy of answers given in writing by subjects to question sheets about each of six companies' accounts. The assignment of subjects to treatments for any one company's accounts was random and was specifically aimed at "achieving pretreatment equality of groups within known statistical limits" as conceived by Campbell and Stanley [p6] (hereafter abbreviated to CS). Subgroups within a roomful of the loan officers of any one bank are thus equated by randomisation, and are represented in the CS convention by parallel rows unseparated by a dashed horizontal line. However, there is no such equivalence assumed between the groups from different banks, and the appropriate CS convention to depict such non

equivalence is the dashed horizontal line. Within any one banking delegation of subjects we have CS's design number six [CS 25/6], the posttest-only control group design whose form is as follows;-

R X O

R O.

Pretesting speed and accuracy before providing a funds flow statement, and then doing so for the same company's accounts after so providing, would only deliver a valid measure of the treatment effect if the subject were successfully hypnotised after the pretest to forget everything in the pretest accounts, before being presented with the same set of accounts plus a funds flow statement in the posttest.

CS's design 9, the equivalent materials design for minimising instrumentation and testing effects, has been incorporated into this research as far as possible, in the absence of pretests. Similar to design 9 is design 11, the counterbalanced design, where all non equivalent subject groups are exposed to all treatments in different orders, using a Latin square to ensure this. Both design 9 and design 11 rely quite heavily on the Latin square. There are two problems with this, both relevant to the present work. One is that the Latin square isolates one variable's main effects at the expense of increasing the risk that the

interactive effects of other variables will be masked.[CS 50/1] The other is the practical problem of happening to have exactly the right number of subjects to ensure cell equality in the ANOVA table generated by the square design. If this is not the researcher's happy situation, then either the slightly less powerful General Linear Model has to be used instead of ANOVA or else the data has to be "haircut" to fit the Procrustes bed of the Latin square specifications. This work tried both these strategic alternatives. To some extent, equality of cell frequencies affects all designs planning to use two way or multi way ANOVA, since it is only one way ANOVA that can tolerate unequal numbers in treatment groups. It is especially important when factorial designs (of which Latin squres are an important subset) are employed, since perfect counterbalancing is the whole point of factoriality.

It was decided that the question of intergroup comparability did not fit into the CS scheme with precision. In particular, their design 10, the pretest - posttest control group design with its relatively strong defences against selection contaminants, could not be used because of its dependence on the availability of an appropriate pretest.[CS p48]. It was considered meretricious to argue that it was legitimate to assume all subjects pretested at zero before exposure to funds statements. Intergroup speed differences would be suggestive of selection-maturation interaction, as would the tendency of any one group to show a large deviation from the grand mean in its use of the

response "not sure". In the end, it was considered best to see each group as conforming to a design 6 specification as described above, whilst between group comparisons shed light on the external validity of the sampling and of the results for the whole population of Hong Kong bank lending officers. This view is tenable given that the total population of such people is unlikely to exceed 250, according to the senior managers of the local banks with whom discussions were held at the outset of the empirical phase.

After reflecting on the question of symmetry, it became clear that a negative outcome could occur even with relatively sophisticated users because of the way in which the information was processed rather than because the information itself itself was useless. Fortunately, this does not change the instrumentation, accounts materials or subject administration which was then well under way. Already inside the data capturing process was the evidence to support or refute an information overload explanation. Thus, positive outcomes would suggest funds statements did what the literature claimed they should do, while negative outcomes would mean one or more of the following rival explanations applied to Hong Kong lenders:-

a) the addition of funds statements to income and position statements creates information load so serious that it masks any information content the funds statement might possess;

b) cultural and linguistic difficulties not apparent in conversation or in the subjects' handling of income and

position statements, which they handled frequently in their jobs, might mean that learning curve effects had not been fully realised for interpreting funds statements;

c) the funds statements presented in the two sequences were too complicated or variable in format or content to represent well the general population of funds statements prepared within the Anglo-American paradigm, or,

d) the design was insufficiently controlled against contamination by extraneous variables.

8.43 FACTORIALIZING THE ACCOUNTS ASSIGNED

If we characterize accounts with funds statents as being type F and those with no statements as type N; then, in the listing shown in the next paragraph, all the letters are type F and all the numbers are type N. The listing shows all the possible combinations of the six type f reports presented three at a time with the six type N reports presented three at a time.

These are the possible combinations;-

ABC 456	A23 4EF
AB3 45F	A23 D5F
AB3 4E6	A23 DE6
AB3 D56	1B3 4EF
A2C 45F	1B3 D5F
A2C 4E6	1B3 DE6
A2C D56	12C 4EF
1BC 45F	12C D5F

1BC 4E6	12C DE6
1BC D56	123 DEF.

The same assignment rules apply to the three variates of the c question sheets coloured yellow, green and dark blue and the three variates of the j sheets coloured orange, pink and light blue.

Full factoriality requires all 20 accounts combinations be paired with all 20 question combinations, making 400 matches for each of the two sequences. Since the question sheet variations are merely to avoid order effects in the question sequencing, it was judged more important to exhaust the accounts combinations than the question sheet ones.

8.44 COMPANY ASSIGNMENTS TO SUBJECTS

This subsection lists the combinations of accounts presented to subjects and indicates how many subjects received each combination. Main sequence accounts were presented to 52 subjects, second sequence accounts to 64 subjects, the difference being the result of forgetting to bring along a main sequence set to one particular small group sitting.

MAIN SEQUENCE

Combination of Accounts	Recipients
KY LY M NY OX PY	2
KY LY MX NY OX PA	5
KY LY MX NY O PY	2
KY LY MX NA OX PY	2
KY LA M NY OX PY	2
KY LA M NY O PY	5
KY LA M NA OX PY	2
KZ LY M NY OX PA	2
KZ LY M NY O PY	2
KZ LY M NA OX PY	2
KY LA MX NY O PA	2
KY LA MX NA OX PA	2
KY LA MX NA O PY	2
KZ LY MX NY O PA	2
KZ LY MX NA OX PA	5
KZ LY MX NA O PY	2
KZ LA M NY O PA	2
KZ LA M NA OX PA	2
KZ LA M NA O PY	2
KZ LA MX NA O PA	5

[TOTAL OF 20 COMBINATION SETS EACH CODE PRESENTED 10 TIMES TO 2 OR 5 SUBJECTS]

SECOND SEQUENCE

Combination of Accounts	Recipients	
KX L M NX OY PX	3	
KX L MX NX OY P		10
KX L MX NX OA PX	2	
KX L MX N OY PX	3	
KX LX M NX OY P	2	
KX LX M NX OA PX	2	
KX LX M N OY PX	2	
K L M NX OY P	2	
K L M NX OA PX	2	
K L M N OY PX	3	
KX LX MX NX OA P	2	
KX LX MX N OY P	2	
KX LX MX N OA PX	2	
K L MX NX OA P	2	
K L MX N OY P	2	
K L MX N OA PX		5
K LX M NX OA P		5
K LX M N OY P		5
K LX M N OA PX		5
K LX MX N OA P	3	

[20 COMBINATION SETS, EACH CODE IN 10 SETS].

8.5 CONTROL OF CONTAMINANTS

8.51 SELECTION

There was no readily detectable selection bias between the groups on educational, racial or other lines. However, such differences in result as there were could be attributable to such a bias. A pretest to establish accounting knowledge would have been necessary to gauge any such bias. In the absence of such a pretest, it is unsafe to assume low F scores on ANOVA are sufficient evidence of no selection bias.

8.52 INSTRUMENTATION AND MATERIALS

Equivalence of instrumentation materials is assumed between the main sequence set of accounts and the second sequence. The criterion validity of this assumption is at least suggested by the lack of significant differences;-

a) between the scores of the groups using main sequence from the scores of those using second sequence, and

b) between the scores of the two groups on the M accounts which are common to both sequences. (This does not mean the non M accounts are therefore equivalent, but rather that the differences expected but not found in (a) above are unlikely to be due to selection, instrumentation or their interaction with other contaminants on the single matter of materials content of the sequence sets). In discussing order effects it is assumed that subjects completed the questions in the order set. Visual inspection of the subjects by the

researcher and his assistants in each group seemed to support this assumption. It is implausible but not impossible that one or two subjects answered the questions in the same conceptual order each time rather than in the same presentation order. Were this unlikely practice to have been general, then order instrumentation testing interactions might have contaminated the results.

8.53 EXTERNAL VALIDITY

Moving on to broader issues, it is assumed that the set of accounts well represents the types of funds statements the lending officers would encounter in making their lending decisions. The bias of the officers against accounts prepared in Hong Kong was so great, however, that local accounts had to be excluded from the presentations to ensure the subjects took the exercise seriously. The price paid for this is that the foreign accounts do not in fact fully represent the local ones that the officers would normally be dealing with, albeit with considerable scepticism.

The officer sample read three pages in roughly the same time, six minutes, that it took Walker's sample to read 9 pages. This suggests that language represented a significant barrier to comparability with officers in other countries, *except for the failure of the 21 expatriates in the various groups to perform significantly faster or better than their Chinese colleagues.*

8.54 OTHER ASPECTS OF VALIDITY

Testing hypotheses of information content of accounting reports involves assumptions about the ability of a sample of subjects to recognize that content. Post test debriefings cast some doubt on that assumption's credibility for a sizeable number of cases, possibly for as many as one third of all the subjects.

Most sessions were conducted after a full day's work. This means history and maturation may have depleted the mental energy of some subjects. This may explain the rather low accuracy performance in some cases, but the relative paucity of extreme outliers on either the accuracy or speed dimension renders it unlikely that either contaminant was a major factor, unless one can believe that they affected very different groups in a remarkably consistent manner. No obvious signs of fatigue were observed during any of the experiments. Conversely, none of the learning effects noticed by Walker appeared with the Hong Kong sample. These remarks anticipate the content of the next chapter which records the experiments' results and the statistical analysis thereof.

CHAPTER 9 THE RESULTS

9.1 INTRODUCTION

9.2 PROCEDURES

9.3 STATISTICAL ANALYSIS

9.4 CONCLUSIONS

CHAPTER 9 THE RESULTS

9.1 INTRODUCTION

In this chapter the main patterns in the results are described and discussed. Brief justifications of the statistical tests used to test the hypotheses are given. Only the most important descriptive and inferential statistics are presented in this chapter. A more detailed and extensive exploration of the descriptive statistics is to be found in Appendix D. A detailed and extensive survey and rationale of the inferential statistics is to be found in Appendix E.

The two dependent variables measured were the time taken to answer each questionnaire on each account by each subject and the accuracy of those answers. The previous chapter summarized the rationale for measuring accuracy, and a more detailed discussion of the marking scheme can also be found in Appendix G. Actual answers given were input into the Statistical Analysis System (SAS) data set creation routines. The raw responses were mostly either "yes" or "no" with the occasional "not sure" or blank. A transformation routine matched each answer with the model answer and then awarded marks of between minus 5 and plus 8, depending on the straightforward accuracy in most contexts, but also on the difficulty or ambiguity of the question in the fuzzier or more obscure contexts. This approach to accuracy differs from that reported by Walker [1984] who was content with a bipolar assessment whereby yes or no answers were either

right or wrong in all contexts. This is partly because his accounts selection included a criterion of equal difficulty, whereas the present study employed the opposite criterion of varied difficulty. In addition, he used "not sure" responses as reliable indicators of "confidence", whereas the present study interpreted them as meaning;- "evidence available in the accounts is too little, too noisy, too fuzzy or too complex to permit a crude yes or no answer to be appropriate." Such an interpretation of the "not sure" response does not preclude the source of dissatisfaction with the evidence being subject lack of confidence, boredom, overload, laziness or inability to read SCFPs generally. With so many possible interpretations of the "not sure" response, it was judged invalid to ascribe one reason systematically to it in the way Walker ascribed "confidence." Finally, on this point, there were one or two contexts where the right answer, under almost any reasonable assumptions at all, was "not sure". Perhaps in something of a reaction to Walker's treatment of this response, the marking scheme adopted here awarded plus 8 to any correct "not sure" answer, whereas in normal cases, the maximum for a correct answer was plus 5. It was correspondingly decided not to measure or represent confidence at all.

Walker's speed and accuracy hypotheses are reproduced below.

H1 There is no difference in the time taken by readers of annual reports to assess a firm's position and prospects

when they are given financial statements which (a) include funds statements and (b) do not include funds statements.

H4 There is no difference in the accuracy achieved by readers of annual reports when assessing aspects of a company's financial position and performance when those readers (a) are provided with funds statements and (b) are not provided with funds statements.

The present work tested those same hypotheses. Walker's H2 concerned the effect of providing an SCFP on consensus, and this was not replicated. It was judged that accurate consensus would be reflected in the accuracy figures while inaccurate consensus has too many rival explanations (other than the superficially appealing one of systematic bias arising from the uselessness of the account in question). The rival explanations include experimenter error in deciding what is "accurate"; difficulties arising from the particular example of the SCFP or other type of account selected rather than from such accounts in general - especially when accounts have been matched for equality of difficulty; and the leading (or misleading) nature of the question asked.

Walker's H3 related to confidence, and that was judged to be not validly or reliably testable, and not particularly worth testing in the first place.

It was decided to attempt to determine if the different banks, as reflected in their sample groups, showed significantly different information processing profiles. This was something Walker reported on for his different sample sets, but did not establish any testable hyypothesis on the

subject. If groups show systematic differences in their processing, then models like the DPH might offer helpful explanations, and, more importantly, interactive effects between the provision of SCFPs and the cognitive style of subjects receiving them could be isolated. This would shed light on the unresolved question of whether different accounting needs exist for different users, but the users would be differentiated by cognitive style, rather than by whether their decision was of an investment rather than a lending nature. The hypothesis tested in this case was the null hypothesis that sample groups show no significant differences either in speed or accuracy of their accounts processing behaviour.

The claims made for the superiority of the SCF over the SCFP have been discussed in Chapters 5 and 6. It was decided to pilot test these claims using one SCF in both the main and in the second sequence set. The null hypothesis tested was that no significant difference exists between SCF and SCFP results in either the speed or accuracy dimensions.

Instrumentation reliability tests consisted of the null hypothesis of no significant differences between speed or accuracy results as between the members of the following pairs:

a) the set of main sequence accounts and the set of second sequence accounts, and

b) one order of questions and either of two alternative orders.

Finally, it was judged of interest to deepen the analysis by testing a hypothesis derived from the information overloadstudies reviewed in Chapter 7, and Iselin's work seemed the most pertinent. The hypothesis tested was the null hypothesis that measures of information load show no systematic relationship to either speed or accuracy results for any account.

9.2 PROCEDURES

Walker tested his speed and accuracy results using non parametric tests of significance and association, particularly chi square, Fisher's exact probability test and the Wilcoxon test. This present study tested its results data rather more extensively, as is detailed in Appendix E which also discusses the criteria by which the statistical tests were selected. The Wilcoxon, Median, Kruskal-Wallis and Kolmogorov-Smirnov tests were chosen from the arsenal of non parametric tests to gain a preliminary view of the normality of the speed and accuracy distributions across groups, accounts and questionnaires, as well as to do a first pass test of the null hypotheses relating to speed and accuracy. Speed was correlated with accuracy across groups, accounts and question types, to see if the R squared was big enough to support the view that any systematic relationship existed between speed and accuracy. Given the robustness of ANOVA (Analysis of Variance) to most departures from non normality, the parametric ANOVA tests in SAS were then

applied with corrections for cell size inequalities. However, because of the possible distortions arising from cell size inequalities, the data was also subjected to the General Linear Model's (GLM) ANOVA which directly manages cell size inequality through its employment of the type three sum of squares. Very little difference was found between the results of the pure ANOVA and the GLM ANOVA, indicating the relative unimportance of cell size inequality in this study. As part of the GLM ANOVA procedure, the experimentwise error rate was held to 5% using Scheffe and other multiple comparison tests detailed in Appendix E. Finally, regression was performed of speed and of accuracy on every reasonable operationalization of Iselin's information load constructs. It was noted that the results of these different tests were mutually supportive.

9.3 STATISTICAL ANALYSIS

9.31 NOTE ON INTERPRETATION

The significance tests are all concerned with the question of whether the different instances of speed or accuracy in each set are more than 95% likely to have come from the same population of groups, accounts, colours, question types or account types. The Ho in each case is that they have, but we must reject the Ho whenever the number given after "Pr>#" [# is any test statistic] is below 0.05. Such situations are marked *** in the tables below.

9.32 THE SCFP's EFFECT ON PROCESSING SPEED

This subsection contains summaries of the results of tests of significance of the differences between the speed results of the different groupings of subjects, accounts and question types. The null hypothesis in every case is that no such difference would be found. For an explanation and justification of each particular inferential test used, see Appendix E. For a summarized discussion of the test results in this subsection, see sub-subsection 9.325.

9.321 Analysis of Variance for Variable SPEED

Classified by Variable TYPE OF ACCOUNT

TYPE	N	Mean	Among MS	Within MS
			170.317	4.142
N	341	5.839		
F	341	6.839	F Value	Prob > F
			41.118	0.0001***

9.322 NONPARAMETRIC TESTS

Wilcoxon 2-Sample Test (Normal Approximation) (with Continuity Correction of .5)
S= 101053 Z= -5.98563 Prob > |Z| = 0.0001
T-Test approx. Significance = 0.0001***

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 35.830 DF= 1 Prob > CHISQ= 0.0001***

Median 2-Sample Test (Normal Approximation)
S= 138.000 Z= -4.97431 Prob > |Z| = 0.0001***
Median 1-Way Analysis (Chi-Square Approximation)
CHISQ= 24.744 DF= 1 Prob > CHISQ= 0.0001***

Kolmogorov-Smirnov 2-Sample Test (Asymptotic)
KSa = 2.52727 Prob > KSa = 0.0001***

9.323 GLM SPEED GROUPINGS

Tukey, Bonferroni, and Scheffe's experimentwise error tests for speed by acount type all show the two types to be signicantly different with type F at 6.866 and type N at 5.813 minutes of processing time.

9.324 GLM ANOVA ON SPEED

(Model tested was speed=account nested in type of account)

Key to column headings

IND VAR	Independent variables	Pr>F	Probability of >F
DF	Degrees of freedom	T1MS	Type 1 Mean Square
T3MS	Type 3 Mean Square	T1F	Type 1 F Value
T3F	Type 3 F Value	RSquare	

IND VAR	DF	T3MS	T3F	Pr>F	T1MS	T1F	Pr>F	RSquare
Type***	1	37.86	12.15	0005	189.09	60.71	0001	
Accont***21		35.57	11.42	0001	35.32	11.34	0001	
Typ*Acc	1	6.57	2.11	1470	6.57	2.11	1470	
Model***	23	40.75	13.08	0001				3138
Error	658	3.11						

Conclusion; 31.30% of the speed variation is explained by account type and account difficulty.

9.325 DISCUSSION OF THE ABOVE RESULTS

All the tests show the provision of funds statements significantly increased processing time, but the GLM ANOVA indicates that other factors than account type explained 68% of the increment in time taken - see, in particular, the analysis of results by sample group in the section after next.

9.33 THE SCFP's EFFECT ON PROCESSING ACCURACY

This subsection reports the summarized results of the accuracy tests in the same order as subsection 9.32 above reported the speed tests. This time, however, brief comments

are given on each individual test, in order to assist the reader to weigh the importance of the slightly positive but inconsistent results on processing accuracy of providing readers with a funds statement.

9.331 DESCRIPTIVE SUMMARY BY ACCOUNT TYPE

A/C	SPEED				ACCURACY		
	MEAN	SD	MIN	MAX	MEAN	SD	N
N	5.81	1.76	1.43	13.35	3.40	1.10	341
F	6.87	2.26	2.58	16.13	3.48	1.05	341

Remarks; This summary shows type F is much slower but slightly more accurate in the responses elicited from the subjects in this study.

9.332 ANOVA BY ACCOUNT TYPE

TYPE	N	Mean	Among MS	Within MS
			0.8446	1.1576
N	341	3.4047		
F	341	3.4751	F Value	Prob > F
			0.730	0.3933

Remark; This supports the previous remark, since the slight difference of accuracy in favour of the type F report has nearly a 40% probability of occurring randomly.

9.333 NONPARAMETRIC TESTS

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)
S= 115463 Z= -.404692 Prob > |Z| = 0.6857
T-Test approx. Significance = 0.6858

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.16394 DF= 1 Prob > CHISQ= 0.6856

Median 2-Sample Test (Normal Approximation)
S= 38.0000 Z= -1.58278 Prob > |Z| = 0.1135
Median 1-Way Analysis (Chi-Square Approximation)
CHISQ= 2.5052 DF= 1 Prob > CHISQ= 0.1135

Kolmogorov-Smirnov 2-Sample Test (Asymptotic)
KSa = 0.536088 Prob > KSa = 0.9361.ls 2

Conclusion: No test finds any significant difference between them as regards accuracy.

9.334 GLM ANOVA ON ACCURACY

Key to column headings

IND VAR Independent variables Pr>F Probability of >F

DF Degrees of freedom T1MS Type 1 Mean Square

T3MS Type 3 Mean Square T1F Type 1 F Value

T3F Type 3 F Value RSquare

IND VAR	DF	T3MS	T3F	Pr>F	T1MS	T1F	Pr>F	RSquare
Type	1	0.06	0.06	8082	0.99	0.92	3388	
Account***21***		3.03	2.80	0001	3.52	3.25	0001	
Type*Account		1.34	1.24	2655	1.34	1.24	2655	
Model***	23	3.31	3.06	0001				0.0967
Error	658	1.08						

Conclusion: only 9.67% of the variation in accuracy is explained by account difficulty and virtually none at all by account type. This suggests that the provision of funds

statements has a negligible effect only in accuracy of accounts processing.

9.335 THE INDIVIDUAL ACCOUNTS

This subsection lists all the accounting reports by their code letters, the number of processed observations, summary speed and accuracy figures, and, in the two far right columns, the correlation coefficient between speed and accuracy and its associated probability of being due to random factors.

CORRELATIONS OF SPEED WITH ACCURACY BY INDIVIDUAL ACCOUNT

Abbreviations

Mn Mean SD Standard Deviation Sp Speed Ac Accuracy

L = lowest accuracy score H = highest

ID	N	MnSp	SDSp	MinS	MaxSp	MnAc	SDAc	L	H	Rho	Pr>R
K	35	6.36	2.00	2.65	11.65	3.14	1.50	0	5	+0.20227	2439
KX	29	8.42	2.40	2.97	15.58	3.72	0.70	3	5	+0.16603	3894
KY	24	7.31	2.36	3.35	14.60	3.58	1.32	0	5	-0.10997	6090
KZ	26	7.75	2.19	2.98	13.35	3.69	0.93	1	5	-0.09372	6488
L	34	6.18	1.17	3.02	8.20	3.29	1.00	1	5	+0.10068	5710
LA	26	5.52	1.55	2.92	8.90	2.23	1.48	0	5	-0.24497	2278
LX	30	4.53	1.07	2.25	6.38	3.77	0.78	2	5	+0.00172	9928
LY	24	6.17	1.37	3.55	8.37	3.96	1.08	1	5	+0.20787	3297
M	55	5.83	1.67	2.58	10.97	3.45	1.03	1	5	+0.02471	8579
MX	58	5.35	1.34	1.43	8.63	3.57	1.01	1	5	+0.08371	5321
N	36	8.42	3.13	3.52	16.13	3.83	0.91	2	5	+0.26895	1127
NA	25	7.07	1.22	5.03	9.85	3.24	0.88	2	5	-0.01029	9611
NX	28	6.22	1.62	2.08	8.65	3.43	1.07	1	5	+0.24752	2041
NY	25	5.95	1.32	3.72	8.70	3.64	0.81	2	5	-0.25180	2247
O	26	5.82	0.51	4.80	6.85	3.62	1.06	0	5	+0.32459	1057
OA	*30*	*9.10*	*2.39*	*5.10*	*14.55*	*3.20*	*1.19*	*1*	*5*	*+0.15831*	*4034*
OX	24	4.79	0.56	3.62	5.83	3.54	0.59	2	5	-0.05685	7919
OY	34	6.25	2.24	2.10	11.55	3.50	0.79	2	5	+0.28294	1049
P	32	6.04	1.73	2.50	11.42	2.97	1.15	1	5	-0.03733	8393
PA	*27*	*5.24*	*1.32*	*2.92*	*7.73*	*3.48*	*0.89*	*1*	*5*	*+0.14350*	*4752*
PX	31	5.91	1.36	3.18	7.82	3.39	1.17	1	5	+0.15071	4184
PY	23	6.03	1.87	2.92	9.88	3.35	0.93	2	5	+0.45902	0276***

Conclusion: no significant correlation except Account PY at +46% This result makes PY an outlier among the other type F accounts and among the accounts generally, suggesting the possibility that it alone has a funds statement worth spending extra time studying. The other possibilty, that the 2.76% chance of this high a correlation is merely

coincidental, cannot be rejected at this stage, since the experimentwise error rate is not controlled go through the Scheffe, Sidak etc procedures.Before that happens, any one result significant at alpha = 5% is only to be expected with more than ten account groups even under purely random distributions of the speed and accuracy variables.In fact PY remained an outlier throughout the Scheffe and other groupings controlling the experimentwise error rate.

9.34 DIFFERENCES BETWEEN SAMPLE GROUPS

This subsection summarizes the descriptive and inferential statistics for the different subject groups. The descriptive statistics are included because the inter group differences on speed and accuracy are so great that they could be argued to dominate the inter account, inter type or inter question differences - in many cases. In this situation it is helpful to know as much as we can about the speed and accuracy distributions of the different samples of subjects.

9.341 SAMPLE GROUP SPEED DIFFERENCES

GROUP	N	Mean	Fast Rank	Slow Rank
K Fastest	72	5.916	1	13
B	120	5.919	2	12
E	60	5.939	3	11
A	46	6.178	4	10
F	36	6.176	5	9
G Median	42	6.265	6	8
I	90	6.397	7	7
H	30	6.678	8	6
C	36	6.731	9	5

J	36	6.759	10	4
D	42	6.881	11	3
M	30	7.047	12	2
L Slowest	42	7.110	13	1

Remarks: The 341st fastest response is the median response and it lies inside Group G whose mean speed was 6.2654. The grand mean speed was 6.3390. Interpolation, on the assumption that group means are reasonable approximations of group medians, gives the group F mean as the overall 316th fastest observation, and the group G mean as the 355th, leads to the grand median calculated thus.

Median = 6.17639 + (7/21=1/3) of (6.26547-6.17639=0.08908)

Mean = 6.20608.

This result is sufficiently far away from the grand mean of 6.3390 to render it unsafe to assume the speed distribution across all subjects is normal. The median of the group means is group I not group G and the distribution appears to be slightly skewed with there being more slow outliers than fast ones.

9.342 ACCURACY BY GROUPS

GROUP	N	Mean	Best Rank	Worst Rank
L Best	42	4.1192	1	13
K	72	3.8333	2	12
I	90	3.6777	3	11
G	42	3.6190	4	10
M	30	3.6000	5	9
E	60	3.5833	6	8
J	36	3.4722	7	7
A	46	3.4347	8	6
F	36	3.3333	9	5
H	30	3.2333	10	4

D	42	3.1190	11	3
C	36	2.9722	12	2
B Worst	120	2.9416	13	1

Remarks: Using the same reasoning about medians as was described above for speed, we have J both as the median group and as the group containing the grand median. The grand median is calculated by interpolation to be 3.44492. This compares with a grand mean for accuracy of 3.440. The closeness of median and mean suggests the possibility that the accuracy distribution is symmetrical, a necessary but not sufficient condition of normality. This time it is not so much skew that precludes normality being assumed as kurtosis, with group B's 120 responses lifting the left hand tail of the distribution with their massed inaccuracy.

9.343 DISTRIBUTION MOMENTS BY SAMPLE GROUP

This sub-subsection lists the main moments of the speed and accuracy distributions for each sample group. The first moment, central tendency, is given by the mean and the median. The second moment, dispersion, is represented by the standard deviation and its associated coefficient of variation. The third moment, skewness, is given by the coefficient of skewness with brackets indicating negative skew. The fourth moment, kurtosis, is given by its coefficient, with numbers higher than 2.0 indicating high peakedness or leptokurtosis relative to a normal distribution and brackets indicating platykurtosis or relative flatness.

NOTE: In all the rows following, a * in the right hand column means that the probability that such a distribution as is shown on the row could have come from a normal population distribution is GREATER than 5%.

All the tables below have the same column headings and CV means the coefficient of variation (SD/Mean).

SPEED

ID	N	MEDIAN	MEAN	SD	CV	SKEWNESS	KURTOSIS	
A	46	5.20	6.18	2.99	48.39	1.569	2.718	
B	120	5.54	5.91	2.57	43.43	1.244	2.202	
C	36	7.13	6.73	2.28	33.88	(0.036)	(0.280)	*
D	42	6.21	6.88	2.62	38.13	1.658	2.977	
E	60	5.86	5.93	1.32	22.26	0.246	(0.390)	*
F	36	5.94	6.17	1.26	20.41	0.130	(0.689)	*
G	42	6.15	6.26	1.39	22.12	0.599	0.775	*
H	30	6.40	6.67	1.87	27.97	1.417	2.655	
I	90	6.13	6.39	1.94	30.37	1.075	2.342	
J	36	6.75	6.75	1.36	20.06	0.202	0.289	*
K	72	5.73	5.90	1.50	25.33	0.328	(0.536)	*
L	42	6.90	7.11	2.24	31.48	0.539	(0.239)	*
M	30	6.67	7.04	2.00	28.35	1.266	2.020	

ACCURACY

ID	N	MEDIAN	MEAN	SD	CV	SKEWNESS	KURTOSIS
A	46	4	3.43	1.05	30.47	(0.97)	1.61
B	120	3	2.94	1.12	37.99	(0.43)	(0.10)
C	36	3	2.97	1.11	37.28	0.19	(0.40)
D	42	3	3.12	1.11	35.55	(0.25)	(0.45)
E	60	4	3.58	1.01	28.28	(0.79)	0.47
F	36	4	3.33	1.21	33.64	(1.49)	1.68
G	42	4	3.62	1.15	31.68	(0.92)	0.52
H	30	3	3.23	1.10	34.15	(0.33)	(0.58)
I	90	4	3.68	0.95	25.72	(1.02)	1.96
J	36	3.5	3.47	1.00	28.79	(0.56)	0.57
K	72	4	3.83	0.92	23.98	(1.22)	2.20
L	42	4	4.12	0.63	15.36	(0.70)	2.22
M	30	4	3.60	1.00	27.87	(0.40)	0.16

Remarks: The possibility of so many of the speed distributions being normally distributed is unexpected but not necessarily significant in any sense. No such possibility applies to the distribution of accuracy scores.

9.344 ANOVA BY GROUP

Analysis of Variance for Variable SPEED
Classified by Variable GROUP

GROUP	N	Mean	Among MS	Within MS
			9.500	4.294
H	30	6.678		
L	42	7.110	F Value	Prob > F
I	90	6.397	2.212	0.0100
C	36	6.731		***
A	46	6.178		
B	120	5.919		
D	42	6.881		
J	36	6.759		
M	30	7.047		
E	60	5.939		
K	72	5.916		
F	36	6.176		
G	42	6.265		

9.345 NONPARAMETRIC TESTS

SPEED

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 33.708 DF= 12 Prob > CHISQ= 0.0007***

Median 1-Way Analysis (Chi-Square Approximation)
CHISQ= 22.812 DF= 12 Prob > CHISQ= 0.0294***
ACCURACY

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 78.566 DF= 12 Prob > CHISQ= 0.0001
Median 1-Way Analysis (Chi-Square Approximation)CHISQ=
22.436 DF= 12 Prob > CHISQ= 0.0329***

9.346 ANALYSIS OF VARIANCE FOR VARIABLE ACCURACY

CLASSIFIED BY SAMPLE GROUP

GROUP	N	Mean	Among MS	Within MS
			6.889	1.054
H	30	3.23		
L	42	4.11	F Value	Prob > F
I	90	3.67	6.534	0.0001
C	36	2.97		***
A	46	3.43		
B	120	2.94		
D	42	3.11		
J	36	3.47		
M	30	3.60		
E	60	3.58		
K	72	3.83		
F	36	3.33		
G	42	3.61		

9.347 CORRELATION BY SAMPLE GROUP

Abbreviations

Mn Mean SD Standard Deviation Sp Speed Ac Accuracy

[Min Acc = 0 to 2 and Max Acc = 5 for all groups]

ID	N	MnSp	SDSp	Min	Max	MnAc	SDAc	Rho	Pr>R
A	46	6.18	2.99	2.25	16.13	3.44	1.05	+0.13818	3598
B	120	5.92	2.57	1.43	15.58	2.94	1.12	+0.11696	2033
C	36	6.73	2.28	2.10	11.65	2.97	1.08	-0.03621	8339
D**	42	6.88***	2.62	3.37	15.05	3.12	1.11	+0.34148	0269
E	60	5.94	1.32	3.05	8.90	3.58	1.01	+0.13930	2885
F	36	6.18	1.26	3.73	8.72	3.33	1.12	-0.07882	6477
G	42	6.27	1.38	3.63	10.47	3.62	1.15	-0.03354	8330
H	30	6.68	1.87	3.83	12.57	3.23	1.10	+0.06579	7298
I	90	6.40	1.94	2.45	13.88	3.68	0.95	+0.05872	5825
J	36	6.76	1.36	3.80	10.18	3.47	1.00	-0.09045	5998
K	72	5.92	1.50	3.35	9.63	3.83	0.92	+0.04834	6868
L	42	7.11	2.24	3.33	12.55	4.12	0.63	+0.19518	2155
M	30	7.05	2.00	4.58	13.35	3.60	1.00	-0.06049	7508

Conclusion: no correlations significant except 34% positive for group D. This result makes the group D subjects outliers and exceptions in that only they appeared to benefit systematically in terms of accuracy scores from spending more time studying accounts generally, and from studying type F (with funds statement) accounts in particular.

9.348 **GENERAL CONCLUSION**

Systematic speed and accuracy differences exist between the sample groups. The null hypothesis is therefore rejected, and the interpretation of the results of this entire experiment is obliged to circumscribe any conclusions to be drawn about funds statement usefulness by drawing attention to the primary role played by the interpretative ability of

the reader.

9.35 INSTRUMENTATION EFFECTS

This subsection looks at the statistical evidence for the two null hypotheses of no significant difference between the main and second sequences of accounts combinations or between the three variations of question order.

9.351 THE SEQUENCE SETS

Speed	Mean	SD
Main	6.55	1.31
Second	6.06	0.85

Acccuracy	Mean	SD
Main	3.44	0.25
Second	3.45	0.40

Conclusion: the sequences are reliably equivalent overall, since differences between the two sequence's means are much exceeded by their standard deviations.

9.352 QUESTIONNAIRE COLOUR SUMMARY MEASURES

CLR	SPEED			ACCURACY			
	*R	MEAN	SD	*R	MEAN	SD	N
DB	4	6.54	2.02	4	3.44	1.01	124
GR	3	6.23	1.53	1	3.61	1.07	093
LB	1	5.87	2.09	5	3.31	1.91	124
OR	6	6.84	2.52	3	3.51	1.06	124
PI	5	6.63	2.04	2	3.57	0.99	094
YE	5	5.96	1.98	6	3.27	1.09	123

*R is rank under speed and accuracy, respectively.

Remarks: The gap between the fastest and the slowest and the gap between the most and least accurate are both well inside

the standard deviations of each of the four extreme mean values. The slight suspicion of systematic order effects raised by the poor showing of yellow on both speed and accuracy is confined within the more important observations of the previous sentence.

9.353 SUMMARY STATISTICS FOR QUESTIONNAIRE TYPE

A/C	SPEED----------				ACCURACY--		
	MEAN	SD	MIN	MAX	MEAN	SD	N
C	6.25	1.89	2.45	15.58	3.43	1.06	340
J	6.43	2.28	1.43	16.13	3.45	1.09	342

Remarks: The differences between means is far outweighed by the sizes of the standard deviations, so it would appear that the two question types produce roughly the same effects on speed and accuracy.

All the significance tests show that the mean accuracy for the judgment scores at 3.4532 is not significantly different from the mean score for the calculation questions at 3.4265.

9.354 CORRELATION BY COLOUR OF QUESTION SHEET

Abbreviations

Mn Mean SD Standard Deviation Sp Speed Ac Accuracy

L = lowest accuracy score H = highest

ID	N	MnSp	SDSp	Min	Max	MnAc	SDAc	L	H	Rho	Pr>R
D	124	6.54	2.02	2.70	15.58	3.44	1.01	1	5	-0.13853	1249
G	93	6.23	1.53	2.65	10.90	3.61	1.07	0	5	-0.09177	3816
L	124	5.87	2.09	1.43	14.90	3.31	1.19	0	5	+0.20854	0201***
O	124	6.84	2.52	2.98	16.13	3.51	1.06	0	5	+0.09544	2917
P	94	6.63	2.04	2.10	14.55	3.57	0.99	1	5	+0.19297	0624***
Y	123	5.96	1.98	2.45	13.88	3.27	1.09	0	5	+0.15186	0936

Conclusion: Significant correlations were found of +20% for the light blue and pink question sheets. Since no such significance is found for the other colours in either the calculation or the judgment group, the possibility of systematic order effects is unexpectedly raised by this result. After all, the whole point of presenting three different orders of presentation for each question sheet was to mitigate any order effects. It seems that the very act of varying the order created its own order effects, since the original question order shown in the yellow and orange sheets showed no significant correlations of speed with accuracy. This result implies that there is a particular arrangement of questions that is able to reward extra time spent answering with improvements in response accuracy. A further implication is that some question combinations have a particular permutation which is optimally robust in resisting the deleterious effects of time pressure. It is possible, though, that the correlations are just spurious.

9.36 THE PERFORMANCE OF THE SCF

The statistics in this subsection shed light on the null hypothesis of no significant difference in either the speed or accuracy dimensions between SCFs and SCFPs. The two SCFs are coded OA and PA and are from different sequence sets. Sub-subsection 9.361 gives summary speed and accuracy statistics by Account, to give a preliminary view of how OA and PA perform against the SCFPs. It will be observed that "easy" main sequence PA had the 3rd best speed and 12th best accuracy, but "moderately easy" second sequence OA had the worst speed of all the Accounts and the fourth worst accuracy.

9.361 SUMMARY OF THE CONTEXT

A/C	SPEED----------			ACCURACY------			
	RANK	MEAN	SD	RANK	MEAN	SD	N
K	16	6.36	2.00	20	3.14	1.50	35
KX	20	8.42	2.40	4	3.72	0.70	29
KY	18	7.31	2.37	8	3.58	1.32	24
KZ	19	7.75	2.19	5	3.69	0.93	26
L	13	6.18	1.17	17	3.29	1.00	34
LA	5	5.52	1.55	22	2.23	1.48	26
LX	1	4.53	1.07	3	3.77	0.77	30
LY	12	6.17	1.37	1	3.96	1.08	24
M	6	5.82	1.67	13	3.46	1.03	55
MX	4	5.35	1.34	9	3.57	1.01	58
N	21	8.42	3.13	2	3.83	0.91	36
NA	22	7.08	1.22	18	3.24	0.88	25
NX	14	6.22	1.62	14	3.43	1.07	28
NY	9	5.95	1.32	6	3.64	0.81	25
O	7	5.83	0.51	7	3.62	1.06	26
OA	*22*	*9.10*	*2.39*	*19*	*3.20*	*1.19*	*30*
OX	2	4.79	0.56	10	3.54	0.59	24
OY	15	6.25	2.24	11	3.50	0.79	34
P	11	6.04	1.73	21	2.97	1.15	32
PA	*3*	*5.24*	*1.32*	*12*	*3.48*	*0.89*	*27*
PX	8	5.91	1.36	15	3.39	1.17	31
PY	10	6.03	1.87	16	3.35	0.94	23

Remarks: LX, OX and *PA* are the fastest and only *PA* of those is type F, specifically SCF. However all the 3 slowest, *OA*, N and KX are type F. Under the accuracy scores, the three best are LY, N and LX and only LX of those is type N. The 3 worst are LA, P and K and only K is type F. There appears to a slight tendency for type F Accounts to take longer to process and for them to produce slightly more accurate results than type N Accounts. This is shown in exaggerated tones by the LA/LY pair: the type F member being the

overall best of all Accounts for accuracy whereas the type N member is the overall worst. This split is an interesting similarity to the C/J split for the OA SCF. It is possible that there is some set of characteristics possessed both by accounts LA/LY and account OA that produces extreme reactions of the kind that might be susceptible to catastrophe theory modelling in future.

9.362 SPEED DISTRIBUTION MOMENTS

ID	N	MEDIAN	MEAN	S D	C V	SKEW	KURTOSIS
F	341	6.417	6.839	2.260	33.04	1.28	2.63
N	341	5.700	5.839	1.782	30.52	0.64	1.08
OA	30	9.058	9.102	2.391	26.27	0.40	(0.30)
PA	27	5.050	5.243	1.324	25.26	0.20	(0.62)*

9.353 ACCURACY DISTRIBUTION MOMENTS

F	341	4	3.475	1.050	30.22	(0.60)	0.11
N	341	4	3.405	1.101	32.34	(0.87)	0.45
OA	30	3	3.20	1.19	37.07	(0.02)	(0.84)
PA	27	4	3.48	0.89	25.65	(1.16)	1.13

Remarks: Very little accuracy differences between types F and N are apparent, but F takes longer and has twice the positive skew and leptokurtosis as N. The SCFs are outliers.

9.364 CORRELATION OF SPEED WITH ACCURACY FOR THE SCFs

ID	N	MnSp	SDSp	MinS	MaxSp	MnAc	SDAc	L	H	Rho	Pr>R
OA	30	9.10	2.39	5.10	14.55	3.20	1.19	1	5	+0.15831	4034
PA	27	5.24	1.32	2.92	7.73	3.48	0.89	1	5	+0.14350	4752

Conclusion: no significant correlation.

9.365 GENERAL CONCLUSION

We can see that the SCF *OA* performs extremely badly relative to the SCFPs but the SCF *PA* does well enough. We cannot on this preliminary evidence support the optimism expressed in ED 54 about the user friendliness of the SCF compared to the old funds statements.

9.37 INFORMATION LOAD EFFECTS

9.371 CORRELATIONS OF SPEED WITH ACCURACY

9.3711 CLASSIFIED BY QUESTION TYPE

Significant correlations at 5% alpha are shown by ***

	Calculation Questions Only		Judgment Questions Only	
Statistic	Speed	Accuracy	Speed	Accuracy
N	340	340	342	342
Mean	6.247	3.427	6.431	3.453
Std Dev	1.892	1.060	2.277	1.092
Minimum	2.450	0.0	1.433	0.0
Maximum	15.583	5.0	16.133	5.0
Pearson's Rho	minus 0.00399		plus 0.17276	
Ho Prob > Rho	0.9416		0.0013	

Conclusion: virtually zero correlation between speed and accuracy within either the judgment or the calculation responses. This fails to support the Pachella [1974] overview described in section 7.3 where speed increases were said to be associated with accuracy decreases, especially when speed was emphasized as in the present experiments.

9.3712 CORRELATION ANALYSIS BY TYPE OF ACCOUNT

	Type F Only		Type N Only	
Statistic	Speed	Accuracy	Speed	Accuracy
N	341	341	341	341
Mean	6.866	2.263	5.813	3.402
Std Dev	2.263	1.050	1.764	1.101
Minimum	2.583	0.0	1.433	0.0
Maximum	16.133	5.0	13.350	5.0
Pearson's Rho	plus 0.09894		plus 0.07724	
Ho Prob > Rho	0.0680		0.1547	

Conclusion: some insignificant positive correlation between speed and accuracy within both types of account, but the hypothesised correlation was negative.

9.372 **GENERAL CONCLUSION**

None of the models, such as Pachella's [1974], relating accuracy to processing speed is supported in these results. Either accuracy in accounts processing is independent of speed for accounts users - even under the explicit and deliberate time pressure subjects endured in the present study; or else any such relationship as may exist was muffled by stronger effects from other sources of variation, not least from ability differences between subject samples.

9.373 INFORMATION LOAD REGRESSIONS ON ALL CUES

Regression of speed on accuracy

Constant		2.223342
R Squared		0.002511
R	0.050111	
X Coefficient(s)	0.045817	

Regression of speed on all cues

Constant		5.139780
R Squared		0.065548
R	0.256024	**
X Coefficient(s)	0.007766	

**significance of between 0.1% and 1%

Regression of accuracy on all cues

Constant		155.4398
R Squared		0.000125
X Coefficient(s)	-0.40361	

Conclusion: Speed is affected by the number of cues, since speed has been measured as time taken to process one set of accounts. If instead speed had been measured, with more construct validity, as time taken to process one cue, then speed would have probably been constant, whilst time taken to process one accounts set would have increased in proportion to the increase in the number of cues in the set.

9.374 ABSOLUTE INFORMATION DIVERSITY

Iselin [1988] renamed the number of dimensions or classifications in a data set "absolute diversity". Three alternative operationalizations of "dimension" in this sense are possible with a set of final accounts;

i) the number of columns used for different years, or for parent as opposed to group results,

ii) the number of rows, since every row of numbers fits a common narrative alongside and to the left of the numbers, or,

iii) the number of times rows are totalled or subtotalled, on the basis that every such event should create a meaningful summary and integration of the aggregated figures, into such meaningful dimensions as "current assets", "funds arising from operations", and so forth. Intuitively, this operationalization of the construct 'dimension' seemed most promising to test the Iselin view that absolute diversity is the primary factor operative in producing information load effects on processing accuracy. However, the results below do not support such a view.

Regression of speed on columns

Constant	2.344269
R Squared	0.004423
R	0.066512
X Coefficient(s)	0.019868

Regression of speed on totalled blocks

Constant	15.68429
R Squared	0.004948
R	0.070344
X Coefficient(s)	0.134228

Regression of accuracy on totalled blocks

Constant	16.90991
R Squared	0.004072
R	0.063813
X Coefficient(s)	-0.13473

Regression of speed on 1/columns

Constant	0.455119
R Squared	0.007047
R	0.083949

X Coefficient(s) -0.00405

Regression of accuracy on 1/columns

Constant	0.427915
R Squared	0.000126
R	0.011263
X Coefficient(s)	0.000595

Regression of speed on 1/rows

Constant	0.022868
R Squared	0.073423
R	0.270968**
X Coefficient(s)	-0.00077

**significance of between 0.1% and 1%

Regression of accuracy on 1/rows

Constant	0.017820
R Squared	0.000364
R	0.019087
X Coefficient(s)	0.000059

Regression of accuracy on columns

Constant	2.484778
R Squared	0.000314
R	0.017727
X Coefficient(s)	-0.00579

Conclusion: Absolute diversity has no significant effect on accuracy and the Iselin view is not supported.

9.375 RELATIVE INFORMATION DIVERSITY

Iselin divided total cues by number of dimensions to obtain what he termed the relative diversity of an information set.

Regression of speed on rows/cues

Constant	0.146330
R Squared	0.060006
R	0.244963 *
X Coefficient(s)	-0.00414

*significance of between 1% and 2%

Regression of accuracy on row/cues

Constant		0.120037
R Squared		0.000000
R	0.000380	
X Coefficient(s)	0.000007	

Again, there is no effect on acuracy of variations in relative diversity and another Iselin view is not supported.

9.376 REPEATED DIMENSIONS

By the term "quantity of repeated dimensions", Iselin means the number of times a dimension is mainifested in various data points after the first such manifestation. It is the total cues less the number of dimensions in a data set.

Regression of speed on cues less rows

Constant		54.75859
Std Err of Y Est		51.15550
R Squared		0.055586
No. of Observations		682
Degrees of Freedom		680
R	0.235768	*
X Coefficient(s)	5.921573	
Std Err of Coef.	0.936004	

*significance of between 1% and 2% but with such a large standard error for the Y estimate, the significance of the significance is trivial

Regression of accuracy on cues less rows

Constant		92.92116
R Squared		0.000081
R	0.009050	
X Coefficient(s)	-0.24861	

Yet again, accuracy scores are unmoved by the Iselin constructs.

9.377 INFORMATION LOAD CONCLUSIONS

Regression of speed on cues less rows,

Regression of speed on rows/cues,

Regression of speed on 1/rows, and

Regression of speed on all cues ;

are the only significant information load results. This study, therefore, lends no support to any of the main information load paradigms that relate speed to accuracy. The tendency for more data (cues) to take more processing time, and thus to show slower processing speeds per accounts set, is scarcely surprising. That the number of rows in an accounting statement seems to carry more significance as an information dimension than the number of totallled blocks (such the current asssets block) or than the number of colums (comparative figures) is of rather more interest. It suggests accounts are read line by line with no systematic skipping between block totals, and raises the possibility that present block totalling and block heading patterns are not seen by users as simplifying the task of accounts interpretation. "Funds" represent a rather clear illustration of just such a failure of arithmetic aggregation to represent the outward manifestation of conceptual integration.

9.4 CONCLUSIONS

9.41 SUMMARY OF CONCLUSIONS

1. Funds statements not only do not speed up the processing of accounts; they slow it down quite significantly.

2. Funds statements sometimes improve the accuracy of accounts processing but not very significantly.

3. Different groups of bank officers vary considerably in both speed and accuracy of processing. Nonetheless,the patterns of accounts difficulty persist across sample groups and across account types although modified in the latter case by the specific difficulties of some funds statements.

4. The two SCFs, OA and PA, do NOT do consistently better than the traditional funds statements as regards both speed and accuracy. Rather, just like the SCFPs, their effects on performance seems to reflect their overall clarity or obscurity, and insufficient standardization is apparent in the new SCFs to control this to the point where most SCFs could be expected to show faster times and greater accuracy in processing by readers than was shown by the old SCFPs.

5. With the exception of two questionnaire colours, no persistent instrumentation effects (of colour, question order or question type) are consistently displayed; nor does there seem to be much difference in performance between those presented with main sequence accounts from those presented with second sequence accounts. This suggests that both the accounts and the question papers are reasonably

reliable tests of accounts processing ability (but not, of course, that they are necessarily valid tests of such ability - that has been argued in Chaper 8 and Appendix G).

6. No information load model was supported, since speed failed to vary with accuracy, and none of Iselin's measures of information load showed effects on accuracy and the effects on speed were not really effects but rather tautologies.

9.42 BRIEF DISCUSSION

The statistical processing has failed to refute many of the null hypotheses listed in section 9.1. However,

[i] there do appear to be order effects for sheets coloured pink or light blue;

[ii] speed is adversely affected by the provision of funds statements; and

[iii] major differences exist between the sample groups in both the speed and the accuracy dimensions. The accounts sequences are roughly equivalent, the c and j scores likewise.

We have seen that SCF OA performed badly relative to other SCFPs but SCF PA did reasonably well. We cannot on this very preliminary evidence, support the optimism expressed in ED 54 about the user friendliness of the SCF compared to the old funds statements.

The most important conclusions, however, concern the two key Walker [1984] hypotheses of speed and accuracy. Funds

statements have a significantly adverse effect on processing speed and a negligibly positive effect on accuracy, but both these main effects are very strongly mediated by the characteristics of the subjects themselves.

CHAPTER 10 CONCLUSION

10.1 THE HYPOTHESES SUPPORTED AND REFUTED

10.2 LIMITATIONS OF THE RESEARCH

10.3 IMPLICATIONS OF THE RESULTS

10.4 POSSIBILITIES FOR FUTURE RESEARCH

10.5 CONCLUDING REMARKS

CHAPTER 10 CONCLUSION

10.1 THE HYPOTHESES SUPPORTED AND REFUTED

This section reviews the results of the empirical investigation and contrasts the extent to which the different hypotheses found support from the results of the statistical tests described in the previous chapter.

1. The SDS Hypothesis, that information load increases have inverted U effects on speed and accuracy.

Decision: Not supported, but no evidence was captured on the left hand side of the hypothesised inverted U, and it was certainly shown that information load increases processing time but not processing INaccuracy.

There is an implication for the SDS Extension; - i e that higher task complexity causes greater use of simplifying strategies and heuristics.

Comment on the Extension; This is rejected in some cases where large processing time increments were associated with the presentation of funds statements, but supported in others where the relative deterioration in accuracy associated with a below average increase in processing time - suggesting either heuristics or relative indifference to the requirements of accuracy. In short, the validity of this proposition depends too heavily on the mediating effect of subject personality for it to be supported in the form stated.

2. The Iselin Repeated Dimensions Hypothesis - More information in dimensions already presented to the reader does not add to information causing overload symptoms.

Decision: Not supported. If SCFPs really only rearrange BS and P&Ls, then they do not constitute new dimensions; yet they do seem to cause the overload symptom of slowed down processing time.

However, - Pachella's overview proposed that large differences in error rate could be associated with small differences in speed, especially at high levels of accuracy.

Decision: Reject. No such association was detected.

3.Iselin's conjecture - more dimensions of information cause decreases in accuracy.

Decision: Not supported. Difficulty seemed to have more to do with obscurity of presentation and novelty of terms rather than increments to information dimensions per se.

4. Possibly as a result of the cultural gap between the UK and Hong Kong, investors and lenders in the territory do not attach much importance to local accounting reports.

Decision: This was assumed in the experimental design but was only pilot tested rather than fully tested, so supporting evidence here is merely anecdotal.

Hong Kong banks have little confidence in financial statements produced by clients.

Decision: Anecdotally supported (see section 8.2)

5. The SCFP improves accuracy in predicting financial distress.

Decision: Not supported by performance on the liquidity and solvency questions, but not falsified entirely as some instances of accuracy improvement did occur.

6. Direct format SCFPs lead to more accurate solvency judgments than indirect formats do.

Decision: No evidence available, as firms overwhelmingly avoid the direct format. Not one of the thousand or so accounts read in 1986 and 1987, prior to the experiment, used the direct format. This suggests that the direct format is seem by firms as significantly more costly to present than the indirect format in terms of both time costs and perhaps also information value. If that last factor is a general explanation, this would support the agency theory paradigm of disclosure. It would suggest that allowing firms to use indirect formats either in the SCFP or, as ED 54 proposes, in the SCF, represents a real agency cost to shareholders and creditors generally.

7. Funds flows are better than cash flows in ex ante discriminating failed from unfailed firms.

Decision: Somewhat supported, given the failure of OA or PA accounts to evoke higher accuracies than the traditional SCFP sets of accounts; although, of course, the present study was not focussed on failure prediction or discriminant

analysis thereof.

8. (Walker's H1) There is no difference in the time taken by readers of annual reports to assess a firm's position and prospects when they are given financial statements which (a) include funds statements and (b) do not include funds statements.

Decision: Rejected, but from the opposite tail of the distribution from that expected by SCFP defenders in the literature. Most subjects took significantly more time to read accounts that included funds statements than to read those that excluded them. The claim that funds statements speed up processing time, perhaps by simplifying financial messages, is refuted in the Hong Kong banking context by the results of this study.

9. (Walker's H4) There is no difference in the accuracy achieved by readers of annual reports when assessing aspects of a company's financial position and performance when those readers (a) are provided with funds statements and (b) are not provided with funds statements.

Decision: Supported as shown in the previous chapter.

10.2 LIMITATIONS OF THE RESEARCH

10.21 INTERNAL VAILIDITY

Absence of pretests avoids contamination by history, maturation and selection interacting with maturation to a great extent, but it greatly increases the bias associated with non random selection of groups. Factorial assignment of account type and question type within each group avoided the within group dangers of selection bias, but between group selection bias remains a potent threat to the meaningfulness of the reported speed and accuracy scores. A pretest, had it been possible to devise an appropriate one and been possible to administer it, would have enabled gain scores to have been computed or analysis of covariance to have been performed.

Another selection effect that could apply to the present work is the possibility of significant differences in intra group competitiveness. At one extreme, the identity of the subject finishing earliest may have been irrelevant to the remaining subjects. At the opposite extreme, it may have had a marked effect on the speed with which the remainder of subjects in a sample tackled their work. It is simply not known if this contaminant of selection interacting with subject sensitivity to competition affected the results.

The provision of 3 permutations of the question sheets was supposed to reduce the contamination of any one permutation's order effects. To the extent that order

effects are present for any one permutation, the assumption that instruments are equivalent and thence reliable is untenable. In this work there does seem to be the presence of unwelcome order effects shown with the slowness of the pink permutation of j questions and the speeding up effect of the dark blue permutation of the c questions. It is unknown why those particular permutations should have had those particular effects, but it is speculated that some subjects were better able to answer a question quickly if it drew on evidence searched in answering the previous question. Perhaps the pink permutation was relatively devoid of such linkages whereas the dark blue permutation was relatively well endowed with them - ex post, at least. It was not detected ex ante that such linkage effects existed, and it is only a conjecture ex post that they may have been perceived by some subjects.

Selection may not be a contaminant only for groups, but the accounts themselves could also have been biassed. Indeed, their selection was made on subjective assessments of external validity, which implies a willingness to pay a price in terms of internal validity selection bias. Inclusion of insurance accounts, funds statements oriented to construction costs rather than working capital or cash, and accounts where the previous year's figures had not been printed - these would delay processing times for almost any conceivable sample of accounts users. While there may be no explicitly evidenced reason to suspect the difficulty of

these accounts affects the type F to type N comparisons, there could have been selection-treatment interaction whereby the *specific* difficulties of these accounts confound the effects of their funds statements through predisposing subjects to confusion in a way that might not have happened with other accounts.

10.22 EXTERNAL VALIDITY

The representativeness of the subjects has been discussed earlier, in chapter 8. They were probably a majority of the practitioners of all Hong Kong bank credit analysts, with non response bias being rather unlikely to skew the results. It is less clear that they represent the world wide population of bank credit analysts very reliably, and that is not claimed. To the extent that they may be believed to represent worldwide accounts users - which they may be thought to do to a greater extent than the Australians and New Zealanders of previous studies - the implications for **either** funds statement usefulness **or** users' accounting literacy are grave. This sample represent overseas investors in the sense that all the accounts they processed in the experiments were foreign. Finally, it might be a little too easy to assume that the question of domestic accounts' credibility domestically is a phenomenon unique to Hong Kong in the financial centres of the world.

As regards the external validity of the accounts themselves, more scientific ways of handling this aspect than this work employed can be envisaged with hindsight. The

long list could have been stratified by difficulty and clustered by style and format. Stratified random cluster sampling of the resultant arrangement of reports would have considerably strengthened the external validity claims of the research and reduced the possible internal validity contamination arising from selection and its interactions. However, that rests on the assumption that the long list was itself representative of the worldwide generality of published accounts, and that claim would itself be most difficult to establish.

The very name experiment implies a sacrifice of external validity. This work's experimental setting of colour coded accounts and questions, of analysts trying to speed through the same sets of accounts in an hour after work in almost examination conditions - none of this represents real world analytical settings very closely. Collective wisdom was not allowed to operate, whereas most banks have credit committees and what one analyst on such a committee misses, another may often pick up. This committee effect exemplifies the operation of the Lens Model's composite judge, whereby collective processing accuracy tends to exceed individual processing accuracy. In short, it is most unlikely that important credit decisions based on accounts would be done at quite such low accuracy levels as were shown by the individuals (acting individually) in this study. However, this study provides absolutely no empirical basis for supposing that the wisdom provided by more

knowledgable members of credit committees to their less gifted colleagues includes the information content of funds statements.

10.23 STATISTICAL AND METRIC VALIDITY

More rigid management of assignment of accounts combinations within both the main and second sequences would have avoided the unbalanced data problem, but the general linear model would still have to have been used for inter group analysis as their sizes were outside of experimental control. The non normality, asymmetry and non mesokurtosis of the sampling distributions has been shown not to prejudice ANOVA real alphas very much (less than 5% either way per Scheffe [1959 p394] i e alpha remains within the boundaries 0.0495 and 0.0505). Scheffe summarized his findings thus:

> "With respect to the probability of type 1 error, we can safely conclude that the ANOVA assumption of normality is of almost no importance. It can be violated, and the probability of a type 1 error remains almost exactly at the value specified by the experimenter, namely alpha." [Scheffe 1959 p372].

If it were not for the requirement of homoscedascity (equal variances), ANOVA could almost be used as a distribution free test. In fact, if sample sizes and variances are both unequal, then the larger the overall number of observations, the greater is the *leftward* shift of the F ratio distribution, which causes the actual alpha to go *below* the nominal one [Glass and Stanley 1970 369-

374].

The Kruskal-Wallis nonparametric equivalent of ANOVA produced results so essentially similar to the ANOVA and GLM_ANOVA results in this work that it may have been unnecessary to have taken the statistical analyses quite as far as was done in Appendix E. Many books and articles (e g Blalock 1984) decry the ease with which copious and often obscure statistics are easily produced by modern computing software. To this the rejoinder germane to the present work is twofold. First, less than 15% of the statistical output actually produced from the raw data input into SAS was thought important enough to include in this thesis or its Appendices. Second, it is not accurate to view a full capability package like SAS as being anywhere near so easy to learn and to drive as familiar user friendly spreadsheets like Lotus 1-2-3. The annual SAS user group worldwide conferences are still regularly publishing tutorials and explanations of such basic aspects of the package as its macros, which suggest that even regular users find its undoubted ability to handle any statistical problem means it is far from user friendly. In short, using SAS is not a soft option. It was chosen for this study in preference to SPSS, Minitab and the other accessible statistical and spreadsheet packages because of its comprehensiveness. For example, the other packages do not produce type III sums of squares for unbalanced GLM ANOVA with the clarity and directness that SAS does, nor do they offer such a comprehensive choice of multiple comparison

techniques for controlling the experimentwise type 1 error rate. What remains supportable in the reservations of such as Blalock [1984] is the folly of thinking a statistical package is a substitute for adequate expertise in the selection and interpretation of statistical tests.

The problem posed by the metric for accuracy was discussed in Appendix G and Chapter 8. It is not difficult to award marks for calculation based questions, but much more difficult to do so validly and reliably for judgment based questions. It is arguable that the question of whether a firm's policies are leading to greater profitability is insufficiently evidenced from a mere set of accounts to enable us to judge any possible answer as wrong. Conversely, it can be argued that this question simply addresses the issue of whether the firm has or has not made more monetary profit this year than last year. Then, we cannot assume that current ratios and liquid asset ratios and their changes are sufficient evidence to every reasonable person of a firm's ability to pay debts as they fall due. Some might want to claim that ability to fund short term debts with new long term loans is just as important to a growing firm. To put it another way, we cannot assume that generally accepted accounting interpretation principles are all that generally accepted by users or that they have full content or even face validity. In such a situation it is sensible to treat 'accuracy' score results as having only limited construct validity. Perhaps, however, enough construct validity has

been captured for the accuracy results to be at least suggestive that funds statements do not greatly aid the achievement of whatever it is that 'accuracy' really comprises.

The discrete nature of the accuracy distribution compared with the continuous nature of the speed distribution is not a major problem for meaningful analysis, except for the SAS version of the Kolmogorov-Smirnov tests. However, speed is real whereas accuracy is constructed, hence artificial. Accuracy scales are man made; processing times suffer no such instrumentation bias. Moreover there is both an upper and a lower bound on accuracy results, whereas processing time only has the lower bound of zero but no natural upper bound. In the strictest sense, the two dependent variables are incommensurable, and no attempt to build a composite index of speed and accuracy was attempted. Just possibly, two separate sets of experiment would have been more rigorous, one concerned only with the effects of funds statements on speed, the other only with effects on accuracy.

10.3 IMPLICATIONS OF THE RESULTS

10.31 REVIEW OF HYPOTHESES CONSIDERED

The most important of Walker's findings were replicated in the very different context of Hong Kong; namely, that any incremental information content funds statements may possess is not demonstrated consistently at the level of the

individual credit analyst. This is easily taken as support for the replacement of the statement by something that more accounts users will be able correctly to understand more readily. It is very far from clear that the SCF is going to turn out to be that something, especially under the indirect format. However, it may well also be the case that any new statement will only yield up its expected benefits if accompanied or preceded by an effective campaign of user training in the purpose and implicit messages of the new statement. We have seen how the biggest R squared attributable to variations in types of pieces of paper presented to analysts was no better than 50% for either speed or accuracy. This means up to 50% or so of the variation in both of the dependent variables has to be explained by factors intrinsic to the users rather than factors intrinsic to accounting and question documents but extrinsic to the users. The relatively poor accuracy performance of analysts even with the familiar balance sheets and profit and loss accounts suggests the problem resides not exclusively in formats, measurements and disclosures, but that user education represents a hitherto strongly underestimated element. After the experimental session with group B, one of the worst performers of all the groups, the participants were exposed to a two hour seminar on the messages intrinsic to funds statements. It was only too evident that most of what was presented was new (and also, fortunately, interesting) to most of the subjects. In

short the hidden contaminant of the present research, possibly applicable to Walker's and certainly to Bradbury and Newby's research in this field, was user ignorance of how to assemble accounting report lines and paragraphs into a coherent story. Many analysts rely mechanistically on ratios and spreadsheet outputs, very much in the style of the DPH's concretes, so the wood is not detected subsuming the trees. Perhaps as a result, functional fixation on earnings and reliance on the chairman's cheerleading essays in the annual report has become rather prevalent.

Another major implication of the results of this research is the importance of clear presentation. While accounting standards theorists and practitioners have spent many person-years standardizing and trying to harmonize disclosures and measurement policies for virtually all the items on the final accounts of business enterprises, the presentation of the numbers themselves has not been addressed. It would seem feasible and reasonable, however, that agreement could more readily be obtained on when numbers should be bracketed than on how fictitious assets should be expensed. It would certainly be more fruitful on the evidence of this present study. Accountancy centres on numbers, but the accounting standard on their acceptable, desireable or even generally accepted mode of presentation has yet to appear anywhere in the world, according to published evidence as at end 1990. This issue is particularly serious for statements of changes, irrespective of what is puportedly changing. If we take as an example a 5

million increase in receivables accompanied by a 3 million increase in payables, we will find in real world accounts examples of all the following presentations and more besides.

1. Increase in receivables 5
   less
   Decrease in payables 3
   Increase in working capital 2

2. Increase in receivables 5
   Add
   Decrease in payables (3)
   Change in working capital 2

3. Change in receivables less payables 2

4. Decrease in payables less receivables (2)

5. Increase(decrease) in receivables 5
   Increase(decrease) in payables (3)
   Increase(decrease) in working capital 2

6. (Increase)/decrease in receivables (5)
   (Decrease)/increase in payables 3
   (Increase)/decrease in working capital (2).

It is suggested that the above variations may well be a

more significant barrier between the preparers and users of accounts than most variations in disclosure or measurement practice so far addressed in the literature of accounting standards. It is not clear when or why accounts preparers first decided or assumed that readers should be capable of algebraic addition, but such is the necessary assumption behind the judgment that the above variations are not a problem. They were for Hong Kong bank analysts, as evidenced both by performance in the experiments and explicitly reported in the post session debriefings.

The final major implication of the results of the present study is that information load or overload is not yet well understood, nor yet operationalized into accounting based measures that could provide rigourous tests of the principal models in the field, especially those consonant with the Pachella overview. This study has shown no significant association between processing time and processing acccuracy except for one sample group and one sample account and then only mildly. Tests should be conducted that grasped the nettle offered by the DPH, and pretested subjects for their cognitive placement on the abstract - concrete continuum. A subsequent administration of the experiment used in the present study could well show an association of information load effects with this particular dimension of cognitive style. The present study has shown the need to look more closely at user characteristics, before venturing any generalizations about accounts usefulness. In that sense, it can be said to have supported the specific

accounts for specific users school of accounting rather than the general purpose statement school. To some extent, however, such support is an artefact of the research design itself, which implicitly assumed lenders looked for different things in accounts from what equity investors would seek. The equity - lender difference need not have the slightest association with the abstract - concrete difference and it would be astonishing if a systematic association were found. It would be fascinating to search for such an association, however, and it is quite important for designers of accounting formats to have available considerably more information about the cognitive styles of their users than they have currently. We still tend to design and discuss accounts prescriptively, implicitly seeing accounts readers as patients rather than as customers, but we have not done a particularly effective job in convincing them we know what's good for them.

10.4 POSSIBILITIES FOR FUTURE RESEARCH

Two of the most important accounting nations, the UK and the USA, have decided to replace funds statements by cash flow statements. Neither used published experimental findings in making that decision. Walker's Australians, Bradbury and Newby's New Zealanders and the Hong Kong Chinese and expatriates of the present work may not necessarily triangulate the funds statement processing behaviour of their American or British equivalents. In

particular, it is probable that Anglo American bank credit officers have more extensive accounting training and a greater regard for the role of accounts in making loan decisions. Therefore, it is important that this work be replicated in equivalent British and American banking settings.

It is also important to conduct speed and accuracy tests of the SCF against its predecessor SCFP using common source final accounts data, to discover whether the SCF has significant incremental information content. It would have been even better to do so before ED 54 and SFAS 95, even at the cost of sacrificing external validity through inventing fictitious results for fictitious companies.

It is important to research the most effective means of presentation of numerical information without preconceptions as to what readers can and cannot do arithmetically; +and to do this research as a precondition of standardizing such presentation.

There is much work still to be done around the world by way of surveying user confidence in locally produced and audited accounts. The users' perception of accounts may well be less trusting than the efficient market academics and the accounting practitioners assume, but may be less cynical than Watts & Zimmerman or the "critical perspectives" school seem to suppose.

The pioneering work of Iselin on information load and dimensionality has strong cautionary implications for increments in accounting disclosures, as did the earlier

musings of Fertakis and others. This field is right for strictly controlled experimental settings where accounting students are a not unreasonable proxy for older decision makers in the real world. As things presently stand, we simply do not know what a generally acceptable definition of accounting information overload would be for the principal user groups in the principal industrial countries. If we are genuinely concerned with capital market efficiency, then we should encourage research on the overload question. The present study's results *tentatively suggest* that difficult accounts and most instances of SCFPs - and even SCFs - may represent such overload, but that overload is more a matter of the subject's cognitive style than it is of the document's inherent clarity or volume of signals.

10.5 CONCLUDING REMARKS

In conclusion, this study has shown that the incremental information of funds statements to credit analysts is rather slight. The conclusions by Walker and by Bradbury and Newby to this effect have been supported rather strongly.

The informational improvements promised by the SCF are not supported by the results of this study, albeit that there is insufficient evidence to take a robust position on the matter.

Attention has been drawn to the underrated importance to the information content of the mode of numerical presentation. It has been argued that lack of

standardization diminishes the information content of accounts in general and of change statements in particular.

Finally, it has been indicated that the information load paradigm has promise for future research on the information content of accounting reports. This study shows an increase in processing time without a significant increase in processing accuracy when funds statements are added to the accounts users' information set. The existing information load paradigms were not very helpful in understanding this result once the attempt was made to test hypotheses arising from those paradigms. Nonetheless, information load studies do seem likely to be fertile in providing effective design improvements to future writers of accounting standards.

END OF VOLUME ONE

APENDICES ARE IN VOLUME TWO

REFERENCES ARE IN APPENDIX H

Thesis title **THE USEFULNESS OF FUNDS FLOW STATEMENTS: AN EMPIRICAL STUDY OF HONG KONG BANKS' LOAN OFFICERS' USE OF PUBLISHED COMPANY ACCOUNTS**

Submitted by **GABRIEL DOUGLAS DONLEAVY**

For the **PhD degree**

In respect of research conducted through the

DEPARTMENT OF ACCOUNTING in the FACULTY OF LAW AND FINANCIAL STUDIES

Completed in the month of MARCH 1991.

VOLUME TWO

VOLUME 2

THE APPENDICES

APPENDIX A

THE ACCOUNTS

FOR THE YEAR ENDED 31st DECEMBER 1987

CONSOLIDATED PROFIT AND LOSS ACCOUNT

	NOTE	1987 £m	1986 (restated) £m
Profit from operations			
Life and pensions business (other than U.S.A. and fund management)	1	70·6	59·9
U.S.A. life business		5·4	6·2
Fund management	2	1·3	4·7
General insurance (excluding hurricane loss)		37·6	4·4
Hurricane loss		(42·0)	–
General insurance result	3	(4·4)	4·4
Shareholders' other income and outgo	4	(5·6)	(0·4)
Associated companies		1·0	0·9
Employee profit sharing scheme		–	(2·2)
Profit before taxation and exceptional item		68·3	73·5
Exceptional life and pensions business profit	5	10·9	28·3
Operating profit before taxation		79·2	101·8
Taxation	6	28·0	33·3
Operating profit after taxation		51·2	68·5
Realised investment appreciation after taxation	7	10·4	11·4
Profit attributable to shareholders		61·6	79·9
Dividends	8	54·0	45·2
Retained profit		7·6	34·7
Movements in consolidated retained profits and reserves			
Balance at beginning of year			
–as previously reported		165·2	180·8
–prior year adjustment		2·8	2·9
–as restated		168·0	183·7
Retained profit for year		7·6	34·7
Transfer from current year earnings for shares issued in lieu of dividends		0·3	–
Capitalisation of reserves		–	(62·5)
Increase (decrease) in unrealised investment appreciation		(6·0)	14·7
Exchange revaluation of interests in overseas operations net of borrowings		(22·4)	(2·6)
Balance at end of year		147·5	168·0

1986 figures have been restated to reflect the introduction of the recommendations of the Statement of Recommended Practice on Accounting for Insurance Business issued by the Association of British Insurers and the change in the basis of grossing-up life and pensions business profit transfers for taxation.

ON 31st DECEMBER 1987

CONSOLIDATED BALANCE SHEET

	NOTE	1987 £m	1986 £m
Investments	20	11,514·0	10,915·1
Purchased interests in U.S.A. insurance funds	15	33·6	33·2
Associated companies	16	1·0	3·3
Other assets	20	707·0	621·6
Total assets		12,255·6	11,573·2
Liabilities and provisions	20	489·2	465·6
Minority interests		0·2	0·1
		489·4	465·7
Total net assets	20	11,766·2	11,107·5
Insurance liabilities, provisions and reserves			
Life and pensions funds	23	11,031·9	10,416·3
General insurance funds	23	457·8	407·0
		11,489·7	10,823·3
Shareholders' net assets		276·5	284·2
Representing capital and reserves			
Called up share capital	24	117·6	115·6
Capital reserves	24	11·4	0·6
Retained profits and reserves		147·5	168·0
Shareholders' funds		276·5	284·2

FOR THE YEAR ENDED 31st DECEMBER 1987

CONSOLIDATED PROFIT AND LOSS ACCOUNT

	NOTE	1987 £m	1986 (restated) £m
Profit from operations			
Life and pensions business (other than U.S.A. and fund management)	1	70·6	59·9
U.S.A. life business		5·4	6·2
Fund management	2	1·3	4·7
General insurance (excluding hurricane loss)		37·6	4·4
Hurricane loss		(42·0)	–
General insurance result	3	(4·4)	4·4
Shareholders' other income and outgo	4	(5·6)	(0·4)
Associated companies		1·0	0·9
Employee profit sharing scheme		–	(2·2)
Profit before taxation and exceptional item		68·3	73·5
Exceptional life and pensions business profit	5	10·9	28·3
Operating profit before taxation		79·2	101·8
Taxation	6	28·0	33·3
Operating profit after taxation		51·2	68·5
Realised investment appreciation after taxation	7	10·4	11·4
Profit attributable to shareholders		61·6	79·9
Dividends	8	54·0	45·2
Retained profit		7·6	34·7
Movements in consolidated retained profits and reserves			
Balance at beginning of year			
–as previously reported		165·2	180·8
–prior year adjustment		2·8	2·9
–as restated		168·0	183·7
Retained profit for year		7·6	34·7
Transfer from current year earnings for shares issued in lieu of dividends		0·3	–
Capitalisation of reserves		–	(62·5)
Increase (decrease) in unrealised investment appreciation		(6·0)	14·7
Exchange revaluation of interests in overseas operations net of borrowings		(22·4)	(2·6)
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Shareholders' net assets		276·5	284·2
represented by capital and reserves			
Called up share capital	24	117·6	115·6
Capital reserves	24	11·4	0·6
Retained profits and reserves		147·5	168·0
Shareholders' funds		276·5	284·2

FOR THE YEAR ENDED 31st DECEMBER 1987

SOURCE AND APPLICATION OF SHAREHOLDERS' AND GENERAL INSURANCE FUNDS

	1987 £m	1986 £m
Movements in funds		
Profit attributable to shareholders	61·6	79·9
Prior year adjustment	–	2·9
Unrealised investment appreciation (depreciation)	(6·0)	14·7
Dividends	(53·7)	(45·2)
Issues of shares	12·8	0·7
Borrowings	0·9	50·0
Net funds movement	15·6	103·0
represented by increase (decrease) in assets		
Investments	78·8	100·3
Purchased interests in U.S.A. insurance funds	7·5	(2·6)
Associated companies	(2·8)	0·8
Debtors	31·5	67·9
Bank balances and cash	1·4	13·3
	116·4	179·7
Less increase (decrease) in liabilities		
General insurance liabilities, provisions and reserves	70·7	62·3
Creditors	30·1	14·4
	100·8	76·7
	15·6	103·0
Funds employed		
Shareholders' funds at beginning of year	284·2	233·8
Borrowings at beginning of year	110·3	61·3
	394·5	295·1
Exchange revaluation	(35·8)	(3·6)
	358·7	291·5
Net funds movement in year (as above)	15·6	103·0
Shareholders' funds at end of year	276·5	284·2
Borrowings at end of year	97·8	110·3
	374·3	394·5

NOTES: 1. Dividends paid in the year totalled £47·6m (1986, £39·6m). The figure shown in the statement is the amount provided in the accounts as payable in respect of the current year's dividend.

2. The effect of exchange revaluation has been excluded from the movements in funds and shown separately in the reconciliation of funds employed.

CONSOLIDATED BALANCE SHEET

at 31st December 1987.

These accounts should be read in conjunction with the notes on pages 33 to 44.

	Notes	£m	1987 £m	£m	1986 £m
Fixed assets					
Tangible assets	11		**528·7**		546·5
Investments	12		**211·6**		279·3
			740·3		825·8
Current assets					
Stocks	13	**376·7**		423·3	
Debtors	14	**355·2**		371·8	
Cash at bank and in hand	15	**39·8**		48·8	
		771·7		843·9	
Creditors: amounts falling due within one year					
Short term borrowings	16	**(54·6)**		(83·9)	
Creditors	17	**(428·2)**		(443·9)	
Taxation payable	18	**(27·7)**		(19·6)	
Dividend payable		**(22·0)**		(19·3)	
		(532·5)		(566·7)	
Net current assets			**239·2**		277·2
Total assets less current liabilities			**979·5**		1103·0
Creditors: amounts falling due after more than one year					
Term loans	19		**(205·4)**		(272·9)
Obligations under finance leases	20		**(12·1)**		(19·9)
Provisions for liabilities and charges	21		**(83·9)**		(83·3)
Net assets			**678·1**		726·9
Capital and reserves					
Called up share capital	22		**244·8**		241·9
Share premium account	23	**118·2**		117·4	
Revaluation reserve	23	**26·8**		33·7	
Other reserves	23	**(74·5)**		(22·7)	
Profit and loss account	23	**297·4**		274·8	
			367·9		403·2
Equity interest			**612·7**		645·1
Outside shareholders' interests in subsidiaries			**65·4**		81·8
			678·1		726·9

The financial statements were approved by the Board of Directors on 9th March 1988 and were signed by:

Directors

CONSOLIDATED SOURCE & APPLICATION OF FUNDS

for the year ended 31st December 1987.

	1987 £m	1986 £m
Source of funds		
Profit before taxation, depreciation and share of profits less losses of related companies	**178·3**	176·5
Dividends from related companies	**4·2**	5·3
Sale of subsidiaries and other investments	**109·3**	58·6
Disposals of tangible fixed assets	**23·7**	24·1
Shares issued as part of the consideration for the acquisition of subsidiaries	**1·7**	10·9
Other sources (net)	**10·6**	8·3
	327·8	283·7
Application of funds		
Capital expenditure	**(107·6)**	(103·6)
Acquisition of subsidiaries and other investments	**(46·3)**	(45·9)
Stocks	**(15·6)**	(10·1)
Debtors less creditors	**(16·1)**	(70·6)
Dividends paid to:		
shareholders of parent company	**(30·9)**	(29·1)
outside shareholders in subsidiaries	**(5·4)**	(6·3)
Taxation paid	**(35·3)**	(52·7)
	(257·2)	(318·3)
Net inflow/(outflow) of funds	**70·6**	(34·6)
Movement in net borrowings		
Net borrowings at 1st January 1987	**(327·9)**	(294·7)
Net inflow/(outflow) of funds	**70·6**	(34·6)
Currency variations	**32·8**	(22·5)
Net funds of subsidiaries acquired and sold	**(7·8)**	23·9
Net borrowings at 31st December 1987	**(232·3)**	(327·9)

Net borrowings include obligations under finance leases of £12·1 million (1986–£19·9 million).

The balance sheet movement on stocks and debtors less creditors is as follows:

	Stocks £m	Debtors less creditors £m
1st January 1987	423·3	(72·1)
Currency variations	(33·3)	8·8
Changes in the composition of the group and discontinued activities	(28·9)	(25·8)
Source and application of funds above	15·6	16·1
31st December 1987	376·7	(73·0)

Movements in funds of subsidiaries acquired and sold are included only from the date of acquisition or up to the date of disposal.

The sources and applications of funds of overseas subsidiaries are translated to sterling at average exchange rates.

The net borrowings at the beginning of the year are retranslated at year-end exchange rates and the difference is included in currency variations.

CONSOLIDATED PROFIT & LOSS ACCOUNT

Kz

for the year ended 31st December 1987.

These accounts should be read in conjunction with the notes on pages 33 to 44.

	Notes	1987 £m	1986 £m
Sales	2	**1900·6**	2059·4
Surplus on trading	3	**138·4**	145·7
Income from investments and interest receivable	5	**4·8**	5·4
Interest payable	6	**(34·0)**	(42·5)
Share of profits less losses of related companies		**37·3**	23·8
Profit on ordinary activities before taxation		**146·5**	132·4
Taxation	7	**(49·8)**	(51·4)
Profit on ordinary activities after taxation		**96·7**	81·0
Profit attributable to outside shareholders' interests		**(12·4)**	(12·6)
Earnings of the year		**84·3**	68·4
Extraordinary items	8	**(22·4)**	(36·5)
Dividends	9	**(33·6)**	(30·6)
Transfer to reserves		**28·3**	1·3
Earnings per share	10	**34·7p**	28·5p

STATEMENT OF MOVEMENT ON RESERVES

	Notes	1987 £m	1986 £m
At 1st January 1987		**403·2**	397·1
Transfer from profit and loss account		**28·3**	1·3
Currency variations	1	**(29·6)**	17·5
Net premium on share issues		**1·8**	8·1
Subsidiaries acquired and sold	1	**(31·3)**	(18·4)
Change in policy	12	**(0·9)**	—
Other movements		**(3·6)**	(2·4)
At 31st December 1987	23	**367·9**	403·2

CONSOLIDATED BALANCE SHEET

Kz

at 31st December 1987. These accounts should be read in conjunction with the notes on pages 33 to 44.

	Notes	£m	1987 £m	£m	1986 £m
Fixed assets					
Tangible assets	11		**528·7**		546·5
Investments	12		**211·6**		279·3
			740·3		825·8
Current assets					
Stocks	13	**376·7**		423·3	
Debtors	14	**355·2**		371·8	
Cash at bank and in hand	15	**39·8**		48·8	
		771·7		843·9	
Creditors: amounts falling due within one year					
Short term borrowings	16	**(54·6)**		(83·9)	
Creditors	17	**(428·2)**		(443·9)	
Taxation payable	18	**(27·7)**		(19·6)	
Dividend payable		**(22·0)**		(19·3)	
		(532·5)		(566·7)	
Net current assets			**239·2**		277·2
Total assets less current liabilities			**979·5**		1103·0
Creditors: amounts falling due after more than one year					
Term loans	19		**(205·4)**		(272·9)
Obligations under finance leases	20		**(12·1)**		(19·9)
Provisions for liabilities and charges	21		**(83·9)**		(83·3)
Net assets			**678·1**		726·9
Capital and reserves					
Called up share capital	22		**244·8**		241·9
Share premium account	23	**118·2**		117·4	
Revaluation reserve	23	**26·8**		33·7	
Other reserves	23	**(74·5)**		(22·7)	
Profit and loss account	23	**297·4**		274·8	
			367·9		403·2
Equity interest			**612·7**		645·1
Outside shareholders' interests in subsidiaries			**65·4**		81·8
			678·1		726·9

The financial statements were approved by the Board of Directors on 9th March 1988 and were signed by:

Directors

GROUP PROFIT AND LOSS ACCOUNT 1987

Note		1987 £m	1986 £m
1	**Turnover**	**546.4**	480.1
1,2	**Operating profit**	**102.8**	81.3
3	Net cost of borrowings	**0.1**	1.1
		102.7	80.2
4	Attributable profits of related companies	**6.9**	8.0
	Profit on ordinary activities before taxation	**109.6**	88.2
7	Tax on profit on ordinary activities	**31.8**	27.8
8	**Profit on ordinary activities after taxation attributable to shareholders**	**77.8**	60.4
9	Dividends	**32.8**	23.4
22	**Retained profit for the year**	**45.0**	37.0
10	**Earnings per ordinary share**	**8.2p**	7.1p

GROUP BALANCE SHEET

at 2nd January, 1988

Note		1987 £m	1986 £m
	Fixed assets		
11	Tangible assets	**159.7**	157.8
12	Investments	**33.0**	26.1
		192.7	183.9
	Current assets		
13	Stocks	**138.0**	129.1
14	Debtors	**132.9**	125.9
15	Investments	**56.5**	37.0
16	Cash at bank and in hand	**135.0**	125.1
		462.4	417.1
	Creditors: Amounts falling due within one year		
16	Loans	**125.5**	125.2
	Taxation	**22.5**	17.7
	Dividend	**19.3**	18.7
17	Trade and other creditors	**91.5**	90.6
		258.8	252.2
	Net current assets	**203.6**	164.9
	Total assets less current liabilities	**396.3**	348.8
	Creditors: Amounts falling due after more than one year		
16	Loans	**140.2**	115.8
	Taxation	**1.3**	4.6
	Other creditors and government grants	**4.9**	5.8
		146.4	126.2
18	**Provisions for liabilities and charges**	**8.7**	12.0
		241.2	210.6
	Capital and reserves		
19	Called up share capital	**96.4**	94.4
21	Share premium account	**28.2**	13.5
22	Other reserves	**25.4**	24.0
22	Profit and loss account	**91.2**	78.7
		241.2	210.6

Approved by the Board on 23rd March, 1988

Director

Director

GROUP SOURCE AND APPLICATION OF FUNDS 1987

	1987 £m	*1986* £m
Funds from operations		
Operating profit	**102.8**	81.3
Net cost of borrowings	**(0.1)**	(1.1)
Depreciation (less profit on asset sales)	**14.4**	16.1
Income from related companies	**1.6**	2.6
	118.7	98.9
Funds from other sources		
Proceeds of share issues	**1.4**	0.6
Sale of tangible fixed assets	**7.1**	4.5
Disposals of subsidiaries and fixed asset investments	**23.7**	1.0
	32.2	6.1
Total inflow of funds	**150.9**	105.0
Application of funds		
Increase in working capital		
Stocks	**19.6**	10.8
Debtors	**17.4**	10.6
Creditors	**0.3**	(4.8)
	37.3	16.6
Purchase of tangible fixed assets	**51.4**	31.7
Acquisition of subsidiaries and fixed asset investments less shares issued in consideration	**36.8**	81.7
Taxation	**24.9**	19.2
Dividends	**32.2**	20.2
	182.6	169.4
Net outflow of funds	**(31.7)**	(64.4)
Exchange difference on foreign currency net borrowings	**27.4**	3.6
Net borrowings in new subsidiaries	**(6.7)**	(8.2)
Bond conversions less issue costs	**15.7**	10.5
Decrease/(increase) in net borrowings	**4.7**	(58.5)
Short term borrowings less cash and current asset investments	**29.1**	(36.5)
Borrowings repayable after one year	**(24.4)**	(22.0)
	4.7	(58.5)

Group Profit & Loss Account

52 weeks ended 2 January 1988	Note	£m 1987	£m 1986
Turnover	2	1,427.6	1,290.4
Cost of sales		(837.1)	(790.2)
Gross profit		590.5	500.2
Distribution costs		(54.7)	(49.8)
Marketing, selling and administrative expenses		(411·1)	(350.7)
Other operating income		5.4	6.0
Trading profit	2 & 3	130.1	105.7
Interest	4	(18.0)	(21.7)
Profit on ordinary activities before taxation		112.1	84.0
Taxation on profit on ordinary activities	5	(24.2)	(17.8)
Profit on ordinary activities after taxation		87.9	66.2
Extraordinary items	6	–	(11.3)
Profit attributable to Rowntree plc	7	87.9	54.9
Dividends	9	(33.4)	(29.3)
Added to reserves	8	54.5	25.6
Earnings per ordinary share	10	40.8p	35.0p

The movement on reserves is shown in detail in note 8.

Group Balance Sheet

at 2 January 1988	Note	£m 1987	£m 1986
Fixed assets			
Tangible assets	11	463.2	
Current assets			
Stocks	14	163.5	
Debtors	15	214.9	
Cash at bank and in hand		96.7	
		475.1	
Creditors—amounts falling due within one year			
Bank overdrafts and loans		(25.4)	
Other creditors	16	(244.7)	
Net current assets		205.0	
Total assets less current liabilities		668.2	
Creditors—amounts falling due after more than one year	17	(18.8)	
Loan capital	18	(231.2)	
Provisions for liabilities and charges	20	(9.6)	
		408.6	
Capital and reserves			
Called up share capital	21	110.2	
Share premium account	8	1.3	
Revaluation reserve	8	45.3	
Capital reserve	8	52.5	
Profit and loss account	8	199.3	
		408.6	

Approved by a meeting of the board on 15 March 1988.

(Directors)

GROUP PROFIT AND LOSS ACCOUNT 1987

Note		1987 £m	1986 £m
1	**Turnover**	**546.4**	480.1
1,2	**Operating profit**	**102.8**	81.3
3	Net cost of borrowings	**0.1**	1.1
		102.7	80.2
4	Attributable profits of related companies	**6.9**	8.0
	Profit on ordinary activities before taxation	**109.6**	88.2
7	Tax on profit on ordinary activities	**31.8**	27.8
8	**Profit on ordinary activities after taxation attributable to shareholders**	**77.8**	60.4
9	Dividends	**32.8**	23.4
22	**Retained profit for the year**	**45.0**	37.0
10	**Earnings per ordinary share**	**8.2p**	7.1p

GROUP BALANCE SHEET

at 2nd January, 1988

Note		1987 £m	1986 £m
	Fixed assets		
11	Tangible assets	**159.7**	157.8
12	Investments	**33.0**	26.1
		192.7	183.9
	Current assets		
13	Stocks	**138.0**	129.1
14	Debtors	**132.9**	125.9
15	Investments	**56.5**	37.0
16	Cash at bank and in hand	**135.0**	125.1
		462.4	417.1
	Creditors: Amounts falling due within one year		
16	Loans	**125.5**	125.2
	Taxation	**22.5**	17.7
	Dividend	**19.3**	18.7
17	Trade and other creditors	**91.5**	90.6
		258.8	252.2
	Net current assets	**203.6**	164.9
	Total assets less current liabilities	**396.3**	348.8
	Creditors: Amounts falling due after more than one year		
16	Loans	**140.2**	115.8
	Taxation	**1.3**	4.6
	Other creditors and government grants	**4.9**	5.8
		146.4	126.2
18	**Provisions for liabilities and charges**	**8.7**	12.0
		241.2	210.6
	Capital and reserves		
19	Called up share capital	**96.4**	94.4
21	Share premium account	**28.2**	13.5
22	Other reserves	**25.4**	24.0
22	Profit and loss account	**91.2**	78.7
		241.2	210.6

Approved by the Board on 23rd March, 1988

Director

Director

LY

Group Profit & Loss Account

52 weeks ended 2 January 1988	Note	£m 1987	£m 1986
Turnover	2	1,427.6	1,290.4
Cost of sales		(837.1)	(790.2)
Gross profit		590.5	500.2
Distribution costs		(54.7)	(49.8)
Marketing, selling and administrative expenses		(411·1)	(350.7)
Other operating income		5.4	6.0
Trading profit	2 & 3	130.1	105.7
Interest	4	(18.0)	(21.7)
Profit on ordinary activities before taxation		112.1	84.0
Taxation on profit on ordinary activities	5	(24.2)	(17.8)
Profit on ordinary activities after taxation		87.9	66.2
Extraordinary items	6	–	(11.3)
Profit attributable to Rowntree plc	7	87.9	54.9
Dividends	9	(33.4)	(29.3)
Added to reserves	8	54.5	25.6
Earnings per ordinary share	10	40.8p	35.0p

The movement on reserves is shown in detail in note 8.

Group Balance Sheet

at 2 January 1988	Note	£m 1987	£m 1986
Fixed assets			
Tangible assets	11	463.2	
Current assets			
Stocks	14	163.5	
Debtors	15	214.9	
Cash at bank and in hand		96.7	
		475.1	
Creditors – amounts falling due within one year			
Bank overdrafts and loans		(25.4)	
Other creditors	16	(244.7)	
Net current assets		205.0	
Total assets less current liabilities		668.2	
Creditors – amounts falling due after more than one year	17	(18.8)	
Loan capital	18	(231.2)	
Provisions for liabilities and charges	20	(9.6)	
		408.6	
Capital and reserves			
Called up share capital	21	110.2	
Share premium account	8	1.3	
Revaluation reserve	8	45.3	
Capital reserve	8	52.5	
Profit and loss account	8	199.3	
		408.6	

Approved by a meeting of the board on 15 March 1988.

(Directors)

LY

Group Source & Application of Funds

52 weeks ended 2 January 1988	£m 1987	£m 1986
SOURCE OF FUNDS		
Funds generated from operations		
Trading profit	130.1	105.7
Depreciation	51.0	43.7
Miscellaneous non cash items	1.2	(1.7)
	182.3	147.7
Less:		
Interest paid	(19.9)	(20.6)
Taxation paid	(21.3)	(22.1)
Net funds from operations	141.1	105.0
APPLICATION OF FUNDS		
Investment		
Expenditure on tangible assets	76.2	82.5
Disposal proceeds of tangible assets	(5.2)	(4.2)
Rationalisation costs	10.0	17.0
	81.0	95.3
Changes in working capital		
Stocks	(3.3)	(7.6)
Debtors	22.6	13.9
Creditors	(10.4)	(20.1)
Dividends paid	29.2	20.9
Total application of funds	119.1	102.4
Net inflow of funds from operations	22.0	2.6
Financial movements		
Net proceeds of share issues	5.2	146.8
Acquisition of subsidiaries and trading assets taken over (note 23)	(14.2)	(189.9)
Bank balances and cash arising on acquisition of subsidiaries	(1.1)	(0.2)
Bond issue expenses	(1.9)	–
	10.0	(40.7)
Adjustment on translation of foreign currency borrowings	21.6	(2.7)
Decrease (increase) in net group borrowings	31.6	(43.4)
Represented by changes in		
Loan capital and overdrafts	4.1	(70.8)
Cash at bank and in hand	27.5	27.4
	31.6	(43.4)

The movement on working capital does not correspond to the change in balance sheet amounts as opening working capital has been translated at closing exchange rates in order to show the real movement in working capital.

CONSOLIDATED PROFIT AND LOSS ACCOUNT

53 weeks ended 28th February, 1987 (1986-52 weeks)

	Note	1987 £m	1986 £m
Sales to customers at net selling prices		**3,806.5**	3,556.4
Value added tax		**213.5**	201.1
Turnover excluding value added tax		**3,593.0**	3,355.3
Cost of sales		**3,367.0**	3,186.2
Gross profit		**226.0**	169.1
Administration expenses		**78.3**	65.0
Operating profit	1	**147.7**	104.1
Interest receivable less payable	3	**21.4**	18.8
		169.1	122.9
Net surplus on sale of properties		**9.4**	8.3
Profit on ordinary activities before taxation and profit sharing		**178.5**	131.2
Employee profit sharing	4	**2.6**	—
Profit on ordinary activities before taxation		**175.9**	131.2
Tax on profit on ordinary activities	5	**56.9**	47.4
Profit on ordinary activities after taxation		**119.0**	83.8
Extraordinary items	6	**—**	(7.4)
Profit for the financial year		**119.0**	76.4
Dividends	7	**31.0**	23.8
Profit retained		**88.0**	52.6
		pence	pence
Earnings per share	8	**28.52**	21.09
Fully diluted earnings per share	8	**26.12**	19.29
Dividend per share		**7.30**	5.80

The presentation of Net surplus on sale of properties has been changed from 1986 (See Note 22).

Accounting policies and notes forming part of these accounts are on page 29 and pages 33 to 41.

BALANCE SHEETS

28th February, 1987

	Note	Consolidated 1987 £m	Consolidated 1986 £m	PLC 1987 £m	PLC 1986 £m
Fixed assets					
Tangible assets	9	999.9	772.2	—	—
Investments: shares in subsidiaries	10	—	—	19.3	19.3
Current assets					
Stocks (goods for resale)		182.5	191.1	—	—
Debtors	11	13.8	24.4	674.5	394.2
Money Market investments and deposits	12	40.2	105.3	31.5	103.3
Cash at bank and in hand		20.3	30.3	—	88.1
		256.8	351.1	706.0	585.6
Creditors:					
Amounts falling due within one year	13	440.4	456.3	59.0	46.1
Net current assets/(liabilities)		(183.6)	(105.2)	647.0	539.5
Total assets less current liabilities		816.3	667.0	666.3	558.8
Creditors:					
Amounts falling due after more than one year	14	120.4	61.2	105.1	56.0
Provisions for liabilities and charges	15	5.8	17.2	—	1.7
		690.1	588.6	561.2	501.1
Shareholders' funds					
Called up share capital	17	21.2	20.6	21.2	20.6
Share premium account	18	180.2	167.2	180.2	167.2
Profit and loss account	18	488.7	400.8	359.8	313.3
		690.1	588.6	561.2	501.1

Directors:
Accounts approved by Board: 29th April, 1987.

Accounting policies and notes forming part of these accounts are on page 29 and pages 33 to 41.

CONSOLIDATED PROFIT AND LOSS ACCOUNT

MX

53 weeks ended 28th February, 1987 (1986–52 weeks)

	Note	1987 £m	1986 £m
Sales to customers at net selling prices		**3,806.5**	3,556.4
Value added tax		**213.5**	201.1
Turnover excluding value added tax		**3,593.0**	3,355.3
Cost of sales		**3,367.0**	3,186.2
Gross profit		**226.0**	169.1
Administration expenses		**78.3**	65.0
Operating profit	1	**147.7**	104.1
Interest receivable less payable	3	**21.4**	18.8
		169.1	122.9
Net surplus on sale of properties		**9.4**	8.3
Profit on ordinary activities before taxation and profit sharing		**178.5**	131.2
Employee profit sharing	4	**2.6**	—
Profit on ordinary activities before taxation		**175.9**	131.2
Tax on profit on ordinary activities	5	**56.9**	47.4
Profit on ordinary activities after taxation		**119.0**	83.8
Extraordinary items	6	**—**	(7.4)
Profit for the financial year		**119.0**	76.4
Dividends	7	**31.0**	23.8
Profit retained		**88.0**	52.6
		pence	pence
Earnings per share	8	**28.52**	21.09
Fully diluted earnings per share	8	**26.12**	19.29
Dividend per share		**7.30**	5.80

The presentation of Net surplus on sale of properties has been changed from 1986 (See Note 22).

Accounting policies and notes forming part of these accounts are on page 29 and pages 33 to 41.

BALANCE SHEETS

MX

28th February, 1987

	Note	Consolidated 1987 £m	Consolidated 1986 £m	Tesco PLC 1987 £m	Tesco PLC 1986 £m
Fixed assets					
Tangible assets	9	999.9	772.2	—	—
Investments: shares in subsidiaries	10	—	—	19.3	19.3
Current assets					
Stocks (goods for resale)		182.5	191.1	—	—
Debtors	11	13.8	24.4	674.5	394.2
Money Market investments and deposits	12	40.2	105.3	31.5	103.3
Cash at bank and in hand		20.3	30.3	—	88.1
		256.8	351.1	706.0	585.6
Creditors:					
Amounts falling due within one year	13	440.4	456.3	59.0	46.1
Net current assets/(liabilities)		(183.6)	(105.2)	647.0	539.5
Total assets less current liabilities		816.3	667.0	666.3	558.8
Creditors:					
Amounts falling due after more than one year	14	120.4	61.2	105.1	56.0
Provisions for liabilities and charges	15	5.8	17.2	—	1.7
		690.1	588.6	561.2	501.1
Shareholders' funds					
Called up share capital	17	21.2	20.6	21.2	20.6
Share premium account	18	180.2	167.2	180.2	167.2
Profit and loss account	18	488.7	400.8	359.8	313.3
		690.1	588.6	561.2	501.1

Directors:
Accounts approved by Board: 29th April, 1987.

Accounting policies and notes forming part of these accounts are on page 29 and pages 33 to 41.

CONSOLIDATED STATEMENT OF SOURCE AND APPLICATION OF FUNDS

53 weeks ended 28th February, 1987 (1986–52 weeks)

	1987 £m	1986 £m
Source of funds		
Profit on ordinary activities before taxation	175.9	131.2
Adjustment for items not involving the movement of funds:		
Depreciation	57.8	47.8
Net surplus on sale of properties	(9.4)	(8.3)
Tax relief on interest capitalised	(6.4)	(4.8)
Amortisation of discount on 4% Unsecured deep discount loan stock	0.7	—
Funds generated from operations	218.6	165.9
Funds from other sources		
Net proceeds from rights issue	—	145.4
Net proceeds from issue of 4% Unsecured deep discount loan stock	60.4	—
Proceeds from other issues of shares	1.6	10.0
Proceeds from disposal of tangible assets	20.4	23.1
Increase/(Decrease) in leasing commitments	15.4	(3.7)
Net proceeds from disposal of businesses (See below)	7.8	5.0
	324.2	345.7
Application of funds		
Purchase of tangible assets	311.9	225.4
Dividends paid	26.0	19.1
Taxation paid	47.2	41.0
Decrease in medium term bank loans	—	6.9
	385.1	292.4
(Decrease)/Increase in working capital	(60.9)	53.3
(Decrease)/Increase in working capital		
(Decrease)/Increase in stock	(0.4)	16.7
(Decrease)/Increase in debtors	(10.6)	10.3
Decrease/(Increase) in creditors	3.4	(56.6)
Movement in net liquid funds		
Increase in bank balances	11.8	14.6
(Decrease)/Increase in Money Market investments and deposits	(65.1)	68.3
	(60.9)	53.3
Net proceeds from disposal of businesses		
Tangible fixed assets	15.4	5.3
Stock	8.2	3.9
Creditors	(15.8)	(7.8)
Bank overdraft	—	(5.0)
Net assets/(liabilities) disposed of	7.8	(3.6)
Net surplus on disposal	—	8.6
	7.8	5.0

Accounting policies and notes forming part of these accounts are on page 29 and pages 33 to 41.

Statements of Consolidated Income

For the Years Ended March 31, 1987, 1986, and 1985

	Millions of Yen			Translation into Thou United States Dollars
	1987	1986	1985	1987
Total Trading Transactions (Notes 7 and 8)	**¥14,168,300**	¥18,081,547	¥17,598,032	**$ 97,043,1**
Revenues:				
Gross trading profit (Note 8)	**¥ 341,165**	¥ 366,679	¥ 371,239	**$ 2,336,7**
Rent and warehousing income	**10,560**	10,120	10,006	**72,3**
Total	**351,725**	376,799	381,245	**2,409,0**
Expenses:				
Selling, general, and administrative	**273,436**	274,666	266,935	**1,872,8**
Provision for doubtful receivables	**31,599**	26,814	14,440	**216,4**
Total	**305,035**	301,480	281,375	**2,089,2**
Operating Income (Note 7)	**46,690**	75,319	99,870	**319,7**
Other Income (Expenses):				
Interest expense (net of interest income: 1987, ¥145,188 million—$994,438 thousand; 1986, ¥184,342 million; 1985, ¥190,246 million)	**(51,491)**	(70,284)	(85,666)	**(352,6**
Dividends	**8,681**	7,084	6,630	**59,4**
Profit on securities—net	**27,182**	31,500	10,883	**186,1**
Provision for estimated losses on foreign investment (Note 2)	**(4,502)**	(5,473)	(5,929)	**(30,8**
Sundry—net	**9,674**	(1,148)	(3,579)	**66,2**
Other income (expenses)—net	**(10,456)**	(38,321)	(77,661)	**(71,6**
Income before Income Taxes and Equity in Earnings	**36,234**	36,998	22,209	**248,1**
Provision for Income Taxes (Notes 1 and 10):				
Current	**20,775**	34,522	30,298	**142,2**
Deferred	**(3,248)**	(5,082)	(9,124)	**(22,2**
Total	**17,527**	29,440	21,174	**120,0**
Income before Equity in Earnings	**18,707**	7,558	1,035	**128,1**
Equity in Earnings (Losses) of Unconsolidated Subsidiaries and Associated Companies—Net (after income tax effect) (Note 2)	**(3,482)**	4,112	9,078	**(23,8**
Net Income	**¥ 15,225**	¥ 11,670	¥ 10,113	**$ 104,2**
	Yen			U.S. Dollars
Net Income per 20 Shares (Note 1)	**¥249**	¥198	¥185	**$1.7**

See accompanying notes to consolidated financial statements

CONSOLIDATED FINANCIAL STATEMENTS

and Consolidated Subsidiaries

Consolidated Balance Sheets

March 31, 1987 and 1986

ASSETS	Millions of Yen 1987	1986	Translation into Thousands of United States Dollars 1987
Current Assets:			
Cash	¥ 138,851	¥ 182,121	$ 951,03
Time deposits (Note 3)	443,065	438,750	3,034,65
Marketable securities (Notes 1 and 2)	205,490	112,789	1,407,46
Trade receivables (Note 3):			
Notes and loans, less unearned interest	1,060,883	1,159,416	7,266,32
Accounts	1,043,060	1,124,498	7,144,24
Unconsolidated subsidiaries and associated companies	232,859	250,450	1,594,92
Allowance for doubtful receivables	(16,211)	(27,307)	(111,03
Inventories (Notes 1 and 3)	294,894	345,954	2,019,82
Advance payments to suppliers	94,786	119,466	649,21
Deferred income taxes (Note 1)	39,565	26,401	270,99
Prepayments	73,462	90,026	503,16
Total current assets	3,610,704	3,822,564	24,730,84
Investments and Non-current Receivables (Note 3):			
Investments in and advances to unconsolidated subsidiaries and associated companies (Notes 1 and 2)	229,115	287,534	1,569,28
Other investments (Notes 1 and 2)	357,541	222,661	2,448,91
Non-current trade receivables, less unearned interest	894,715	939,608	6,128,18
Allowance for doubtful receivables	(93,034)	(92,500)	(637,21
Allowance for estimated losses on foreign investment (Note 2)	(75,813)	(71,311)	(519,26
Property leased to others—at cost, less accumulated depreciation 1987, ¥34,582 million—$236,863 thousand; 1986, ¥33,860 million (Note 1)	37,207	39,736	254,84
Total investments and non current receivables	1,349,731	1,325,728	9,244,73
Property and Equipment—At cost (Note 3):			
Land, land improvements, and timberlands	48,406	47,852	331,54
Buildings, including leasehold improvements	151,885	158,722	1,040,30
Equipment and fixtures	84,208	91,769	576,76
Ships	2,052	6,838	14,05
Projects in progress	2,054	3,406	14,06
Total	288,605	308,587	1,976,74
Less accumulated depreciation (Note 1)	104,511	109,579	715,82
Property and equipment—net	184,094	199,008	1,260,91
Deferred Income Taxes—Non-current (Note 1)	18,616	24,982	127,50
Miscellaneous Assets (less amortization)	22,775	22,239	155,99
Total	¥5,185,920	¥5,394,521	$35,520,00

See accompanying notes to consolidated financial statements

LIABILITIES AND SHAREHOLDERS' EQUITY	Millions of Yen		Translation into Thousands of United States Dollars (Note 1)
	1987	1986	1987
Current Liabilities:			
Short-term bank loans (Notes 3 and 4)	**¥1,367,664**	¥1,230,949	**$ 9,367,562**
Notes discounted with banks (Note 4)	**120,311**	209,981	**824,048**
Current maturities of long-term debt (Notes 3 and 4)	**221,760**	204,069	**1,518,904**
Trade payables:			
Notes and acceptances (Note 3)	**684,886**	866,077	**4,691,000**
Accounts	**926,217**	975,224	**6,343,952**
Unconsolidated subsidiaries and associated companies	**72,573**	92,953	**497,075**
Accrued expenses:			
Income taxes	**11,888**	20,124	**81,425**
Interest	**19,353**	17,622	**132,555**
Other	**29,056**	27,857	**199,013**
Advances from customers	**87,221**	92,321	**597,404**
Deposits	**26,746**	21,123	**183,192**
Total current liabilities	**3,567,675**	3,758,300	**24,436,130**
Long-term Debt, less Current Maturities (Notes 3 and 4)	**1,352,054**	1,405,552	**9,260,644**
Accrued Pension Costs and Liability for Severance Indemnities (Notes 1 and 5)	**25,365**	23,970	**173,733**
Minority Interests	**11,940**	10,500	**81,781**
Shareholders' Equity (Note 6):			
Common stock, ¥50 par—authorized, 2,500,000,000 shares; issued and outstanding: 1987—1,208,066,011 shares; 1986—1,005,822,321 shares	**62,417**	53,163	**427,514**
Capital surplus (Note 4)	**101,000**	60,602	**691,781**
Retained earnings:			
Appropriated for legal reserve	**13,383**	12,644	**91,664**
Unappropriated (Notes 4 and 12)	**139,069**	129,843	**952,527**
Foreign currency translation adjustments	**(86,983)**	(60,053)	**(595,774)**
Total shareholders' equity	**228,886**	196,199	**1,567,712**
Commitments and Contingent Liabilities (Note 11)			
Total	**¥5,185,920**	¥5,394,521	**$35,520,000**

and Consolidated Subsidiaries

Statements of Changes in Consolidated Financial Position

For the Years Ended March 31, 1987, 1986, and 1985

	Millions of Yen			Translation into Thousa United States Dollars (I
	1987	1986	1985	**1987**
Source of Funds:				
Operations:				
Net income	**¥ 15,225**	¥ 11,670	¥ 10,113	**$ 104,281**
Charges (credits) to operations not requiring (providing) funds:				
Depreciation and amortization	**25,657**	30,541	31,710	**175,733**
Provision for doubtful receivables	**26,149**	24,055	5,622	**179,103**
Provision for estimated losses on foreign investment	**4,502**	5,473	5,929	**30,836**
Equity in earnings of unconsolidated subsidiaries and associated companies – net	**6,182**	(3,965)	(16,791)	**42,342**
Deferred income taxes – non-current	**11,658**	4,393	(7,748)	**79,849**
Other—net	**7,653**	15,843	10,607	**52,417**
Total from operations	**97,026**	88,010	39,442	**664,561**
Increase (decrease) in:				
Short-term borrowings and current maturities of long-term debt	**64,736**	(205,169)	(4,667)	**443,397**
Trade payables	**(250,578)**	(298,348)	267,140	**(1,716,288**
Other current liabilities	**(4,783)**	(47,481)	(17,087)	**(32,760**
Decrease in investments in and advances to unconsolidated subsidiaries and associated companies	**—**	—	33,857	**—**
Sales of investment securities, property leased to others, and property and equipment	**69,684**	42,519	67,925	**477,288**
Incurrence of long-term debt	**547,135**	477,863	501,780	**3,747,500**
Issuance of common stock	**37,337**	8,527	—	**255,734**
Net proceeds ascribed to warrants	**12,315**	—	—	**84,349**
Effect of exchange rate changes on funds	**—**	—	4,923	**—**
Total	**572,872**	65,921	893,313	**3,923,781**
Application of Funds:				
Increase (decrease) in:				
Trade receivables	**(186,466)**	(519,341)	277,197	**(1,277,164**
Inventories	**(51,060)**	(70,410)	8,600	**(349,726**
Other current assets	**(28,080)**	(30,793)	(31,051)	**(192,329**
Increase in investments in and advances to unconsolidated subsidiaries and associated companies	**1,176**	55,159	—	**8,054**
Increase (decrease) in non-current trade receivables and other investments	**134,055**	(18,086)	77,484	**918,185**
Additions to property leased to others, and property and equipment	**38,704**	45,685	35,839	**265,096**
Reduction of long-term debt	**573,463**	477,907	400,840	**3,927,829**
Payment of cash dividends	**5,260**	4,927	4,928	**36,027**
Effect of exchange rate changes on funds	**20,877**	8,577	—	**142,993**
Other—net	**11,197**	5,610	10,444	**76,692**
Total	**519,126**	(40,765)	784,281	**3,555,657**
Net Increase in Funds	**53,746**	106,686	109,032	**368,124**
Cash, Time Deposits, and Marketable Securities—Beginning of Year	**733,660**	626,974	517,942	**5,025,068**
Cash, Time Deposits, and Marketable Securities—End of Year	**¥787,406**	¥733,660	¥626,974	**$5,393,192**

See accompanying notes to consolidated financial statements

NA

Profit and Loss Accounts

For the year ended 31 December 1987

Australia and New Zealand Limited and Subsidiary Companies

	Notes	Consolidated 1987 $'000	Consolidated 1986 $'000	Holding Company 1987 $'000	Holding Company 1986 $'000
Operating Profit	3	**26,770**	22,546	**7,645**	4,814
Income tax attributable to operating profit	6	**13,185**	10,715	**66**	(27)
Operating Profit After Income Tax		**13,585**	11,831	**7,579**	4,841
Gain on inventory valuation after income tax	7		1,488		
Loss on extraordinary items		**1,890**	914	**350**	
Income tax attributable to loss on extraordinary items		**30**	604		
Loss on extraordinary items after income tax	8	**1,860**	310	**350**	
Operating Profit and Extraordinary Items After Income Tax		**11,725**	13,009	**7,229**	4,841
Retained profits at the beginning of the financial year		**49,660**	39,109	**23,384**	21,001
Total available for appropriation		**61,385**	52,118	**30,613**	25,842
Dividends – interims paid		**5,409**	2,458	**5,409**	2,458
– final proposed		**2,950**		**2,950**	
Retained Profits at the End of the Financial Year		**$53,026**	$49,660	**$22,254**	$23,384

Notes to and forming part of these accounts and the group accounts are set out on pages 12 to 19.

NA

Balance Sheets

As at 31 December 1987

Australia and New Zealand Limited
and Subsidiary Companies

	Notes	Consolidated 1987 $'000	Consolidated 1986 $'000	Holding Company 1987 $'000	Holding Company 1986 $'000
Current Assets					
Cash		**19,287**	14,276	**2,403**	1,024
Receivables	9	**37,645**	36,355	**5**	6
Investments	10	**5,000**	5,000	**5,000**	
Inventories	11	**37,719**	34,766		
Prepayments and deferred charges		**685**	1,002		
Total Current Assets		**100,336**	91,399	**7,408**	1,030
Non-Current Assets					
Investments	10		5,000	**26,632**	31,632
Property, plant and equipment	12	**31,151**	28,589		
Future income tax benefits	13	**2,869**	2,815	**501**	427
Total Non-Current Assets		**34,020**	36,404	**27,133**	32,059
Total Assets		**134,356**	127,803	**34,541**	33,089
Current Liabilities					
Creditors and borrowings	14	**32,394**	37,725	**79**	126
Provisions	15	**22,837**	17,165	**4,148**	1,555
Total Current Liabilities		**55,231**	54,890	**4,227**	1,681
Non-Current Liabilities					
Provisions	15	**3,703**	2,234	**36**	
Total Non-Current Liabilities		**3,703**	2,234	**36**	
Total Liabilities		**58,934**	57,124	**4,263**	1,681
Net Assets		**$75,422**	$70,679	**$30,278**	$31,408
Shareholders' Equity					
Share capital	16	**4,917**	4,917	**4,917**	4,917
Reserves	17	**17,479**	16,102	**3,107**	3,107
Retained profits		**53,026**	49,660	**22,254**	23,384
Total Shareholders' Equity		**$75,422**	$70,679	**$30,278**	$31,408

Notes to and forming part of these accounts and the group accounts are set out on pages 12 to 19.

Consolidated Statement of Sources and Applications of Funds

For the year ended 31 December 1987

Australia and New Zealand Limited and Subsidiary Companies

		1987 $'000		1986 $'000
SOURCES OF FUNDS				
Funds From Operations (1)				
Inflows of funds from operations	202,793		193,175	
Less outflows of funds from operations	171,639	**31,154**	167,360	25,815
Reduction in Assets				
Current Assets				
Investment	5,000			
Inventories			2,541	
Prepayments and deferred charges	317	**5,317**	–	2,541
Proceeds from Sales of Non-Current Assets				
Real Estate	187			
Plant and Equipment (forming part of the loss arising from closing down chemicals operations)	–	**187**	262	262
Increase in Liabilities				
Current Liabilities				
Creditors and borrowings				1,431
		36,658		30,049
APPLICATIONS OF FUNDS				
Increase in Assets				
Current Assets				
Cash	5,011		6,739	
Receivables	1,290		1,572	
Investment			5,000	
Inventories	2,953			
Prepayments and deferred charges	–	**9,254**	43	13,354
Non-Current Assets				
Property, plant and equipment		**4,914**		2,863
Reduction in Liabilities				
Current Liabilities				
Creditors and borrowings		**5,348**		
Non-Current Liabilities				
Creditors and borrowings				140
Dividends paid		**5,409**		4,917
Income tax paid		**10,717**		7,565
Loss arising from closing down chemicals operations	1,613		539	
Less amount set aside to provision	947	**666**	539	–
Costs associated with takeover responses		**350**		
Cost of disposal of production waste				1,210
		36,658		30,049

NOTE:

(1) Reconciliation of operating profit before income tax with funds from operations is as follows:

Operating profit before income tax	**26,770**		22,546
Add: depreciation	**2,389**		1,932
provision for employee entitlements	**745**		833
changes in exchange rates	**1,045**		426
net book value of disposals of property, plant and equipment	**205**		78
Funds from operations	**31,154**		25,815

and Consolidated Subsidiaries

Statements of Consolidated Income

For the Years Ended March 31, 1987, 1986, and 1985

	Millions of Yen			Translation into Thousands of United States Dollars
	1987	1986	1985	1987
Total Trading Transactions (Notes 7 and 8)	**¥14,168,300**	¥18,081,547	¥17,598,032	**$ 97,043,1**
Revenues:				
Gross trading profit (Note 8)	**¥ 341,165**	¥ 366,679	¥ 371,239	**$ 2,336,7**
Rent and warehousing income	**10,560**	10,120	10,006	**72,3**
Total	**351,725**	376,799	381,245	**2,409,0**
Expenses:				
Selling, general, and administrative	**273,436**	274,666	266,935	**1,872,8**
Provision for doubtful receivables	**31,599**	26,814	14,440	**216,4**
Total	**305,035**	301,480	281,375	**2,089,2**
Operating Income (Note 7)	**46,690**	75,319	99,870	**319,7**
Other Income (Expenses):				
Interest expense (net of interest income: 1987, ¥145,188 million—$994,436 thousand; 1986, ¥184,342 million; 1985, ¥190,246 million)	**(51,491)**	(70,284)	(85,666)	**(352,6**
Dividends	**8,681**	7,084	6,630	**59,4**
Profit on securities—net	**27,182**	31,500	10,883	**186,1**
Provision for estimated losses on foreign investment (Note 2)	**(4,502)**	(5,473)	(5,929)	**(30,8**
Sundry—net	**9,674**	(1,148)	(3,579)	**66,2**
Other income (expenses)—net	**(10,456)**	(38,321)	(77,661)	**(71,6**
Income before Income Taxes and Equity in Earnings	**36,234**	36,998	22,209	**248,1**
Provision for Income Taxes (Notes 1 and 10):				
Current	**20,775**	34,522	30,298	**142,2**
Deferred	**(3,248)**	(5,082)	(9,124)	**(22,2**
Total	**17,527**	29,440	21,174	**120,0**
Income before Equity in Earnings	**18,707**	7,558	1,035	**128,1**
Equity in Earnings (Losses) of Unconsolidated Subsidiaries and Associated Companies—Net (after income tax effect) (Note 2)	**(3,482)**	4,112	9,078	**(23,8**
Net Income	**¥ 15,225**	¥ 11,670	¥ 10,113	**$ 104,2**
	Yen			U.S. Dollars
Net Income per 20 Shares (Note 1)	**¥249**	¥198	¥185	**$1.7**

See accompanying notes to consolidated financial statements

CONSOLIDATED FINANCIAL STATEMENTS

and Consolidated Subsidiaries

Consolidated Balance Sheets

March 31, 1987 and 1986

	Millions of Yen		Translation into Tho United States Dollars
ASSETS	**1987**	1986	**1987**
Current Assets:			
Cash	**¥ 138,851**	¥ 182,121	**$ 951,0**
Time deposits (Note 3)	**443,065**	438,750	**3,034,6**
Marketable securities (Notes 1 and 2)	**205,490**	112,789	**1,407,4**
Trade receivables (Note 3):			
Notes and loans, less unearned interest	**1,060,883**	1,159,416	**7,266,3**
Accounts	**1,043,060**	1,124,498	**7,144,2**
Unconsolidated subsidiaries and associated companies	**232,859**	250,450	**1,594,9**
Allowance for doubtful receivables	**(16,211)**	(27,307)	**(111,0**
Inventories (Notes 1 and 3)	**294,894**	345,954	**2,019,8**
Advance payments to suppliers	**94,786**	119,466	**649,2**
Deferred income taxes (Note 1)	**39,565**	26,401	**270,9**
Prepayments	**73,462**	90,026	**503,1**
Total current assets	**3,610,704**	3,822,564	**24,730,8**
Investments and Non-current Receivables (Note 3):			
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Other investments (Notes 1 and 2)	**357,541**	222,661	**2,448,91**
Non-current trade receivables, less unearned interest	**894,715**	939,608	**6,128,18**
Allowance for doubtful receivables	**(93,034)**	(92,500)	**(637,21**
Allowance for estimated losses on foreign investment (Note 2)	**(75,813)**	(71,311)	**(519,26**
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Total investments and non current receivables	**1,349,731**	1,325,728	**9,244,73**
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Buildings, including leasehold improvements	**151,885**	158,722	**1,040,30**
Equipment and fixtures	**84,208**	91,769	**576,76**
Ships	**2,052**	6,838	**14,05**
Projects in progress	**2,054**	3,406	**14,06**
Total	**288,605**	308,587	**1,976,74**
Less accumulated depreciation (Note 1)	**104,511**	109,579	**715,82**
Property and equipment—net	**184,094**	199,008	**1,260,91**
Deferred Income Taxes—Non-current (Note 1)	**18,616**	24,982	**127,50**
Miscellaneous Assets (less amortization)	**22,775**	22,239	**155,99**
Total	**¥5,185,920**	¥5,394,521	**$35,520,00**

See accompanying notes to consolidated financial statements

LIABILITIES AND SHAREHOLDERS' EQUITY	Millions of Yen 1987	1986	Translation into Thousands of United States Dollars (Note 1) 1987
Current Liabilities:			
Short-term bank loans (Notes 3 and 4)	**¥1,367,664**	¥1,230,949	**$ 9,367,562**
Notes discounted with banks (Note 4)	**120,311**	209,981	**824,048**
Current maturities of long-term debt (Notes 3 and 4)	**221,760**	204,069	**1,518,904**
Trade payables:			
Notes and acceptances (Note 3)	**684,886**	866,077	**4,691,000**
Accounts	**926,217**	975,224	**6,343,952**
Unconsolidated subsidiaries and associated companies	**72,573**	92,953	**497,075**
Accrued expenses:			
Income taxes	**11,888**	20,124	**81,425**
Interest	**19,353**	17,622	**132,555**
Other	**29,056**	27,857	**199,013**
Advances from customers	**87,221**	92,321	**597,404**
Deposits	**26,746**	21,123	**183,192**
Total current liabilities	**3,567,675**	3,758,300	**24,436,130**
Long-term Debt, less Current Maturities (Notes 3 and 4)	**1,352,054**	1,405,552	**9,260,644**
Accrued Pension Costs and Liability for Severance Indemnities (Notes 1 and 5)	**25,365**	23,970	**173,733**
Minority Interests	**11,940**	10,500	**81,781**
Shareholders' Equity (Note 6):			
Common stock, ¥50 par—authorized, 2,500,000,000 shares; issued and outstanding: 1987—1,208,066,011 shares; 1986—1,005,822,321 shares	**62,417**	53,163	**427,514**
Capital surplus (Note 4)	**101,000**	60,602	**691,781**
Retained earnings:			
Appropriated for legal reserve	**13,383**	12,644	**91,664**
Unappropriated (Notes 4 and 12)	**139,069**	129,843	**952,527**
Foreign currency translation adjustments	**(86,983)**	(60,053)	**(595,774)**
Total shareholders' equity	**228,886**	196,199	**1,567,712**
Commitments and Contingent Liabilities (Note 11)			
Total	**¥5,185,920**	¥5,394,521	**$35,520,000**

Profit and Loss Accounts

For the year ended 31 December 1987

Australia and New Zealand Limited and Subsidiary Companies

	Notes	Consolidated 1987 $'000	Consolidated 1986 $'000	Holding Company 1987 $'000	Holding Company 1986 $'000
Operating Profit	3	**26,770**	22,546	**7,645**	4,814
Income tax attributable to operating profit	6	**13,185**	10,715	**66**	(27)
Operating Profit After Income Tax		**13,585**	11,831	**7,579**	4,841
Gain on inventory valuation after income tax	7		1,488		
Loss on extraordinary items		**1,890**	914	**350**	
Income tax attributable to loss on extraordinary items		**30**	604		
Loss on extraordinary items after income tax	8	**1,860**	310	**350**	
Operating Profit and Extraordinary Items After Income Tax		**11,725**	13,009	**7,229**	4,841
Retained profits at the beginning of the financial year		**49,660**	39,109	**23,384**	21,001
Total available for appropriation		**61,385**	52,118	**30,613**	25,842
Dividends – interims paid		**5,409**	2,458	**5,409**	2,458
– final proposed		**2,950**		**2,950**	
Retained Profits at the End of the Financial Year		**$53,026**	$49,660	**$22,254**	$23,384

Notes to and forming part of these accounts and the group accounts are set out on pages 12 to 19.

Balance Sheets
As at 31 December 1987

Australia and New Zealand Limited
and Subsidiary Companies

	Notes	Consolidated 1987 $'000	Consolidated 1986 $'000	Holding Company 1987 $'000	Holding Company 1986 $'000
Current Assets					
Cash		**19,287**	14,276	**2,403**	1,024
Receivables	9	**37,645**	36,355	**5**	6
Investments	10	**5,000**	5,000	**5,000**	
Inventories	11	**37,719**	34,766		
Prepayments and deferred charges		**685**	1,002		
Total Current Assets		**100,336**	91,399	**7,408**	1,030
Non-Current Assets					
Investments	10		5,000	**26,632**	31,632
Property, plant and equipment	12	**31,151**	28,589		
Future income tax benefits	13	**2,869**	2,815	**501**	427
Total Non-Current Assets		**34,020**	36,404	**27,133**	32,059
Total Assets		**134,356**	127,803	**34,541**	33,089
Current Liabilities					
Creditors and borrowings	14	**32,394**	37,725	**79**	126
Provisions	15	**22,837**	17,165	**4,148**	1,555
Total Current Liabilities		**55,231**	54,890	**4,227**	1,681
Non-Current Liabilities					
Provisions	15	**3,703**	2,234	**36**	
Total Non-Current Liabilities		**3,703**	2,234	**36**	
Total Liabilities		**58,934**	57,124	**4,263**	1,681
Net Assets		**$75,422**	$70,679	**$30,278**	$31,408
Shareholders' Equity					
Share capital	16	**4,917**	4,917	**4,917**	4,917
Reserves	17	**17,479**	16,102	**3,107**	3,107
Retained profits		**53,026**	49,660	**22,254**	23,384
Total Shareholders' Equity		**$75,422**	$70,679	**$30,278**	$31,408

Notes to and forming part of these accounts and the group accounts are set out on pages 12 to 19.

STATEMENTS OF INCOME AND REINVESTED EARNINGS FOR THE YEARS ENDED DECEMBER 31

Dollars in Millions

	1987	1986*	1985*
Operating Revenues			
Local service	$ 942.5	$ 947.8	$ 906.0
Network access	802.9	785.5	683.4
Toll service	646.9	618.6	622.0
Directory advertising and other	395.2	350.3	302.0
Provision for uncollectibles	(11.9)	(8.4)	(9.5)
	2,775.6	2,693.8	2,503.9
Operating Expenses			
Employee costs, including benefits and taxes	796.7	803.4	784.6
Depreciation and amortization	556.4	435.2	394.6
Other	565.5	536.9	529.9
	1,918.6	1,775.5	1,709.1
Net operating revenues	857.0	918.3	794.8
Operating Taxes			
Federal income tax	212.0	283.6	214.1
Other	169.4	162.4	165.9
	381.4	446.0	380.0
Operating income	475.6	472.3	414.8
Other Income (Expense)			
Interest charged construction	10.9	9.4	15.5
Miscellaneous—net	(3.4)	(1.2)	(1.2)
	7.5	8.2	14.3
Interest Expense	110.8	106.9	128.9
Net Income	$ 372.3	$ 373.6	$ 300.2
Reinvested Earnings			
At beginning of year	$ 824.2	$ 710.0	$ 654.8
Add: Net income	372.3	373.6	300.2
	1,196.5	1,083.6	955.0
Deduct: Dividends declared and paid	302.0	259.4	245.0
At End of Year	$ 894.5	$ 824.2	$ 710.0

The accompanying notes are an integral part of these financial statements.

**Certain items have been reclassified to conform to the 1987 presentation.*

BALANCE SHEETS AS OF DECEMBER 31

Dollars in Millions

Assets	1987	1986
Telephone Plant — at cost		
In service	$6,687.4	$6,309.6
Under construction and other	145.9	130.0
	6,833.3	6,439.6
Accumulated depreciation	(2,168.2)	(1,802.2)
	4,665.1	4,637.4
Current Assets		
Cash	6.7	9.6
Accounts receivable (net of allowances for uncollectibles of $15.8 and $14.0)	436.6	454.1
Material and supplies	22.9	20.5
Prepaid expenses	27.4	13.5
Deferred charges	160.0	146.0
	653.6	643.7
Deferred Charges and Other Assets	104.2	81.5
Total Assets	$5,422.9	$5,362.6
Shareowner's Investment and Liabilities		
Shareowner's Investment		
Common stock — one share, without par value, owned by parent	$1,381.2	$1,381.2
Reinvested earnings	894.5	824.2
	2,275.7	2,205.4
Long-Term Debt	1,216.5	1,264.6
Current Liabilities		
Debt maturing within one year	171.8	70.6
Accounts payable		
Parent and affiliates	23.4	20.1
Other	370.3	340.7
Advance billing and customer deposits	134.8	161.5
Accrued expenses		
Vacation pay	56.7	57.3
Interest	27.7	27.6
Taxes	2.3	55.7
	787.0	733.5
Deferred Credits		
Deferred income taxes	848.6	833.5
Unamortized investment tax credits	247.8	273.9
Other	47.3	51.7
	1,143.7	1,159.1
Commitments and Contingencies		
Total Shareowner's Investment and Liabilities	$5,422.9	$5,362.6

The accompanying notes are an integral part of these financial statements.

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Consolidated Statement of Income

The Company and Subsidiaries

(Dollars in millions, except per share)	Year Ended December 31, 1987	1986	1985
Net Sales	$ 9,905.2	$9,040.0	$8,341.1
Other Income	179.9	121.0	114.2
	10,085.1	9,161.0	8,455.3
Cost and Expenses:			
Cost of goods sold	7,374.6	6,941.5	6,550.4
Selling, administrative and general expense	1,634.9	1,596.6	1,380.9
Interest and amortization of debt discount and expense	282.5	121.9	101.5
Unusual items	(135.0)	10.1	21.3
Foreign currency exchange	38.9	19.1	33.8
Minority interest in net income of subsidiaries	16.8	9.6	6.6
	9,212.7	8,698.8	8,094.5
Income from continuing operations before income taxes	872.4	462.2	360.8
United States and foreign taxes on income	358.5	245.4	133.7
Income from continuing operations	513.9	216.8	227.1
Discontinued operations	257.0	(92.7)	185.3
Net Income	$ 770.9	$ 124.1	$ 412.4
Per Share of Common Stock:			
Income from continuing operations	$ 8.49	$2.02	$2.11
Discontinued operations	4.24	(.86)	1.73
Net Income	$12.73	$1.16	$3.84

The accompanying accounting policies and notes are an integral part of this financial statement.

Consolidated Balance Sheet

The Company and Subsidiaries

(Dollars in millions)	December 31, 1987	1986
ASSETS		
Current Assets:		
Cash and short term securities	$ 200.5	$ 130.5
Accounts and notes receivable	1,501.3	1,986.5
Inventories	1,501.4	1,352.2
Prepaid expenses	101.3	82.7
Net assets held for sale	—	107.8
Total Current Assets	3,304.5	3,659.7
Other Assets:		
Investments in nonconsolidated subsidiaries and affiliates, at equity	107.6	32.9
Long term accounts and notes receivable	354.0	240.0
Investments and miscellaneous assets, at cost	53.8	34.4
Deferred pension plan cost	373.1	320.2
Deferred charges	74.6	72.1
Net assets held for sale	—	96.6
	963.1	796.2
Properties and Plants	4,128.3	4,583.4
	$8,395.9	$9,039.3
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current Liabilities:		
Accounts payable—trade	$ 821.9	$ 749.5
Accrued payrolls and other compensation	322.9	337.1
Other current liabilities	375.9	406.9
United States and foreign taxes:		
Current	268.7	168.5
Deferred	16.0	—
Notes payable to banks and overdrafts	244.0	304.2
Long term debt due within one year	90.2	44.4
Deferred gain on sale of assets	—	134.7
Total Current Liabilities	2,139.6	2,145.3
Long Term Debt and Capital Leases	3,282.4	2,914.9
Other Long Term Liabilities	376.7	317.5
Deferred Income Taxes	679.3	586.4
Minority Equity in Subsidiaries	83.5	72.6
Shareholders' Equity:		
Preferred stock, no par value:		
Authorized, 50,000,000 shares		
Outstanding shares, none	—	—
Common stock, no par value:		
Authorized, 150,000,000 shares		
Outstanding shares, 56,986,579 (97,080,482 in 1986)	57.0	97.1
Capital surplus	11.2	104.2
Retained earnings	1,922.6	3,122.2
	1,990.8	3,323.5
Foreign currency translation adjustment	(156.4)	(320.9)
Total Shareholders' Equity	1,834.4	3,002.6
	$8,395.9	$9,039.3

The accompanying accounting policies and notes are an integral part of this financial statement.

Consolidated Statement of Changes in Financial Position

The Company and Subsidiaries

(Dollars in millions)	Year Ended December 31, 1987	1986	1985
Funds provided from operations:			
Income from continuing operations	$ 513.9	$ 216.8	$ 227.1
Non-cash items:			
Depreciation	349.9	349.0	268.3
Unusual items	4.1	(45.5)	28.5
Accounts and notes receivable reduction (increase)	485.2	(295.2)	—
Inventories (increase) reduction	(149.2)	26.3	(45.1)
Long term accounts and notes receivable (increase)	(114.0)	(113.2)	(87.2)
United States and foreign taxes increase (reduction)	116.2	(64.2)	(59.3)
Deferred income taxes increase	92.9	111.1	26.4
Other items	118.7	170.7	138.6
Income (loss) from discontinued operations	257.0	(92.7)	185.3
	1,674.7	263.1	682.6
Funds (used for) provided from financing:			
Notes payable to banks and overdrafts (reduction) increase	(60.2)	187.9	(41.1)
Long term debt and capital lease reduction	(2,846.2)	(109.6)	(234.7)
Long term debt and capital lease increase	3,259.5	1,455.7	982.4
Common stock issued	14.6	66.0	43.4
Common stock acquired	(2,027.2)	(614.2)	—
	(1,659.5)	985.8	750.0
Funds used for investment:			
Capital expenditures	(665.6)	(1,130.8)	(1,098.2)
Property and plant dispositions	925.0	254.3	405.6
Discontinued operations—capital expenditures	(92.2)	(256.8)	(577.7)
Other transactions	(185.9)	(43.4)	(47.0)
	(18.7)	(1,176.7)	(1,317.3)
Dividends paid	(91.0)	(174.1)	(171.3)
Foreign currency translation adjustment reduction	164.5	93.4	51.6
Cash and short term securities increase (reduction)	$ 70.0	$(8.5)	$(4.4)

The accompanying accounting policies and notes are an integral part of this financial statement.

STATEMENTS OF INCOME AND REINVESTED EARNINGS FOR THE YEARS ENDED DECEMBER 31

Dollars in Millions

	1987	1986*	1985*
Operating Revenues			
Local service	$ 942.5	$ 947.8	$ 906.0
Network access	802.9	785.5	683.4
Toll service	646.9	618.6	622.0
Directory advertising and other	395.2	350.3	302.0
Provision for uncollectibles	(11.9)	(8.4)	(9.5)
	2,775.6	2,693.8	2,503.9
Operating Expenses			
Employee costs, including benefits and taxes	796.7	803.4	784.6
Depreciation and amortization	556.4	435.2	394.6
Other	565.5	536.9	529.9
	1,918.6	1,775.5	1,709.1
Net operating revenues	857.0	918.3	794.8
Operating Taxes			
Federal income tax	212.0	283.6	214.1
Other	169.4	162.4	165.9
	381.4	446.0	380.0
Operating income	475.6	472.3	414.8
Other Income (Expense)			
Interest charged construction	10.9	9.4	15.5
Miscellaneous — net	(3.4)	(1.2)	(1.2)
	7.5	8.2	14.3
Interest Expense	110.8	106.9	128.9
Net Income	$ 372.3	$ 373.6	$ 300.2
Reinvested Earnings			
At beginning of year	$ 824.2	$ 710.0	$ 654.8
Add: Net income	372.3	373.6	300.2
	1,196.5	1,083.6	955.0
Deduct: Dividends declared and paid	302.0	259.4	245.0
At End of Year	$ 894.5	$ 824.2	$ 710.0

The accompanying notes are an integral part of these financial statements.

**Certain items have been reclassified to conform to the 1987 presentation.*

BALANCE SHEETS AS OF DECEMBER 31

Dollars in Millions

Assets	1987	1986
Telephone Plant — at cost		
In service	$6,687.4	$6,309.6
Under construction and other	145.9	130.0
	6,833.3	6,439.6
Accumulated depreciation	(2,168.2)	(1,802.2)
	4,665.1	4,637.4
Current Assets		
Cash	6.7	9.6
Accounts receivable (net of allowances for uncollectibles of $15.8 and $14.0)	436.6	454.1
Material and supplies	22.9	20.5
Prepaid expenses	27.4	13.5
Deferred charges	160.0	146.0
	653.6	643.7
Deferred Charges and Other Assets	104.2	81.5
Total Assets	$5,422.9	$5,362.6
Shareowner's Investment and Liabilities		
Shareowner's Investment		
Common stock — one share, without par value, owned by parent	$1,381.2	$1,381.2
Reinvested earnings	894.5	824.2
	2,275.7	2,205.4
Long-Term Debt	1,216.5	1,264.6
Current Liabilities		
Debt maturing within one year	171.8	70.6
Accounts payable		
Parent and affiliates	23.4	20.1
Other	370.3	340.7
Advance billing and customer deposits	134.8	161.5
Accrued expenses		
Vacation pay	56.7	57.3
Interest	27.7	27.6
Taxes	2.3	55.7
	787.0	733.5
Deferred Credits		
Deferred income taxes	848.6	833.5
Unamortized investment tax credits	247.8	273.9
Other	47.3	51.7
	1,143.7	1,159.1
Commitments and Contingencies		
Total Shareowner's Investment and Liabilities	$5,422.9	$5,362.6

The accompanying notes are an integral part of these financial statements.

Consolidated Statement of Income

The Company and Subsidiaries

(Dollars in millions, except per share)	Year Ended December 31, 1987	1986	1985
Net Sales	$ 9,905.2	$9,040.0	$8,341.1
Other Income	179.9	121.0	114.2
	10,085.1	9,161.0	8,455.3
Cost and Expenses:			
Cost of goods sold	7,374.6	6,941.5	6,550.4
Selling, administrative and general expense	1,634.9	1,596.6	1,380.9
Interest and amortization of debt discount and expense	282.5	121.9	101.5
Unusual items	(135.0)	10.1	21.3
Foreign currency exchange	38.9	19.1	33.8
Minority interest in net income of subsidiaries	16.8	9.6	6.6
	9,212.7	8,698.8	8,094.5
Income from continuing operations before income taxes	872.4	462.2	360.8
United States and foreign taxes on income	358.5	245.4	133.7
Income from continuing operations	513.9	216.8	227.1
Discontinued operations	257.0	(92.7)	185.3
Net Income	$ 770.9	$ 124.1	$ 412.4
Per Share of Common Stock:			
Income from continuing operations	$ 8.49	$2.02	$2.11
Discontinued operations	4.24	(.86)	1.73
Net Income	$12.73	$1.16	$3.84

The accompanying accounting policies and notes are an integral part of this financial statement.

Consolidated Balance Sheet

The Company and Subsidiaries

(Dollars in millions)	December 31, 1987	1986
ASSETS		
Current Assets:		
Cash and short term securities	$ 200.5	$ 130.5
Accounts and notes receivable	1,501.3	1,986.5
Inventories	1,501.4	1,352.2
Prepaid expenses	101.3	82.7
Net assets held for sale	—	107.8
Total Current Assets	3,304.5	3,659.7
Other Assets:		
Investments in nonconsolidated subsidiaries and affiliates, at equity	107.6	32.9
Long term accounts and notes receivable	354.0	240.0
Investments and miscellaneous assets, at cost	53.8	34.4
Deferred pension plan cost	373.1	320.2
Deferred charges	74.6	72.1
Net assets held for sale	—	96.6
	963.1	796.2
Properties and Plants	4,128.3	4,583.4
	$8,395.9	$9,039.3
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current Liabilities:		
Accounts payable—trade	$ 821.9	$ 749.5
Accrued payrolls and other compensation	322.9	337.1
Other current liabilities	375.9	406.9
United States and foreign taxes:		
Current	268.7	168.5
Deferred	16.0	—
Notes payable to banks and overdrafts	244.0	304.2
Long term debt due within one year	90.2	44.4
Deferred gain on sale of assets	—	134.7
Total Current Liabilities	2,139.6	2,145.3
Long Term Debt and Capital Leases	3,282.4	2,914.9
Other Long Term Liabilities	376.7	317.5
Deferred Income Taxes	679.3	586.4
Minority Equity in Subsidiaries	83.5	72.6
Shareholders' Equity:		
Preferred stock, no par value:		
Authorized, 50,000,000 shares		
Outstanding shares, none	—	—
Common stock, no par value:		
Authorized, 150,000,000 shares		
Outstanding shares, 56,986,579 (97,080,482 in 1986)	57.0	97.1
Capital surplus	11.2	104.2
Retained earnings	1,922.6	3,122.2
	1,990.8	3,323.5
Foreign currency translation adjustment	(156.4)	(320.9)
Total Shareholders' Equity	1,834.4	3,002.6
	$8,395.9	$9,039.3

The accompanying accounting policies and notes are an integral part of this financial statement.

Statement of profit

for year ended 31 May 1987

The Company Limited and Subsidiaries

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	Notes	Consolidated 1987	Consolidated 1986	Holding Company 1987	Holding Company 1986
		Thousands of dollars $000		Thousands of dollars $000	
Operating revenue					
Sales		**8 761 858**	8 503 322	**1 418 342**	1 471 567
Other revenue	2	**610 625**	239 661	**744 389**	994 186
		9 372 483	8 742 983	**2 162 731**	2 465 753
Profit before depreciation, interest expense and income tax	2-6	**2 601 966**	2 755 599	**832 943**	1 175 324
Deduct					
Depreciation	7	**690 909**	581 136	**90 930**	78 278
Profit before interest expense and income tax		**1 911 057**	2 174 463	**742 013**	1 097 046
Deduct					
Interest expense	8	**451 296**	318 270	**505 528**	372 649
Profit before income tax	9	**1 459 761**	1 856 193	**236 485**	724 397
Deduct					
Income tax expense	10	**619 520**	847 414	**40 463**	106 736
Net profit before minority interests and extraordinary items	11	**840 241**	1 008 779	**196 022**	617 661
Deduct					
Minority interests		**19 971**	20 576		
Net profit attributable to BHP shareholders, before extraordinary items		**820 270**	988 203		
Add					
Extraordinary items net of tax – attributable to BHP shareholders	12	**41 035**	24 712	**—**	57 585
Net profit attributable to BHP shareholders		**861 305**	1 012 915	**196 022**	675 246
Profits of BHP shareholders					
Profits available for appropriation					
Unappropriated profits brought forward from previous year	13	**2 146 628**	1 610 976	**856 272**	637 083
Net profit from current year		**861 305**	1 012 915	**196 022**	675 246
		3 007 933	2 623 891	**1 052 294**	1 312 329
Profits available for appropriation were applied to					
Reserves	13	**91**	47 066	**—**	25 860
Dividends	14	**475 983**	430 197	**475 983**	430 197
Unappropriated profits carried forward	13	**2 531 859**	2 146 628	**576 311**	856 272
		3 007 933	2 623 891	**1 052 294**	1 312 329

	Notes	Consolidated 1987	Consolidated 1986	Holding Company 1987	Holding Company 1986
		Thousands of dollars $000		Thousands of dollars $000	
Funds have been provided from					
Shareholders' equity					
Paid up capital of -- shareholders	15	**1 552 095**	1 258 041	**1 552 095**	1 258 041
Share subscriptions receivable	15	**107 053**	—	**107 053**	—
Reserves and unappropriated profits	13	**5 756 729**	5 317 417	**2 262 187**	2 492 202
Total shareholders' equity		**7 415 877**	6 575 458		
Equity of other shareholders of subsidiary companies		**366 348**	144 483		
Total shareholders' equity		**7 782 225**	6 719 941	**3 921 335**	3 750 243
Non-current liabilities	17	**6 777 381**	5 605 344	**813 485**	944 339
Current liabilities					
Provisions	16	**702 936**	1 059 133	**83 396**	150 125
Borrowings repayable within twelve months	18	**965 413**	1 910 875	**51 929**	162 738
Creditors	19	**1 291 739**	1 253 718	**3 964 916**	3 049 613
		2 960 088	4 223 726	**4 100 241**	3 362 476
Total funds provided		**17 519 694**	16 549 011	**8 835 061**	8 057 058
These funds are represented by					
Fixed assets	20	**10 975 944**	10 647 068	**1 183 413**	1 088 694
Investments	21	**2 229 844**	2 029 566	**3 234 649**	2 771 765
Other non-current assets	22	**727 010**	539 336	**459 702**	33 302
Current assets					
Inventories	23	**1 562 035**	1 407 275	**312 874**	271 128
Debtors	24	**1 479 599**	1 220 339	**3 623 491**	3 887 223
Cash and short term investments	25	**376 278**	567 718	**20 932**	4 946
		3 417 912	3 195 332	**3 957 297**	4 163 297
Intangibles	26	**168 984**	137 709		
Total assets employed		**17 519 694**	16 549 011	**8 835 061**	8 057 058

Limited and Subsidiaries

P

2 Statement of sources and applications of funds

	Consolidated 1987	Consolidated 1986
	Thousands of dollars $000	
Sources of funds		
Opening net liquids†	**354 768**	646 095
Funds from operations		
Inflows of funds from operations		
Sales	**8 761 858**	8 503 322
Proceeds from sales of non-current assets	**201 357**	59 828
Other revenue	**409 268**	179 833
	9 372 483	8 742 983
deduct Outflows of funds for operations	**7 018 699**	6 169 892
Total funds from operations (a)	**2 353 784**	2 573 091
Other funds		
Extraordinary items	**407 960**	45 927
Increase in other non-current liabilities	**114 536**	344 096
Debt raising		
Long term loans	**2 432 440**	2 604 908
Equity financing		
Proceeds from share issues		
shareholders	**443 704**	132 062
Other shareholders	**215 000**	18 119
Total funds available	**6 322 192**	6 364 298

†Cash and short term investments (note 25) less overdrafts (note 18)

	Consolidated 1987	Consolidated 1986
	Thousands of dollars $000	
Applications of funds		
Purchase of non-current assets*		
Fixed assets*	**1 626 100**	3 812 224
Investments*	**338 786**	1 638 939
Other non-current assets	**242 136**	58 043
Increased interest in subsidiary	**—**	64 775
Repayment of debt		
Long term loans	**916 081**	723 352
Non recourse loans	**53 253**	126 595
Income tax paid	**686 706**	454 915
Dividends paid	**489 257**	441 852
	4 352 319	7 320 695
Increase/(decrease) in working capital		
Inventories	**154 760**	138 064
Debtors	**259 260**	71 495
Provisions other than tax	**(8 594)**	(52 455)
Other current borrowings	**1 290 135**	(1 243 032)
Creditors	**(38 021)**	(258 249)
Net difference on acquisitions and disposals (b)	**19 390**	—
Other variations	**36 367**	33 012
Closing net liquids †	**256 576**	354 768
Total funds applied	**6 322 192**	6 364 298

*Includes interest capitalised

Funds from operations

The reconciliation of funds from operations with profit before income tax is as follows:

Total Funds from operations	**2 353 784**	2 573 091
deduct/(add)		
Depreciation	**690 909**	581 136
Amortisation	**14 149**	15 851
Provision for employee benefits and major repairs and rehabilitation	**11 727**	69 821
Proceeds from sale of non-current assets	**201 357**	59 828
Net profit from sale of non-current assets	**(13 100)**	(9 738)
Other	**(11 019)**	—
Profit before income tax	**1 459 761**	1 856 193

(b) Acquisitions and disposals

Amounts included in the funds statement have been affected by the acquisitions and disposals as follows:

Fixed assets	**(66 668)**	2 100 412
Investments	**—**	219 017
Other non-current assets	**(2 450)**	20 889
Inventories	**8 357**	32 914
Debtors	**(9 862)**	106 503
Cash and short term investments	**(190)**	18 521
Non-current liabilities	**137**	(423 827)
Provisions	**518**	(50 538)
Borrowings repayable within twelve months	**(2 924)**	(18 064)
Creditors	**3 486**	(146 599)
	(69 596)	1 859 228
Minority interest in new subsidiary	**—**	(745)
Net identifiable assets	**(69 596)**	1 858 483
Net consideration	**(50 206)**	1 858 483
Net difference on acquisitions and disposals	**19 390**	—

Liquidity

Standbys and other support facilities

Arrangements with banks to provide standby funds and/or support facilities

In Australian currency	**267 079**	172 221
In other currencies	**1 577 082**	1 317 702
	1 844 161	1 489 923
Amounts utilised	**1 169 461**	1 036 381
Net available	**674 700**	453 542

In addition to the above, at 31 May 1986 a revolving loan facility of US$400 000 000 was fully drawn.

PA

COMPANY AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF OPERATIONS AND RETAINED EARNINGS

	Year Ended December 31, 1987	Period from May 1 through December 31, 1986*
	(Thousands)	
Net sales	$1,379,786	$972,819
Cost of products sold	1,068,449	732,936
Gross Earnings	311,337	239,883
Selling, administrative and general expenses	152,678	99,764
	158,659	140,119
Other income (expense):		
Interest expense	(179,167)	(123,958)
Sundry expense	(21,455)	(13,120)
Sundry income	16,331	6,772
	(184,291)	(130,306)
Earnings (Loss) before taxes and extraordinary items	(25,632)	9,813
Income tax benefit	3,423	84,855
Earnings (Loss) before extraordinary items	(22,209)	94,668
Extraordinary items:		
Extraordinary loss on refinancing of debt (net of applicable income tax benefit of $5,582)	(8,373)	—
Extraordinary gain on early extinguishment of debt (net of applicable income tax expense of $5,448)	8,173	—
Net Earnings (Loss)	$ (22,409)	$ 94,668
Retained Earnings		
Balance beginning of period	$ 91,668	$ —
Net earnings (loss) for the period	(22,409)	94,668
Cash dividends	(3,000)	(3,000)
Balance End of Period	$ 66,259	$ 91,668

*Restated to reflect the adoption of S.F.A.S. No. 96, "Accounting for Income Taxes." See Note "Restatement for Accounting Change."

See notes to consolidated financial statements.

PA

COMPANY AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS

ASSETS

	December 31, 1987	1986*
	(Thousands)	
Current Assets		
Cash and short-term investments	$ 22,973	$ 17,055
Trade and sundry receivables, less allowances (1987-$24,054; 1986-$24,596)	181,348	195,052
Inventories:		
Finished goods	65,217	77,379
Products in process	4,242	3,235
Materials and supplies	37,219	31,714
	106,678	112,328
Other	15,686	13,954
Total Current Assets	326,685	338,389
Property, Plant and Equipment—Based on Cost		
Mineral deposits	7,088	7,061
Plant sites	53,573	53,781
Buildings	252,932	254,225
Machinery and equipment	779,185	777,764
	1,092,778	1,092,831
Less allowances for depreciation and depletion	124,865	60,970
	967,913	1,031,861
Goodwill, net of accumulated amortization (1987–$22,665; 1986–$8,886)	529,914	527,243
Investments and Other Assets	149,524	156,832
	$1,974,036	$2,054,325

*Restated to reflect the adoption of S.F.A.S. No. 96, "Accounting for Income Taxes." See Note "Restatement for Accounting Change."

COMPANY AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS (Continued)

LIABILITIES AND STOCKHOLDER'S EQUITY

	December 31, 1987	1986*
	(Thousands)	
Current Liabilities		
Accounts and notes payable	$ 76,293	$ 71,739
Accrued liabilities	109,770	106,397
Income taxes	3,614	4,631
Current portion of long-term debt	3,657	3,152
Total Current Liabilities	193,334	185,919
Long-Term Debt	1,298,292	1,350,453
Deferred Items		
Income taxes	271,680	301,265
Other	55,473	36,278
Stockholder's Equity		
Common stock—$1 par value, 1,000 shares authorized and issued	1	1
Additional paid-in capital	89,999	89,999
Retained earnings	66,259	91,668
Equity adjustment from foreign currency translation	292	87
Notes receivable—management group	(1,294)	(1,345)
	155,257	180,410
	$1,974,036	$2,054,325

See notes to consolidated financial statements.

COMPANY AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CHANGES IN FINANCIAL POSITION

	Year Ended December 31, 1987	Period from May 1 through December 31, 1986*
	(Thousands)	
Cash Provided:		
From operations:		
Net earnings (loss) before extraordinary items	$(22,209)	$ 94,668
Depreciation, depletion and amortization	76,516	52,292
Accretion of original issue discount	81,366	50,790
Amortization of intangible assets	18,015	11,939
Deferred income tax benefit	(7,841)	(100,999)
Total from Operations Before Extraordinary Items	145,847	108,690
Extraordinary Items:		
Extraordinary loss on refinancing of debt	(8,373)	—
Write-off of debt issuance costs	8,779	—
Extraordinary gain on early extinguishment of debt	8,173	—
Total from Extraordinary Items	8,579	—
Total from Operations	154,426	108,690
Changes in Noncash Components of Working Capital (Excluding Financing Transactions):		
Increase in noncash components of working capital related to merger	—	(225,857)
Accounts and notes receivable	13,704	15,140
Inventories	5,650	20,066
Other assets	(1,732)	7,538
Accounts payable and accrued liabilities	6,430	21,565
Income taxes	(1,017)	(8,847)
Net Changes in Noncash Components	23,035	(170,395)
Investment Transactions:		
Increase in noncurrent assets related to merger:		
Property, plant and equipment	—	(1,102,320)
Goodwill	(16,450)	(536,129)
Notes receivable—management group	—	(1,345)
Net pension asset	—	(53,576)
Organization costs	—	(25,769)
Other, net	—	(5,098)
Deferred income taxes	—	375,869
Property, plant and equipment purchases	(23,765)	(35,521)
Carrying value of properties sold or retired	10,528	28,983
Proceeds from sale of discontinued operations	—	64,192
Receipt of Lafarge Coppee stock	—	(39,269)
Sale of Compagnie du Platre stock	—	19,835
Other, net	4,157	—
Net Investment Transactions	(25,530)	(1,310,148)
Financing Transactions:		
Increase in current portion of long-term debt and notes payable	2,002	4,364
Issuance of long-term debt	430,000	1,570,932
Reduction of long-term debt	(575,015)	(273,388)
Issuance of common stock	—	90,000
Net Financing Transactions	(143,013)	1,391,908
Net cash provided before distribution of dividends	8,918	20,055
Cash dividends paid	(3,000)	(3,000)
Increase in Cash and Short-Term Investments	$ 5,918	$ 17,055

*Restated to reflect the adoption of S.F.A.S. No. 96, "Accounting for Income Taxes." See Note "Restatement for Accounting Change."

See notes to consolidated financial statements.

Company Limited and Subsidiaries

	Notes	Consolidated 1987	Consolidated 1986	Holding Company 1987	Holding Company 1986
		Thousands of dollars $000		Thousands of dollars $000	
Funds have been provided from					
Shareholders' equity					
Paid up capital of ... shareholders	15	**1 552 095**	1 258 041	**1 552 095**	1 258 041
Share subscriptions receivable	15	**107 053**	—	**107 053**	—
Reserves and unappropriated profits	13	**5 756 729**	5 317 417	**2 262 187**	2 492 202
Total shareholders' equity		**7 415 877**	6 575 458		
Equity of other shareholders of subsidiary companies		**366 348**	144 483		
Total shareholders' equity		**7 782 225**	6 719 941	**3 921 335**	3 750 243
Non-current liabilities	17	**6 777 381**	5 605 344	**813 485**	944 339
Current liabilities					
Provisions	16	**702 936**	1 059 133	**83 396**	150 125
Borrowings repayable within twelve months	18	**965 413**	1 910 875	**51 929**	162 738
Creditors	19	**1 291 739**	1 253 718	**3 964 916**	3 049 613
		2 960 088	4 223 726	**4 100 241**	3 362 476
Total funds provided		**17 519 694**	16 549 011	**8 835 061**	8 057 058
These funds are represented by					
Fixed assets	20	**10 975 944**	10 647 068	**1 183 413**	1 088 694
Investments	21	**2 229 844**	2 029 566	**3 234 649**	2 771 765
Other non-current assets	22	**727 010**	539 336	**459 702**	33 302
Current assets					
Inventories	23	**1 562 035**	1 407 275	**312 874**	271 128
Debtors	24	**1 479 599**	1 220 339	**3 623 491**	3 887 223
Cash and short term investments	25	**376 278**	567 718	**20 932**	4 946
		3 417 912	3 195 332	**3 957 297**	4 163 297
Intangibles	26	**168 984**	137 709		
Total assets employed		**17 519 694**	16 549 011	**8 835 061**	8 057 058

Statement of profit

for year ended 31 May 1987

The Company Limited and Subsidiaries

	Notes	Consolidated 1987	Consolidated 1986	Holding Company 1987	Holding Company 1986
		Thousands of dollars $000		Thousands of dollars $000	
Operating revenue					
Sales		**8 761 858**	8 503 322	**1 418 342**	1 471 567
Other revenue	2	**610 625**	239 661	**744 389**	994 186
		9 372 483	8 742 983	**2 162 731**	2 465 753
Profit before depreciation, interest expense and income tax	2-6	**2 601 966**	2 755 599	**832 943**	1 175 324
Deduct					
Depreciation	7	**690 909**	581 136	**90 930**	78 278
Profit before interest expense and income tax		**1 911 057**	2 174 463	**742 013**	1 097 046
Deduct					
Interest expense	8	**451 296**	318 270	**505 528**	372 649
Profit before income tax	9	**1 459 761**	1 856 193	**236 485**	724 397
Deduct					
Income tax expense	10	**619 520**	847 414	**40 463**	106 736
Net profit before minority interests and extraordinary items	11	**840 241**	1 008 779	**196 022**	617 661
Deduct					
Minority interests		**19 971**	20 576		
Net profit attributable to shareholders, before extraordinary items		**820 270**	988 203		
Add					
Extraordinary items net of tax – attributable to BHP shareholders	12	**41 035**	24 712	**—**	57 585
Net profit attributable to shareholders		**861 305**	1 012 915	**196 022**	675 246
Profits of BHP shareholders					
Profits available for appropriation					
Unappropriated profits brought forward from previous year	13	**2 146 628**	1 610 976	**856 272**	637 083
Net profit from current year		**861 305**	1 012 915	**196 022**	675 246
		3 007 933	2 623 891	**1 052 294**	1 312 329
Profits available for appropriation were applied to					
Reserves	13	**91**	47 066	**—**	25 860
Dividends	14	**475 983**	430 197	**475 983**	430 197
Unappropriated profits carried forward	13	**2 531 859**	2 146 628	**576 311**	856 272
		3 007 933	2 623 891	**1 052 294**	1 312 329

COMPANY AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF OPERATIONS AND RETAINED EARNINGS

	Year Ended December 31, 1987	Period from May 1 through December 31, 1986*
	(Thousands)	
Net sales	$1,379,786	$972,819
Cost of products sold	1,068,449	732,936
Gross Earnings	311,337	239,883
Selling, administrative and general expenses	152,678	99,764
	158,659	140,119
Other income (expense):		
Interest expense	(179,167)	(123,958)
Sundry expense	(21,455)	(13,120)
Sundry income	16,331	6,772
	(184,291)	(130,306)
Earnings (Loss) before taxes and extraordinary items	(25,632)	9,813
Income tax benefit	3,423	84,855
Earnings (Loss) before extraordinary items	(22,209)	94,668
Extraordinary items:		
Extraordinary loss on refinancing of debt (net of applicable income tax benefit of $5,582)	(8,373)	—
Extraordinary gain on early extinguishment of debt (net of applicable income tax expense of $5,448)	8,173	—
Net Earnings (Loss)	$ (22,409)	$ 94,668
Retained Earnings		
Balance beginning of period	$ 91,668	$ —
Net earnings (loss) for the period	(22,409)	94,668
Cash dividends	(3,000)	(3,000)
Balance End of Period	$ 66,259	$ 91,668

*Restated to reflect the adoption of S.F.A.S. No. 96, "Accounting for Income Taxes." See Note "Restatement for Accounting Change."

See notes to consolidated financial statements.

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COMPANY AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS

ASSETS

	December 31, 1987	December 31, 1986*
	(Thousands)	
Current Assets		
Cash and short-term investments	$ 22,973	$ 17,055
Trade and sundry receivables, less allowances (1987-$24,054; 1986-$24,596)	181,348	195,052
Inventories:		
Finished goods	65,217	77,379
Products in process	4,242	3,235
Materials and supplies	37,219	31,714
	106,678	112,328
Other	15,686	13,954
Total Current Assets	326,685	338,389
Property, Plant and Equipment—Based on Cost		
Mineral deposits	7,088	7,061
Plant sites	53,573	53,781
Buildings	252,932	254,225
Machinery and equipment	779,185	777,764
	1,092,778	1,092,831
Less allowances for depreciation and depletion	124,865	60,970
	967,913	1,031,861
Goodwill, net of accumulated amortization (1987–$22,665; 1986–$8,886)	529,914	527,243
Investments and Other Assets	149,524	156,832
	$1,974,036	$2,054,325

*Restated to reflect the adoption of S.F.A.S. No. 96, "Accounting for Income Taxes." See Note "Restatement for Accounting Change."

COMPANY AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS (Continued)

LIABILITIES AND STOCKHOLDER'S EQUITY

	December 31, 1987	1986*
	(Thousands)	
Current Liabilities		
Accounts and notes payable	$ 76,293	$ 71,739
Accrued liabilities	109,770	106,397
Income taxes	3,614	4,631
Current portion of long-term debt	3,657	3,152
Total Current Liabilities	193,334	185,919
Long-Term Debt	1,298,292	1,350,453
Deferred Items		
Income taxes	271,680	301,265
Other	55,473	36,278
Stockholder's Equity		
Common stock—$1 par value, 1,000 shares authorized and issued	1	1
Additional paid-in capital	89,999	89,999
Retained earnings	66,259	91,668
Equity adjustment from foreign currency translation	292	87
Notes receivable—management group	(1,294)	(1,345)
	155,257	180,410
	$1,974,036	$2,054,325

See notes to consolidated financial statements.

APPENDIX B

THE QUESTIONNAIRES

Accounts Experiment

Reports K L M N O P (indicate which accounts you are responding to by circling the relevant letter).

Please answer each of the following questions by writing **YES** or **NO** or **NOT SURE** after the question on this page.

1. Are the firm's financing and investment policies apparently creating greater profitability?

2. Has the composition of the firm's assets changed much in 1987?

3. At the end of 1987 did the firm appear to be able to finance its further growth from internally generated funds?

4. Is the firm likely to be able to pay its debts and commitments on time?

5. Has the firm become more reliant on loan creditors in 1987?

Accounts Experiment

Reports K L M N O P (indicate which accounts you are responding to by circling the relevant letter).

Please answer each of the following questions by writing **YES** or **NO** or **NOT SURE** after the question on this page.

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Accounts Experiment

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4. Has the composition of the firm's assets changed much in 1987?

5. Are the firm's financing and investment policies apparently creating greater profitability?

Accounts Experiment

Reports K L M N O P (indicate which accounts you are responding to by circling the relevant letter).

Please answer each of the following questions by writing YES or NO or NOT SURE after the question on this page.

1. Has the business raised new equity capital in the financial year 1987?

2. Did the business finish 1987 more indebted to outside creditors than it was at end 1986?

3. Has the business retained and ploughed back a higher proportion of its net earnings in 1987 than it did in 1986?

4. Has the business improved its ability to pay debts as they fall due (as shown by its net liquidity position) from the end of 1986 to the end of 1987?

5. Has the business allowed its net investment in fixed assets, subsidiaries and associates to shrink in 1987; in other words, has the asset base of the business (excluding working capital and intangibles) fallen in monetary terms?

Accounts Experiment

Reports K L M N O P (indicate which accounts you are responding to by circling the relevant letter).

Please answer each of the following questions by writing **YES** or **NO** or **NOT SURE** after the question on this page.

1. Has the business allowed its net investment in fixed assets, subsidiaries and associates to shrink in 1987, in other words, has the asset base of the business (excluding working capital and intangibles) fallen in monetary terms?

2. Has the business improved its ability to pay debts as they fall due (as shown by its net liquidity position) from the end of 1986 to the end of 1987?

3. Has the business retained and ploughed back a higher proportion of its net earnings in 1987 than it did in 1986?

4. Did the business finish 1987 more indebted to outside creditors than it was at end 1986?

5. Has the business raised new equity capital in the financial year 1987?

Accounts Experiment

Reports K L M N O P (indicate which accounts you are responding to by circling the relevant letter).

Please answer each of the following questions by writing **YES** or **NO** or **NOT SURE** after the question on this page.

1. Has the business retained and ploughed back a higher proportion of its net earnings in 1987 than it did in 1986?

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5. Has the business raised new equity capital in the financial year 1987?

APPENDIX C

SAMPLES OF THE PRELIMINARY INTERVIEWS

APPENDIX C

SAMPLES OF THE PRELIMINARY INTERVIEWS

This appendix transcribes the more informative of the interview notes mentioned in Chapter 8, in order to convey the backgrounds of the officers sampled from the banks.

Hong Kong Bank (Page) - Group A

The credit control department governs new credit and doubtful debts that are referred up by the branches as being of a non routine nature. "Factory inspection teams" check client stock levels on instruction from the credit control department.

Only started using funds flow statements 18 months ago and only adopted in house financial training (including funds flow) 3 years ago. Funds flow training is a half day with exercises and case studies, but can extend to a full day. Intends to prepare cash flow statements from clients' accounts by the third quarter of 1988 on a format that begins with funds flow from operations and ends with changes in short and long term loan balances.

Unquoted companies who are suspected of drifting into financial difficulties are required to submit monthly management accounts including a detailed income statement and usually also an ageing analysis of receivables, a cash flow report and cash flow forecast. The first sign of possible difficulty to the bank is diminishing activity through the current account, and this alone is often enough to trigger the involvement of the credit control department.

The bank defines working capital strictly as stock plus debtors less

creditors as that is the relevant definition for international trade financing.

The international business spreadsheet used has this format;

Operating funds flow

+/- working capital movements

= net operational cash flow [which must be +ve for loan to be granted]

Other inflows less outflows

Total net flows

Expended on / financed by

loans in descending maturity order

overdrafts

cash.

Key purpose of business finance courses (inntroductory and advanced) is to sensitize staff to the differences in accounting appearence between a successfully growing firm and a potentially failing one.

Hang Lung (Training Manager Kwan) - Group B

Small to medium clientele

Have their own financial analysts course mostly on how to do visits

Knowledge of customer the most important factor and accounts believed to conceal more than they reveal.

Standard Chartered (Senior Manager Parker) - Gp C

Funds flow statement important in trade financing in last 2 years possibly on account of the previous incidence of bad debts.

Trade finance is the main business but that could include property acquired for their own offices and residences; Facilities often begin

with a mortage - annually revalued. With L/Cs goods themselves are the security.

Unsecured trade finance to hongs and to "other well capitalized companies" often with negative pledge agreements.

Requests for $15m (>90% of them) must go to London

Extent to which purpose of loan fits client's normal line of business.

Past history has made this bank very risk averse so does no shipping finance now.

New customers get visited to look at inventory etc.

Responsiveness of the Account Relationship Manager to the client is the main strategy for getting business away from other banks.

Far East (Snr Mgr Lam) - Group D

All corporate customers - credit committee system - no individual powers

Management profile, market reputation and country risk most important but need 3 year track record

Wing Lung (AGM Cheung) - Group E

Small and medium clients for mostly unsecured trade finance.

Accounts thought unreliable because used for tax, so always need to be backed up by visits. Upto 5 years ago, accounts ignored as untrustworthy if available at all. After 84/5 bank failures, the Commissioner of Banking required more attention to be paid to clients' financial standing and this bank formed a credit analysis section within its loan department and now requires 3 years Balance Sheet and Profit

and Loss Accounts from applicants.

Credit analysts are trained (i e are ex) Chase and Citibank

Wing Hang (Manager Tam) - Group G

Mixed custom - small upto quoted company customers.

Always request 3 years' audited acccounts, often with interims. If accounts are doubtful, collateral preferably time deposits or real estate will be required.

Residential mortgages major business, then placement of short term forex and 10 year commercial mortgages to 80% of valuation. All these could be supplemented with overdrafts.

Collateral for credit lines could be less than the line itself if the loan is self liquidating, although most of the unsecured balance would be justified from the accounts.

20 lending officers and 11 credit dept staff, 2 officers per line per customer. China trade and general trade financing in two separate divisions.

First Chekiang (Senior Manager Tse) - Group I

95% owned by Dai Ichi

Mortgage finance is the primary business, then trade finance for small to medium sized textile industry clientele. 25% liquidity ratio requirement precludes it from becoming a tycoons bank.

Discretion granted to persons not to their positions - some without limit

$2-5m unsecured facility needs supporting financial statements transferred onto a spreadsheet for the previous 3 years, but ;-

Accounts have only been analysed since 7 years ago in response to

the request of their auditors. However, accounts usually untrustworthy and out of date - now receiving draft accounts for 1986.

Hua Chiao Commercial (Credit Dept Mgr Cheong) - Group J

Big role of subjectivity, where information on reputation is obtained bank to bank and from applicants' customers and suppliers.

The policy is - information first collateral second: "If companies with people of high status refuse to give information, collateral is required"

No written guidelines exist for credit analysts, but 2 yrs minimium accounts are generally sought; then spreadsheets are compiled from Balance Sheet and Profit and Loss Account only.

Bank's auditor plays a role in judging applicants accounts but accounts are not necesssarily audited

Shanghai Commercial (General Manager Chan) - Gp K

Major business is trade finance including merchandizing of shipping documents for small and medium customers.

Accounts are reviewed by analysts but are not an important part of the lending decision relative to performance, integrity security and history. They always request accounts but rarely get them fresher than 12 months. They often ask their own accountants to express an opinion of the applicant's accounts.

APPENDIX D

THE DETAILED RESULTS

APPENDIX D THE DETAILED RESULTS

D.1 INTRODUCTION TO THE CLASSIFICATIONS

D.2 THE OBSERVATIONS

D.3 SPEED

D.4 ACCURACY

D.5 SPEED WITH ACCURACY

D.6 SUMMARY DESCRIPTIVE STATISTICS

D THE DETAILED RESULTS

D.1 INTRODUCTION TO THE CLASSIFICATIONS

The results use the abbreviations introduced in Chapter 8. For easy reference, they are restated here.

The accounts presented to subjects were either type F (balance sheet, income statement and SCFP) or type N (only balance sheet and income statement). The accounts themselves all have identifying letters and are displayed in Appendix A. The questionnaires, displayed in Appendix B, are also of two types, C or J. C questionnaires required calculation to answer correctly, while J questionnaires required the exercise of evaluative judgment. The 5 questions in each questionnaire were reordered twice to give rise to the six differently coloured questionnaires displayed in Appendix B.

Each of the 13 subject groups was allocated its own designatory letter, alphabetical order corresponding to chronological order of the sessions with the groups.

D.2 THE OBSERVATIONS

D.21 FREQUENCIES OF OBSERVATIONS

TYPE F		TYPE N	
K	1coding error	K	34
KX	29		
KY	24	KZ	26
L	34	LX	30
LY	24	LA	26
M	55	MX	58
N	36	NX	28
NA	25	NY	25
O	26	OX	24
OA	*30*	OY	34
P	30	PX/P	33
PA	*27*	PY	23

TOTAL341 341

Remarks; Although the total number of observations of with funds statements accounts (type F) are the same as the number of observations of type N accounts, there is imbalance between the two types at the level of any one account. This would introduce error into two or three way ANOVA results.

Calculation		Judgment	
Yellow	123	Orange	124
Dark blue	124	Light blue	124
Green	93	Pink	94
TOTAL	340	TOTAL	342

Remarks; The colours are virtually wholly balanced at the coloured sheet level and at the question type (CorJ -calculation or judgment) level.

	TYPE F	TYPE N	Totals
Calculation	176	164	340
Judgment	165	177	342
TOTALS	341	341	682

Remarks; There is a slight imbalance whereby calculation questions assigned to type F accounts plus judgment questions assigned to type N accounts exceed by circa 6% calculation questions assigned to type N accounts plus judgment questions assigned to type F accounts. The north west- south east diagonal slightly dominates the north east - south west diagonal, and interpretations of type-CORJ interactive effects should allow for this imbalance.

D.22 FREQUENCY OF ACCURACY SCORES BY QUESTION NUMBER ORDER BY ACCOUNT

The modal frequencies in each column are shown with *** to the immediate right.

Question 1

	-5	0	3	5	8
K	5	8	0	19	3***
KX	4	0	0	25	0
KY	4	0	0	20	0
KZ	2	0	0	24	0
L	10	1	0	23	0
LA	1	12***	0	10	3***
LX	0	5	0	25	0
LY	0	0	0	24	0

M	6	3	0	46	0
MX	7	2	0	49***0	
N	5	2	0	29	0
NA	11	0	0	14	0
NX	3	1	0	24	0
NY	8	0	0	17	0
O	1	1	0	24	0
OA	*10*	*0*	*0*	*20*	*0*
OX	1	1	0	22	0
OY	3	1	1	29	0
P	7	3	3***	19	0
PA	*0*	*0*	*0*	*27*	*0*
PX	12***	2	0	17	0
PY	1	0	0	22	0

Question 2

	-5	-3	0	3	5	8
K	7	6	2	9	11	0
KX	5	0	4	0	20	0
KY	4	8	0	4	8	0
KZ	3	10***0		10***3		0
L	9	0	3	0	22	0
LA	0	0	18***0		0	8
LX	1	0	1	0	28	0
LY	4	0	10	0	7	3
M	6	0	0	0	49***0	
MX	6	0	3	0	49***0	
N	7	3	2	12	12	0
NA	3	0	0	0	22	0
NX	1	6	0	6	15	0
NY	2	0	1	0	22	0
O	11	0	10	0	1	4
OA	*10*	*0*	*1*	*0*	*19*	*0*
OX	7	0	9	0	8	0
OY	3	0	2	0	29	0
P	10	0	7	1	9	5***
PA	*14***0*		*0*	*0*	*13*	*0*
PX	11	0	0	0	20	0
PY	12	0	0	0	11	0

Question 3

	-5	-3	0	3	5	8
K	6	0	2	5***	22	0
KX	5	0	3	0	21	0
KY	6	0	5	0	13	0
KZ	12	0	1	0	13	0
L	11	0	1	0	22	0
LA	1	0	13	0	11	1
LX	7	0	4	0	19	0
LY	4	0	0	0	20	0
M	27***0		2	0	26	0
MX	21	0	4	0	33***0	
N	9	0	0	0	27	0
NA	5	0	0	0	20	0
NX	7	0	5	0	8	8***
NY	1	0	0	0	24	0
O	7	0	2	0	17	0
OA	*8*	*0*	*1*	*0*	*21*	*0*
OX	13	0	1	0	10	0
OY	3	0	16***0		10	5
P	3	1***	13	0	11	4
PA	*9*	*0*	*1*	*0*	*17*	*0*
PX	4	0	2	0	25	0
PY	14	0	0	0	9	0

Question 4

	-5	-3	0	3	5	8
K	3	0	16***0		5	11***
KX	5	0	4	0	20	0
KY	5	0	0	0	19	0
KZ	4	0	1	0	21	0
L	9	0	1	0	24	0
LA	2	0	12	0	11	1
LX	8	0	7	0	15	0
LY	4	0	1	0	19	0
M	15	0	3	0	37	0
MX	17	0	2	0	39***0	
N	4	0	0	0	32	0
NA	19***0		3	0	3	0
NX	7	0	6	0	15	0
NY	17	0	3	0	5	0

O	1	0	2	0	23	0
OA	*10*	*0*	*1*	*0*	*19*	*0*
OX	1	0	0	0	23	0
OY	3	1	2	0	28	0
P	2	2***	5	12***	11	0
PA	*10*	*0*	*3*	*0*	*14*	*0*
PX	9	0	1	0	21	0
PY	9	0	0	0	14	0

Question 5

	-5	0	5	8
K	6	5	24	0
KX	5	2	22	0
KY	2	0	22	0
KZ	1	0	25	0
L	13	0	21	0
LA	0	11	12	5***
LX	3	1	26	0
LY	2	0	22	0
M	21***	1	33	0
MX	16	5	37***	0
N	9	1	26	0
NA	3	0	22	0
NX	7	1	19	1
NY	1	1	23	0
O	0	1	25	0
OA	*13*	*0*	*17*	*0*
OX	1	1	22	0
OY	3	13***	15	3
P	4	8	19	1
PA	*4*	*0*	*23*	*0*
PX	7	2	22	0
PY	2	0	21	0

SUMMARY OF THE ABOVE

The accounts asterisked above for showing the modal frequencies per accuracy score per question order number are as below. A "/" means not applicable.

	Score					
	-5	-3	0	3	5	8
Qn						
1	PX	/	LA	P	MX	K=LA
2	*PA*	KZ	LA	KZ	M=MX	P
3	M	P	OY	K	MX	NX

4	NA	P	K	P	MX	K
5	M	/	OY	/	MX	LA

From the summary table, we can see the expected domination of M/MX which appear in both the main and second sequence. This especially applies to MX, the type N member of the pair, which seems to outperform its type M sibling.

We can note the difficulty subjects experienced with the P/PX set and the good showing of the LA (type N) member of the LA/LY set.

A most unexpected result was the appearence of *PA* as the modal scorer of -5 for the various second questions. This is not consistent with the view that simple SCF layouts aid the accounts user to process information embedded in annual reports.

D.3 SPEED

D.31 BY GROUP

GROUP	N	Mean	Fast Rank	Slow Rank
K	72	5.916	1	13
B	120	5.919	2	12
E	60	5.939	3	11
A	46	6.178	4	10
F	36	6.176	5	9
G Median	42	6.265	6	8
I	90	6.397	7	7
H	30	6.678	8	6
C	36	6.731	9	5
J	36	6.759	10	4
D	42	6.881	11	3
M	30	7.047	12	2
L	42	7.110	13	1

Remarks; The 341st fastest response is the median response and it lies inside Group G whose mean speed was 6.2654. The grand mean speed was 6.3390. Interpolation, on the assumption that group means are reasonable approximations of group medians, which gives the group F mean as the overal 316th fastest observation, and the group G mean as the 355th, leads to the grand median calculated thus.

Median = 6.17639 + (7/21=1/3) of (6.26547-6.17639=0.08908)

= 6.20608.

This result is sufficiently far away from the grand mean of 6.3390 to render it unsafe to assume the speed distribution across all subjects is normal. The median of the group means is group I not group G and the distribution appears to be slightly skewed w*p+5Xith there being more slow outliers than fast ones. In Appendix E we shall see if group variances are broadly equal as required for parametric ANOVA or not.

D.32 BY ACCOUNT TYPE BY C or J QUESTION TYPE

Level of TYPE	Level of CORJ	N	------SPEED------- Mean	SD
F	C	176	6.718	2.118
F	J	165	7.022	2.402
N	C	164	5.740	1.458
N	J	177	5.878	2.007

Remarks; The FJ combination is the slowest and the NC combination is quickest, which, although neat, is a result that could have been affected by the slight imbalance of observation frequencies in that there are some eleven fewer observations of FJ and NC combinations than FC or NJ ones.(The discrepancy is equivalent to some 6% of any one combination frequency).

D.33 BY ACCOUNT BY C or J QUESTION TYPE

Level of ACCOUNT	Level of CORJ	N	-----SPEED------- Mean	SD	SEQUENCE
M	C	25	5.685	1.524	both
M	J	30	5.942	1.793	both
MX	C	32	5.511	1.155	both
MX	J	26	5.144	1.529	both
KY	C	11	5.821	1.565	main with
KY	J	13	8.566	2.228	----"----
LY	C	11	6.401	1.312	----"----
LY	J	13	5.970	1.442	----"----
NA	C	16	7.144	1.346	----"----
NA	J	9	6.950	1.015	----"----
O	C	16	5.767	0.548	----"----
O	J	10	5.916	0.457	----"----
PA	*C*	*13*	*5.075*	*1.709*	----"----
PA	*J*	*14*	*5.397*	*0.870*	----"----
KZ	C	6	6.147	1.212	main w/out
KZ	J	20	8.232	2.212	----"-----
LA	C	12	6.223	1.425	----"-----
LA	J	14	4.913	1.425	----"-----
NY	C	15	6.087	1.110	----"-----
NY	J	10	5.740	1.633	----"-----
OX	C	14	4.835	0.563	----"-----
OX	J	10	4.731	0.589	----"-----
PY	C	11	5.098	1.489	----"-----
PY	J	12	6.876	1.826	----"-----
KX	C	16	8.236	2.965	2nd with
KX	J	13	8.648	1.537	---"----
L	C	16	6.301	1.184	---"----

L	J	18	6.073	1.183	---"----
N	C	21	7.591	2.513	---"----
N	J	15	9.580	3.601	---"----
OA	*C*	*20*	*8.468*	*2.126*	---"----
OA	*J*	*10*	*10.370*	*2.488*	---"----
P	C	12	6.443	2.154	---"----
P	J	20	5.793	1.417	---"----
K	C	11	5.289	1.595	2nd w/out
K	J	24	6.847	2.008	---"-----
LX	C	12	4.461	0.888	---"-----
LX	J	18	4.583	1.194	---"-----
NX	C	15	6.513	1.148	---"-----
NX	J	13	5.874	2.034	---"-----
OY	C	22	6.688	2.024	---"-----
OY	J	12	5.444	2.479	---"-----
PX	C	13	5.887	1.264	---"-----
PX	J	18	5.930	1.466	---"-----

Remarks; Eight accounts show judgment responses faster than calculations; they are - L LA LY MX NA NX OX OY. The rest show the expected pattern of calculation being completed more quickly than judgment, with the greatest difference being displayed by KY. There are considerable differences in variance between the accounts, rendering unlikely the Ho of commonality of source population or normality of distribution.

D.34 BY ACCOUNT TYPE BY COLOUR OF QUESTION SHEET

Level of TYPE	Level of COLOR	N	SPEED Rank	SPEED Mean	SD
F	D	68	4	7.047	2.260
F	G	47	3	6.615	1.688
F	L	51	2	6.522	2.159
F	O	67	6	7.340	2.726
F	P	47	5	7.112	2.103
F	Y	61	1	6.431	2.233
N	D	56	4	5.926	1.475
N	G	46	3	5.839	1.243
N	L	73	1	5.420	1.935
N	O	57	6	6.245	2.117
N	P	47	5	6.146	1.874
N	Y	62	2	5.500	1.576

Remarks; The similarity of the rankings between the type F and type N assignments of the questionnaires suggests the questionnaires are reliable.

D.35 BY ALL EXCEPT GROUP

Level of TYPE ACCT	CORJ	COLOR	N	SPEED Mean	SD
F K	J	L	1	11.650	.

F	KX	C	D	7	9.280	3.833
F	KX	C	G	3	7.155	3.657
F	KX	C	Y	6	7.558	0.792
F	KX	J	L	1	6.633	.
F	KX	J	O	7	8.766	1.062
F	KX	J	P	5	8.886	2.069
F	KY	C	D	3	6.850	0.469
F	KY	C	G	7	5.733	1.566
F	KY	C	Y	1	3.350	.
F	KY	J	L	5	7.910	1.369
F	KY	J	O	7	9.059	2.834
F	KY	J	P	1	8.400	.
F	L	C	D	7	6.111	1.459
F	L	C	G	4	6.800	0.864
F	L	C	Y	5	6.166	1.082
F	L	J	L	3	6.350	0.550
F	L	J	O	5	5.190	1.238
F	L	J	P	10	6.431	1.138
F	LY	C	D	5	7.233	0.967
F	LY	C	G	5	5.270	0.587
F	LY	C	Y	1	7.900	.
F	LY	J	L	3	5.572	1.246
F	LY	J	O	7	5.580	1.490
F	LY	J	P	3	7.277	0.960
F	M	C	D	8	4.987	0.961
F	M	C	G	6	5.716	1.387
F	M	C	Y	11	6.175	1.820
F	M	J	L	12	4.801	1.269
F	M	J	O	12	6.622	1.987
F	M	J	P	6	6.863	1.075
F	N	C	D	10	6.916	1.735
F	N	C	G	4	7.766	1.053
F	N	C	Y	7	8.454	3.785
F	N	J	L	7	8.700	3.264
F	N	J	O	5	10.220	5.014
F	N	J	P	3	10.566	1.822
F	NA	C	D	5	6.950	1.669
F	NA	C	G	3	7.955	0.225
F	NA	C	Y	8	6.962	1.390
F	NA	J	L	2	8.150	0.353
F	NA	J	O	5	6.880	0.816
F	NA	J	P	2	5.925	0.671
F	O	C	D	4	5.608	0.569
F	O	C	G	4	6.129	0.568
F	O	C	Y	8	5.666	0.515
F	O	J	L	2	5.733	0.282
F	O	J	O	3	5.788	0.078
F	O	J	P	5	6.066	0.624
F	OA	C	D	13	8.589	2.323
F	OA	C	G	5	8.393	1.697
F	OA	C	Y	2	7.866	2.946
F	OA	J	L	1	7.633	.
F	OA	J	O	6	10.708	2.146
F	OA	J	P	3	10.605	3.490
F	P	C	D	3	5.477	0.356

F	P	C	G	4	7.537	0.491
F	P	C	Y	4	6.341	3.710
F	P	J	L	10	6.298	1.422
F	P	J	O	5	5.743	1.050
F	P	J	P	4	5.416	0.719
F	PA	C	D	3	6.811	1.455
F	PA	C	G	2	4.950	1.720
F	PA	C	Y	8	4.456	1.498
F	PA	J	L	4	5.537	0.847
F	PA	J	O	5	5.336	1.160
F	PA	J	P	5	5.346	0.740
N	K	C	D	2	7.216	0.447
N	K	C	G	7	4.940	1.567
N	K	C	Y	2	4.583	1.107
N	K	J	L	12	6.040	1.663
N	K	J	O	6	6.241	1.024
N	K	J	P	5	8.553	1.534
N	KZ	C	D	1	6.933	.
N	KZ	C	G	2	5.483	0.212
N	KZ	C	Y	3	6.327	1.689
N	KZ	J	L	4	6.604	0.833
N	KZ	J	O	10	8.991	2.683
N	KZ	J	P	6	8.052	1.382
N	LA	C	D	4	6.583	1.566
N	LA	C	G	3	6.833	0.187
N	LA	C	Y	5	5.570	1.669
N	LA	J	L	5	4.126	1.095
N	LA	J	O	7	5.164	1.488
N	LA	J	P	2	6.000	1.555
N	LX	C	D	3	4.333	0.327
N	LX	C	G	1	3.933	.
N	LX	C	Y	8	4.575	1.071
N	LX	J	L	12	4.493	1.360
N	LX	J	O	2	5.633	0.589
N	LX	J	P	4	4.329	0.572
N	MX	C	D	15	5.780	1.067
N	MX	C	G	9	5.372	1.083
N	MX	C	Y	8	5.166	1.403
N	MX	J	L	9	4.759	1.990
N	MX	J	O	12	5.425	1.196
N	MX	J	P	5	5.163	1.481
N	NX	C	D	2	6.850	2.545
N	NX	C	G	7	6.511	0.836
N	NX	C	Y	6	6.402	1.223
N	NX	J	L	7	4.664	1.911
N	NX	J	O	3	6.894	0.814
N	NX	J	P	3	7.677	1.280
N	NY	C	D	4	5.637	0.930
N	NY	C	G	4	6.237	0.390
N	NY	C	Y	7	6.259	1.478
N	NY	J	L	2	8.041	0.931
N	NY	J	O	2	4.850	1.202
N	NY	J	P	6	5.269	1.279
N	OX	C	D	2	4.408	0.624
N	OX	C	G	4	5.183	0.609

N OX	C Y	8	4.768	0.498
N OX	J L	3	4.550	0.819
N OX	J O	4	4.795	0.642
N OX	J P	3	4.827	0.452
N OY	C D	9	6.257	2.349
N OY	C G	7	6.845	1.428
N OY	C Y	6	7.152	2.304
N OY	J L	5	5.943	3.388
N OY	J O	1	4.566	.
N OY	J P	6	5.175	1.962
N P	C G	1	5.366	.
N P	J L	1	2.500	.
N PX	C D	11	5.919	1.381
N PX	C G	1	5.733	.
N PX	C Y	1	5.683	.
N PX	J L	8	6.206	1.510
N PX	J O	5	5.000	1.791
N PX	J P	5	6.420	0.629
N PY	C D	3	5.988	0.906
N PY	C Y	8	4.764	1.570
N PY	J L	5	7.033	1.844
N PY	J O	5	7.396	1.708
N PY	J P	2	5.183	2.050

Remarks; The 5 most extreme speeds for each account type are as follows:

Slowest F	Slowest N	Fastest F	Fastest N
OA J O	KZ J O	KY C Y	P J L
OA J P	K J P	*PA C Y*	LX C G
N J P	KZ J P	M J L	LA J L
N J O	NY J L	*PA C G*	LX J P
KX C D	NX J P	M C D	OX C D

While the difficult SCF *OA* occupies 1st and 2nd place in the slowest F list, the simple SCF, *PA* occupies 2nd and 4th place in the fastest F list. This suggests the possibility that the novelty of the SCF format produces extreme speed reactions.

The set N/NX was found difficult as was K/KX, while both the type Ns in both L sets were found easy. Pink seems somewhat associated with slowness, light blue with swiftness, but not to an overwhelming degree.

D.36 BY GROUP BY ACCOUNT TYPE

Level of GROUP TYPE N	SPEED Mean	F less N in Minutes	% of F	SD
H N 15	6.607			1.581
H F 15	6.748	0.141	02.10	2.171
L N 21	6.568			2.107
L F 21	7.653	1.085	14.18	2.282
B N 60	5.148			2.103
B F 60	6.691	1.543	23.06	2.774

J N	18	6.378		1.298
J F	18	7.139	0.761 10.66	1.339
M N	15	7.302		2.438
M F	15	6.792	(0.51) (6.98)	1.476
K N	36	5.627		1.448
K F	36	6.204	0.577 9.30	1.511
E N	30	5.602		1.248
E F	30	6.276	0.674 10.74	1.328
F N	18	6.169		1.299
F F	18	6.183	0.014 0.02	1.258
I N	45	5.679		1.329
I F	45	7.116	1.437 20.19	2.194
G N	21	6.019		1.628
G F	21	6.511	0.493 7.57	1.076
A N	23	5.058		1.390
A F	23	7.298	2.240 30.69	3.705
C N	18	5.727		2.165
C F	18	7.734	2.457 31.76	1.972
D N	21	6.126		1.603
D F	21	7.636	1.510 19.78	3.215

Remarks; The above shows all groups taking significantly longer to process type F accounts than type N except for the isolated individuals comprising the unrelated constituents of group M. It is interesting to observe that the members of the two note issuing banks, groups A and C, took more than 30% longer to do type F accounts. Most of the Westerners were in these two groups, and both banks use sophisticated spreadsheets in credit analysis including inputs from funds flow statements.

D.37 BY GROUP BY C or J

Level of GROUP CORJ	N	----SPEED---------- Mean	J minus C Minutes	in %	SD
H C	15	6.281			1.685
H J	15	7.075	0.7944	11.23	2.011
L C	21	6.548			1.374
L J	21	7.673	1.1246	14.66	2.777
B C	60	6.333			2.587
B J	60	5.505	1.2750	20.13	2.508
J C	18	6.583			1.514
J J	18	6.935	0.3519	5.07	1.193
M C	15	7.016			1.470
M J	15	7.077	0.0761	1.08	2.470
K C	36	5.730			1.229
K J	36	6.102	0.4014	6.58	1.723
E C	30	5.892			1.161
E J	30	5.986	0.0939	1.57	1.484
F C	18	6.083			1.268
F J	18	6.269	0.1861	2.97	1.282
I C	45	6.168			2.197
I J	45	6.627	0.4589	6.92	1.644
G C	21	5.962			1.246

G J 21	6.568	0.6056	9.22	1.480
A C 22	6.157			2.680
A J 24	6.197	0.0403	0.65	3.306
C C 18	6.738			1.938
C J 18	6.723	0.0158	0.02	2.635
D C 21	6.496			1.719
D J 21	7.266	0.7707	0.11	3.292

Remarks; No major differences in processing time between the c question sets and the j sets except for group B which was also one of the groups displaying a well average number of "not sure" responses.

D.4 ACCURACY

D.41 BY GROUPS

GROUP	N	Mean	Best Rank	Worst Rank
L	42	4.119	1	13
K	72	3.833	2	12
I	90	3.677	3	11
G	42	3.619	4	10
M	30	3.600	5	9
E	60	3.583	6	8
J	36	3.472	7	7
A	46	3.434	8	6
F	36	3.333	9	5
H	30	3.233	10	4
D	42	3.119	11	3
C	36	2.972	12	2
B	120	2.941	13	1

Remarks; Using the same reasoning about medians as was described above for speed, we have J both as the median group and as the group containing the grand median. The grand median is calculated by interpolation to be 3.445. This compares with a grand mean for accuracy of 3.440. The closeness of median and mean suggests the possibility that the accuracy distribution is symmetrical, a necessary but not sufficient condition of normality. This time it is not so much skew alone that precludes normality being assumed as its interaction with kurtosis, since group B's 120 responses' massed inaccuracy lift the left hand tail of the distribution.

D.43 BY TYPE BY C or J

Level of TYPE	Level of CORJ	N	----ACCURACY----- Mean	SD
F	C	176	3.431	1.056
F	J	165	3.527	1.045
N	C	164	3.420	1.068
N	J	177	3.384	1.132

Remarks; The maximum mean difference of some 0.14 of a point is much less than the average standard deviation of over one whole point. This suggests the slight excess of FC and NJ assignments over FJ and NC ones is not a source of systematic bias in the results.

D.44 BY ACCOUNT BY C or J

Level of ACCOUNT	CORJ	N	ACCURACY Rankings Worst	Best	Mean	SD
K	C	11			3.636	1.120
K	J	24	4		2.916	1.612
KX	C	16			3.687	0.602
KX	J	13			3.769	0.832
KY	C	11			3.545	1.634
KY	J	13			3.615	1.043
KZ	C	6			3.666	0.516
KZ	J	20			3.700	1.031
L	C	16			3.250	0.930
L	J	18			3.333	1.084
LA	C	12	1		1.250	1.215
LA	J	14			3.071	1.141
LX	C	12		1	4.250	0.452
LX	J	18			3.444	0.783
LY	C	11		4	4.090	1.136
LY	J	13			3.846	1.068
M	C	25			3.560	1.083
M	J	30			3.366	0.999
MX	C	32			3.656	0.937
MX	J	26			3.461	1.103
N	C	21			3.857	0.853
N	J	15			3.800	1.014
NA	C	16			3.000	0.730
NA	J	9			3.666	1.000
NX	C	15			3.866	0.639
NX	J	13	5		2.923	1.255
NY	C	15			3.266	0.798
NY	J	10		2=	4.200	0.421
O	C	16			3.500	1.264
O	J	10			3.800	0.632
OA	*C*	*20*	*3*		*2.700*	*1.031*
OA	*J*	*10*		*2=*	*4.200*	*0.788*
OX	C	14			3.285	0.611
OX	J	10		5	3.900	0.316
OY	C	22			3.727	0.702
OY	J	12			3.083	0.792
P	C	12			3.666	0.651
P	J	20	2		2.550	1.190
PA	*C*	*13*			*3.153*	*0.987*
PA	*J*	*14*			*3.785*	*0.699*
PX	C	13			3.307	1.031
PX	J	18			3.444	1.293
PY	C	11			3.090	0.943
PY	J	12			3.583	0.900

Remarks; The top 5 and bottom 5 accuracy scores are listed again here;

Worst 5	LA C,	P J,	OA C,	K J,	NX J.
Best 5	LX C,	NY C,	OA J,	LY C,	OX J.

The expected predominance of c responses in higher scores

and j responses in lower scores was not found. K and NX once again seemed too difficult for some, but the really surprising result is the coexistence of very high j scores with very low c scores for the more difficult of the two SCFs, *OA*. *OA* was the second sequence SCF, and it was a source of far greater difficulty to subjects than *PA*, the main sequence SCF. It is therefore strange to find subjects scoring a mean of 4.2 on judgment questions for this account, and it is suggested that it results from the account interaction with particular subjects rather than than from a main effect of the account itself.

Remarks B: The distribution of accuracy scores across accounts gives us a slightly higher median at 3.5 than for the distribution across sample groups which in turn suggests the presence of skew in this distribution. It seems that type F accounts tend to evoke more accurate performance than type N, but it is noteworthy that both of the SCFs score worse than the grand median, contrary to claims made for the superior usefulness of SCFs over SCFPs.

D.45 BY COLOUR

Level of CORJ COLOR N	----ACCURACY----- Mean	SD
C D 124	3.443	1.006
C G 93	3.612	1.073
C Y 123	3.268	1.086
J L 124	3.306	1.190
J O 124	3.508	1.055
J P 94	3.574	0.989

Remarks; The difference between the most and least accurate is less than the smallest of the standard deviations. Colour therefore appears reliably to control for order effects.

D.46 BY ACCOUNT BY COLOUR

Levels of ----------ACCURACY---------- TYPE ACCT	Rankings	Mean	SD
CORJ CLR N	Best Worst		
F K J L 1	Coding error	4.000	.
F KX C D 7		3.857	0.690
F KX C G 3		3.666	0.577
F KX C Y 6		3.500	0.547
F KX J L 1		4.000	.
F KX J O 7		3.857	0.899

F	KX	J	P	5		3.600	0.894
F	KY	C	D	3		4.000	1.000
F	KY	C	G	7		3.714	1.704
F	KY	C	Y	1	2=	1.000	.
F	KY	J	L	5		4.000	0.707
F	KY	J	O	7		3.285	1.253
F	KY	J	P	1		4.000	.
F	L	C	D	7	9	2.714	0.755
F	L	C	G	4		3.500	0.577
F	L	C	Y	5		3.800	1.095
F	L	J	L	3		3.666	0.577

Levels of

----------ACCURACY----------

TYPE	ACCT	CORJ	CLR	N	Rankings Best	Rankings Worst	Mean	SD
F	L	J	O	5			3.400	0.894
F	L	J	P	10			3.200	1.316
F	LY	C	D	5	5		4.600	0.894
F	LY	C	G	5			3.800	1.303
F	LY	C	Y	1			3.000	.
F	LY	J	L	3			3.000	1.732
F	LY	J	O	7			4.142	0.690
F	LY	J	P	3			4.000	1.000
F	M	C	D	8			3.750	0.707
F	M	C	G	6			3.166	1.602
F	M	C	Y	11			3.636	1.026
F	M	J	L	12			3.666	0.887
F	M	J	O	12			3.000	1.044
F	M	J	P	6			3.500	1.048
F	N	C	D	10			3.900	0.567
F	N	C	G	4			3.750	1.258
F	N	C	Y	7			3.857	1.069
F	N	J	L	7			3.285	0.951
F	N	J	O	5			3.800	0.836
F	N	J	P	3	1=		5.000	0.000
F	NA	C	D	5			3.000	0.000
F	NA	C	G	3			4.000	0.000
F	NA	C	Y	8		8	2.625	0.744
F	NA	J	L	2			3.000	1.414
F	NA	J	O	5	10		4.200	0.447
F	NA	J	P	2			3.000	1.414
F	O	C	D	4	6=		4.500	0.577
F	O	C	G	4			3.500	0.577
F	O	C	Y	8			3.000	1.511
F	O	J	L	2	6=		4.500	0.707
F	O	J	O	3			4.000	0.000
F	O	J	P	5			3.400	0.547
F	*OA*	*C*	*D*	*13*		*6*	*2.230*	*0.832*
F	*OA*	*C*	*G*	*5*			*3.600*	*0.894*
F	*OA*	*C*	*Y*	*2*			*3.500*	*0.707*
F	*OA*	*J*	*L*	*1*			*3.000*	.

F	*OA*	*J*	*O*	*6*	*4.166*	*0.752*
F	*OA*	*J*	*P*	*3*	*4*	*4.666*	*0.577*
F	P	C	D	3	4.000	1.000
F	P	C	G	4	3.500	0.577
F	P	C	Y	4	3.500	0.577
F	P	J	L	10	10	2.800	1.229
F	P	J	O	5	4	1.400	0.547
F	P	J	P	4	3.250	0.957
F	*PA*	*C*	*D*	*3*	*3.666*	*0.577*
F	*PA*	*C*	*G*	*2*	*3.500*	*0.707*
F	*PA*	*C*	*Y*	*8*	*2.875*	*1.125*
F	*PA*	*J*	*L*	*4*	*3.250*	*0.957*
F	*PA*	*J*	*O*	*5*	*4.000*	*0.707*
F	*PA*	*J*	*P*	*5*	*4.000*	*0.000*
N	K	C	D	2	4.000	0.000
N	K	C	G	7	3.714	1.253

Levels of

----------ACCURACY----------

TYPE	ACCT	CORJ	CLR	N	Rankings Best	Rankings Worst	Mean	SD
N	K	C	Y	2			3.000	1.414
N	K	J	L	12		7	2.416	1.729
N	K	J	O	6			3.333	1.632
N	K	J	P	5			3.400	1.341
N	KZ	C	D	1			4.000	.
N	KZ	C	G	2			3.500	0.707
N	KZ	C	Y	3			3.666	0.577
N	KZ	J	L	4			4.000	0.816
N	KZ	J	O	10			3.400	1.173
N	KZ	J	P	6			4.000	0.894
N	LA	C	D	4		2=	1.000	0.000
N	LA	C	G	3			2.333	2.309
N	LA	C	Y	5		1	0.800	0.447
N	LA	J	L	5			3.600	0.894
N	LA	J	O	7			3.000	1.154
N	LA	J	P	2		5	2.000	1.414
N	LX	C	D	3			4.000	0.000
N	LX	C	G	1	1=		5.000	.
N	LX	C	Y	8	9		4.250	0.462
N	LX	J	L	12			3.333	0.778
N	LX	J	O	2			4.000	0.000
N	LX	J	P	4			3.500	1.000
N	MX	C	D	15			3.466	0.833
N	MX	C	G	9			3.666	1.224
N	MX	C	Y	8			4.000	0.755
N	MX	J	L	9			3.222	1.394
N	MX	J	O	12			3.666	0.651
N	MX	J	P	5			3.400	1.516
N	NX	C	D	2			4.000	0.000
N	NX	C	G	7			4.000	0.816
N	NX	C	Y	6			3.666	0.516

N NX J L	7		2.857	1.573
N NX J O	3		3.000	1.000
N NX J P	3		3.000	1.000
N NY C D	4		3.500	0.577
N NY C G	4		3.750	0.500
N NY C Y	7		2.857	0.899
N NY J L	2		4.000	0.000
N NY J O	2	6=	4.500	0.707
N NY J P	6		4.166	0.408
N OX C D	2		3.500	0.707
N OX C G	4		3.500	0.577
N OX C Y	8		3.125	0.640
N OX J L	3		4.000	0.000
N OX J O	4		4.000	0.000
N OX J P	3		3.666	0.577
N OY C D	9		4.111	0.333
N OY C G	7		3.285	0.951
N OY C Y	6		3.666	0.516
N OY J L	5		3.200	1.095
N OY J O	1		3.000	.
N OY J P	6		3.000	0.632

Levels of
----------ACCURACY----------

TYPE ACCT CORJ CLR N	Rankings Best Worst	Mean	SD
N P C G 1		4.000	.
N P J L 1		3.000	.
N PX C D 11		3.181	0.981
N PX C G 1	1=	5.000	.
N PX C Y 1		3.000	.
N PX J L 8		3.125	1.552
N PX J O 5		3.600	1.516
N PX J P 5		3.800	0.447
N PY C D 3		3.666	0.577
N PY C Y 8		2.875	0.991
N PY J L 5		4.000	1.224
N PY J O 5		3.400	0.547
N PY J P 2		3.000	0.000

Remarks; The best and worst lists are as follows;

Best	Worst	Rank*
N LX C G	N LA C Y	1
F N J P		
N PX C G	F KY C Y	
	N LA C D	
F OA J P	F P J O	4
F LY C D	N LA J P	5

F O C D		F OA C D	6
F O J L			
N NY J O		N K J L	
		F NA C Y	8
N LX C Y		F L C D	9
F NA J O		F P J L	10

*Ties are shown single spaced

LA shows worst and then P, while LX shows best then O. Type F does slightly better than type N and the transformation of type N LA into type F LY seems to improve performance, but the transformation of type N NY into type F NA does the contrary. No very obvious bias arising from question type or colour appears revealed.

D.47 BY GROUP BY TYPE BY CorJ

Level of GROUP	TYPE	CORJ	N	Ranks Best	Ranks Worst	----ACCURACY----- Mean	SD
B	N	C	24		5	2.875	0.991
B	N	J	36		4	2.888	1.140
B	F	C	36		3	2.861	1.125
B	F	J	24			3.208	1.215
J	N	C	9			3.444	0.726
J	N	J	9	4=		4.000	0.707
J	F	C	9			3.111	0.927
J	F	J	9			3.333	1.414
M	N	C	6			3.666	1.505
M	N	J	9	3		4.111	0.600
M	F	C	9			3.222	0.440
M	F	J	6			3.333	1.366
K	N	C	18			3.444	1.293
K	N	J	18	8		3.888	0.758
K	F	C	18	2		4.166	0.857
K	F	J	18	9		3.833	0.514
E	N	C	15			3.200	0.941
E	N	J	15			3.533	0.990
E	F	C	15	6		3.933	0.961
E	F	J	15			3.666	1.112
F	N	C	9		2	2.777	1.394
F	N	J	9			3.555	0.726
F	F	C	9			3.444	1.424
F	F	J	9			3.555	0.726
I	N	C	21	10		3.761	0.624
I	N	J	24			3.333	1.239
I	F	C	24			3.750	0.989
I	F	J	21	7		3.904	0.700

G	N	C	9		3.222	1.394
G	N	J	12		3.416	1.443
G	F	C	12		3.666	0.778
G	F	J	9	1	4.222	0.666
A	N	C	12	4=	4.000	0.953
A	N	J	11	6	2.909	1.300
A	F	C	10		3.400	0.843
A	F	J	13		3.384	0.869
C	N	C	11		3.545	1.213
C	N	J	7	9=	3.000	1.000
C	F	C	7	9=	3.000	1.000
C	F	J	11	1	2.363	0.924
D	N	C	9		3.111	1.166
D	N	J	12	7=	2.916	0.900
D	F	C	12	7=	2.916	1.240
D	F	J	9		3.666	1.118

Remarks: This important table divides observations by the three sources of main effects on accuracy, namely group and account type and question type.

The best and worst are as under;

Best	Worst	Rank
G F J	C F J	1
K F C	F N C	2
M N J	B F C	3
A N C J N J	B N J	4
	B N C	5
E F C	A N J	6
I F J K N J	D N J D F C	7
K F J	C N J C F C	9
I N C		10

There is no support from the above for the view that question type or account type affects accuracy generally. There is considerable evidence, however, of the difference in ability between the various groups, from I and K at best to B, C and D at worst. It remains to be shown in the next appendix how significant, statistically and generally, such differences are.

D.5 SPEED WITH ACCURACY

D.51THE ACCOUNTS

A/C	SPEED----------			ACCURACY----------			
		MEAN	SD		MEAN	SD	
	RANK			RANK			N
K	16	6.36	2.00	20	3.14	1.50	35
KX	20	8.42	2.40	4	3.72	0.70	29
KY	18	7.31	2.37	8	3.58	1.32	24
KZ	19	7.75	2.19	5	3.69	0.93	26
L	13	6.18	1.17	17	3.29	1.00	34
LA	5	5.52	1.55	22	2.23	1.48	26
LX	1	4.53	1.07	3	3.77	0.77	30
LY	12	6.17	1.37	1	3.96	1.08	24
M	6	5.82	1.67	13	3.46	1.03	55
MX	4	5.35	1.34	9	3.57	1.01	58
N	21	8.42	3.13	2	3.83	0.91	36
NA	22	7.08	1.22	18	3.24	0.88	25
NX	14	6.22	1.62	14	3.43	1.07	28
NY	9	5.95	1.32	6	3.64	0.81	25
O	7	5.83	0.51	7	3.62	1.06	26
OA	*22*	*9.10*	*2.39*	*19*	*3.20*	*1.19*	*30*
OX	2	4.79	0.56	10	3.54	0.59	24
OY	15	6.25	2.24	11	3.50	0.79	34
P	11	6.04	1.73	21	2.97	1.15	32
PA	*3*	*5.24*	*1.32*	*12*	*3.48*	*0.89*	*27*
PX	8	5.91	1.36	15	3.39	1.17	31
PY	10	6.03	1.87	16	3.35	0.94	23
Main		6.55	1.31		3.44	0.25	
Second		6.06	0.85		3.45	0.40	

Remarks: LX, OX and *PA* are the fastest and only *PA* of those is type F, sepifically SCF. However all the 3 slowest, *OA*, N and KX are type F. Under the accuracy scores, the three best are LY, N and LX and only LX of those is type N. The 3 worst are LA, P and K and only K is type F. There appears to a slight tendency for type F to take longer to process and for it to produce slightly more accurate results than type N. This is shown in exaggerated tones by the LA/LY pair: the type F member being the overall best of all accounts for accuracy whereas the type N member is the overall worst. This split is an interesting similarity to the C/J split for the *OA* account. It is possible that there is some set of characteristics possessed both by accounts LA/LY and account *OA* that produces extreme reactions of the kind that might be susceptible to catastrophe theory modelling in future.

The differences between main sequence and second sequence means are well below standard errors of either sequence both for speed and for accuracy. This suggests that the two sequences were equivalent as testing materials, and reduces the suspicions of selection bias that could be harboured in

either accounts sample

D.52 ACCOUNT TYPE

A/C	SPEED MEAN	SD	MIN	MAX	ACCURACY MEAN	SD	N
N	5.81	1.76	1.43	13.35	3.40	1.10	341
F	6.87	2.26	2.58	16.13	3.48	1.05	341

Remarks; This summary shows type F is much slower but slightly more accurate in the responses elicited from the subjects in this study.

D.53 QUESTIONNAIRE COLOUR

A/C	SPEED------- *R	MEAN	SD	ACCURACY------- *R	MEAN	SD	N
DB	4	6.54	2.02	4	3.44	1.01	124
GR	3	6.23	1.53	1	3.61	1.07	093
LB	1	5.87	2.09	5	3.31	1.91	124
OR	6	6.84	2.52	3	3.51	1.06	124
PI	5	6.63	2.04	2	3.57	0.99	094
YE	5	5.96	1.98	6	3.27	1.09	123

*R is rank under speed and accuracy, respectively.

Remarks; The gap between the fastest and the slowest and the gap between the most and least accurate are both well inside the standard deviations of each of the four extreme mean values. The slight suspicion of sytematic order effects raised by the poor showing of yellow on both speed and accuracy is confined within more important observations in the previous sentence.

D.54 QUESTIONNAIRE TYPE

C	6.25	1.89	2.45	15.58	3.43	1.06	340
J	6.43	2.28	1.43	16.13	3.45	1.09	342

Remarks; The differences between means is far outweighed by the sizes of the standard deviations, so it would appear that the two question types produce roughly the same effects on speed and accuracy.

D.55 SPEEDS FOR THE DIFFERENT ACCURACY SCORES BY QUESTION

	Min	Max	Mean	Std Dev
Q1				
-5	1.43	15.58	6.48	2.15
0	2.08	9.35	5.40	1.80

D.6 SUMMARY DESCRIPTIVE STATISTICS

D.61 OVERALL

Variable=SPEED

Moments

N	682	Sum Wgts	682
Mean	6.339125	Sum	4323.283
Std Dev	2.09431	Variance	4.386133
Skewness	1.151716	Kurtosis	2.756984
CV	33.03783	Std Mean	0.080195
T:Mean=0	79.04613	Prob>|T|	0.0
Sgn Rank	116451.5	Prob>|S|	0.0001
Num ^= 0	682		
W:Normal	0.932633	Prob<W	0.0

Quantiles(Def=5)

100% Max	16.13333	99%	13.88333
75% Q3	7.383333	95%	9.916667
50% Med	6.058333	90%	8.7
25% Q1	4.95	10%	3.966667
0% Min	1.433333	5%	3.483333
		1%	2.5
Range	14.7		
Q3-Q1	2.433333		
Mode	5.7		

Histogram

```
Minutes                                                  #
17+*                                                     1
15.*                                                     5
13.**                                                    9
11.***                                                  18
 9+**************                                       81
 7.************************************               234
 5.****************************************** *       262
 3.************                                       71
 1+*                                                     1
   ----+----+----+----+----+----+----+----+----+----
   * may represent up to 6 counts
```

Variable=ACCURACY

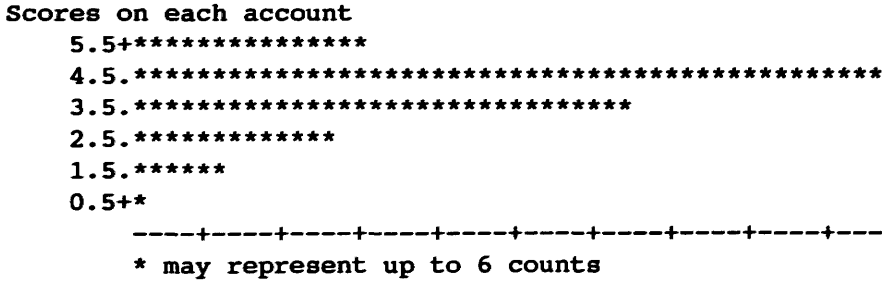
Moments

N	682	Sum Wgts	682
Mean	3.439883	Sum	2346
Std Dev	1.07572	Variance	1.157174
Skewness	-0.73115	Kurtosis	0.317795
CV	31.272	Std Mean	0.041191
T:Mean=0	83.50963	Prob>|T|	0.0
Sgn Rank	114413	Prob>|S|	0.0001
Num ^= 0	676		
W:Normal	0.867211	Prob<W	0.0

Quantiles(Def=5)

100% Max	5	99%	5
75% Q3	4	95%	5
50% Med	4	90%	5
25% Q1	3	10%	2
0% Min	0	5%	1
		1%	1
Range	5		
Q3-Q1	1		
Mode	4		

Histogram



D.62 BY GROUP

NOTE: In all the sections following, a * in the right hand column means that the probability that such a distribution as is shown on the row could have come from a normal population distribution is GREATER than 5%.

All the tables below have the same column headings and CV means the coefficient of variation (SD/Mean).

SPEED

ID	N	MEDIAN	MEAN	STD DEV	CV	SKEWNESS	KURTOSIS	
A	46	5.2083	6.1786	2.99	48.39	1.569	2.718	
B	120	5.5417	5.9195	2.57	43.43	1.244	2.202	
C	36	7.1333	6.7310	2.28	33.88	(0.036)	(0.280)	*
D	42	6.2167	6.8813	2.62	38.13	1.658	2.977	
E	60	5.8667	5.9392	1.32	22.26	0.246	(0.390)	*
F	36	5.9417	6.1764	1.26	20.41	0.130	(0.689)	*
G	42	6.1583	6.2655	1.39	22.12	0.599	0.775	*
H	30	6.4083	6.6783	1.87	27.97	1.417	2.655	
I	90	6.1333	6.3980	1.94	30.37	1.075	2.342	
J	36	6.7500	6.7593	1.36	20.06	0.202	0.289	*
K	72	5.7333	5.9162	1.50	25.33	0.328	(0.536)	*
L	42	6.9080	7.1107	2.24	31.48	0.539	(0.239)	*
M	30	6.6750	7.0472	2.00	28.35	1.266	2.020	

ACCURACY

A	46	4	3.43	1.05	30.47	(0.97)	1.61	
B	120	3	2.94	1.12	37.99	(0.43)	(0.10)	
C	36	3	2.97	1.11	37.28	0.19	(0.40)	
D	42	3	3.12	1.11	35.55	(0.25)	(0.45)	
E	60	4	3.58	1.01	28.28	(0.79)	0.47	
F	36	4	3.33	1.21	33.64	(1.49)	1.68	
G	42	4	3.62	1.15	31.68	(0.92)	0.52	
H	30	3	3.23	1.10	34.15	(0.33)	(0.58)	
I	90	4	3.68	0.95	25.72	(1.02)	1.96	
J	36	3.5	3.47	1.00	28.79	(0.56)	0.57	
K	72	4	3.83	0.92	23.98	(1.22)	2.20	
L	42	4	4.12	0.63	15.36	(0.70)	2.22	
M	30	4	3.60	1.00	27.87	(0.40)	0.16	

Remarks: The possibility of so many of the speed distributions being normally distributed is unexpected but not necessarily significant in any sense.

D.63 BY ACCOUNT

SPEED

ID	N	MEDIAN	MEAN	S D	C V	SKEW	KURTOSIS	
K	35	6.033	6.358	2.004	31.52	0.53	0.37	*
KX	29	8.383	8.421	2.401	28.52	0.80	2.61	
KY	24	7.133	7.308	2.368	32.41	1.08	2.91	*
KZ	26	7.750	7.751	2.195	28.31	0.30	0.81	*
L	34	6.075	6.180	1.172	18.96	(0.36)	0.42	*
LA	26	5.692	5.518	0.030	28.04	0.03	(0.40)	*
LX	30	4.633	4.534	1.068	23.54	(0.30)	(0.30)	*
LY	24	6.292	6.168	1.372	22.24	(0.13)	(1.02)	*
M	55	5.500	5.825	1.666	22.60	0.70	0.84	*
MX	58	5.400	5.347	1.336	24.99	(0.09)	0.88	*

N	36	7.858	8.420	3.128	37.15	0.92	0.41	
NA	25	6.783	7.075	1.219	17.23	0.49	(0.15)	*
NX	28	6.267	6.217	1.621	26.08	(0.67)	0.56	*
NY	25	6.033	5.949	1.323	22.24	0.05	(0.50)	*

ID	N	MEDIAN	MEAN	S D	C V	SKEW	KURTOSIS	
O	26	5.808	5.825	0.511	8.77	0.02	(0.40)	*
OA	30	9.058	9.102	2.391	26.27	0.40	(0.30)	
OX	24	4.850	4.792	0.564	11.78	(0.32)	0.04	*
OY	34	6.117	6.250	2.241	35.86	0.35	0.07	*
P	31	6.150	6.059	1.750	28.89	0.79	2.06	*
PA	27	5.050	5.243	1.324	25.26	0.20	(0.62)	*
PX	31	6.400	5.912	1.363	23.05	(0.81)	(0.54)	
PY	24	6.375	5.999	1.835	30.59	0.43	(0.13)	*

ACCURACY

K	35	4	3.14	1.50	47.66	(0.76)	(0.40)
KX	29	4	3.72	0.70	18.85	0.45	(0.80)
KY	24	4	3.58	1.32	36.73	(1.38)	1.74
KZ	26	4	3.69	0.93	25.14	(0.94)	1.69
L	34	3	3.29	1.00	30.38	(0.07)	(0.36)
LA	26	1.5	2.23	1.48	66.26	0.45	(1.15)
LX	30	4.63	4.53	1.07	23.54	(0.30)	(0.30)
LY	24	6.29	6.17	1.37	22.24	(0.13)	(1.02)
M	55	3	3.46	1.03	29.91	(0.29)	(0.31)
MX	58	5.4	5.35	1.34	24.99	(0.09)	0.88
N	36	4	3.83	0.91	23.75	(0.37)	(0.56)
NA	25	3	3.24	0.88	27.14	(0.12)	(0.99)
NX	28	4	3.43	1.07	31.18	(0.78)	0.25
NY	25	4	3.64	0.81	22.26	(0.75)	0.26
O	26	4	3.62	1.06	29.35	(1.74)	4.49
OA	30	3	3.20	1.19	37.07	(0.02)	(0.84)
OX	24	4	3.54	0.59	16.61	(0.87)	(0.11)
OY	34	4	3.50	0.79	22.52	(0.39)	(0.27)
P	31	3	2.94	1.15	39.27	(0.15)	(0.80)
PA	27	4	3.48	0.89	25.65	(1.16)	1.13
PX	31	4	3.39	1.17	34.66	(0.70)	(0.29)
PY	24	3.5	3.38	0.92	27.37	(0.14)	(0.84)

Remarks; The speed distributions are virtually all possible for normal distributions and their variances are roughly equal. Also interesting is the generally negative accuracy skew.

D.63 BY COLOUR

SPEED

ID	N	MEDIAN	MEAN	S D	C V	SKEW	KURTOSIS	
D	124	7.550	6.541	2.017	30.84	1.42	3.75	
G	93	6.950	6.232	1.528	24.51	0.31	0.24	*
L	124	5.792	5.874	2.093	35.65	0.85	2.35	
O	124	6.175	6.837	2.516	36.80	1.27	2.03	
P	94	6.358	6.629	2.040	30.78	1.03	2.34	
Y	123	5.567	5.962	1.978	33.18	1.12	2.26	

ACCURACY

ID	N	MEDIAN	MEAN	S D	C V	SKEW	KURTOSIS
D	124	4	3.44	1.01	29.22	(0.60)	(0.02)
G	93	4	3.61	1.07	29.72	(0.95)	1.01
L	124	3	3.31	1.19	36.01	(0.59)	(0.09)
O	124	4	3.51	1.06	30.08	(1.05)	0.98
P	94	4	3.57	0.99	27.67	(0.48)	(0.01)
Y	123	3	3.27	1.09	33.26	(0.67)	0.10

Remarks; Once again accuracy is negatively skewed. Only the green speed distribution could be normal.

D.64 BY CORJ

SPEED

ID	N	MEDIAN	MEAN	S D	C V	SKEW	KURTOSIS
C	340	5.950	6.247	1.892	30.29	1.13	2.89
J	342	6.183	6.431	2.277	35.40	1.12	2.40

ACCURACY

C	340	4	3.427	1.060	30.95	(0.71)	0.33
J	342	4	3.453	1.092	31.63	(0.76)	0.33

Remarks; There seems to be almost no difference between the c question sheets and the j question sheets as regards either the speed or the accuracy distributions.

D.65 BY TYPE

SPEED

F	341	6.417	6.839	2.260	33.04	1.28	2.63
N	341	5.700	5.839	1.782	30.52	0.64	1.08

ACCURACY

F	341	4	3.475	1.050	30.22	(0.60)	0.11
N	341	4	3.405	1.101	32.34	(0.87)	0.45

Remarks; Very little accuracy differences between types F and N, but F takes longer and has twice the positive skew and leptokurtosis as N.

D.7 CONCLUSION

There does appear to be a number of systematic patterns in the results.

1. Funds statements not only do not speed up the processing of accounts; they slow it down quite significantly.
2. Funds statements sometimes improve the accuracy of accounts processing but not very significantly.
3. Different banks vary considerably in both speed and accuracy of processing.
4. The patterns of accounts difficulty persist across sample groups and across account types although modified in the latter case by the specific difficulties of some funds statements.
5. The two SCFs, OA and PA, do NOT do consistently better than the traditional funds statements as regards both speed and accuracy, but whether there is statistical significance in this will be clear in the next appendix.
6. No obvious instrumentation effects of colour, question order or question type are consistently displayed; nor does there seem to be much difference in performance between those presented with main sequence accounts from those presented with second sequence accounts. This suggests that both the accounts and the question papers are reasonably reliable tests of accounts processing ability.

APPENDIX E

APPENDIX E STATISTICAL PROCESSING RESULTS

E.1 THE PROCEDURES USED

E.2 NONPARAMETRIC SIGNIFICANCE TESTS

E.3 CORRELATIONS OF SPEED WITH ACCURACY

E.4 PARAMETRIC ANOVA

E.5 GLM ANOVA

E.6 INFORMATION LOAD REGRESSIONS

E.7 CONCLUSION

E STATISTICAL PROCESSING RESULTS

E.1 THE PROCEDURES USED

E.11 NONPARAMETRIC TESTS

E.111 MEDIAN TEST

The median test tests the sample median deviations for their joint consistency with the null hypothesis that they both came from a common population. [Gibbons 1985 135]. When as for groups, accounts and colours below, more than two samples are involved, the median test estimates a grand median from the various sample medians, then tests the null hypothesis that for each sample some half of the observations are above the *grand* median and half below. The test statistic Q is calculated for a goodness of fit to the distribution specified in the previous sentence, and Q turns out to have a distribution sufficiently similar to that of chi squared that it can be interpreted analogously.Its power efficiency is only 63.7% of the F test for parametrised populations (normal distibutions with equal variances) [Gibbons 1985 196-8].

E.112 WILCOXON TESTS

The Wilcoxon signed ranks test extends the one sample median test by ranking all observations, then signing them for being above (+) or below (-) the median. The smaller of the total pluses or minuses is compared with the statistic S that would have been expected under Ho for a symmetric distribution. The distribution of S is trannsformable into the normal distribution statistic z for samples larger than 20, thus;

$z = [S+0.5-n(n+1)/4]/[n(n+1)(2n+1)/24]^{EXP\ 0.5}$

The Wilcoxon rank sum test for pairs of samples assigns ranks to each observation across both samples, compares the rank sums of the samples

to measure the probability that the differences in rank sums would have occurred if they both came from a common population [Sprent 1981].

A limitation of the Wilcoxon test is the requirement of equal sample sizes of continuous data from symetrically disributed populations [Gibbons 1985 p167], and for two samples the next test to be descibed is preferred in this study.

E.113 KRUSKAL WALLIS

The Kruskal Wallis H test is a nonparametric F test in essence. It converts raw scores into ranks drawn from all the samples and sees if the value of the rank sums average half the total ranks times number of sample observations for any one sample. The test statistic H is usually defined as;

$$12/[N(N+1)].\text{SUM from } i=1 \text{ to } i=k \text{ of } R_i^2/n_i - 3(N+1)$$

and Ho is rejected when calculated H exceeds chi squared for the chosen alpha at k minus one degrees of freedom;

where

k = number of samples

N = total number of observations for the entirety of the samples

n_i = the number of observations in sample i

R_i = the sum of ranks assigned to the observations in the ith sample.

The power efficiency of the H test is 95.5% of the F test for a fully parametrized set of populations. [Gibbons 1985 198-201].

The Kruskal Wallis test only does one way ANOVA, so can only be applied to one treatment variable at atime, unlike true ANOVA which can

do two or three way tests and GLM ANOVA which can handle multi-way ANOVA in SAS. For sample sizes all of over 5, the H distribution approximates the Chi Squared distribution [Blalock 1984 336-379].

E.114 KOLMOGOROV SMIRNOV

The Kolmogorov-Smirnov test requires its data to come from continuous not discrete data in order that it can function indepedently of the theoretical population distribution against which it calibrates the observation with the maximum deviation from that theoretical distribution. It therefore cannot appropriately be used with the accuracy scores in the present work, since they are unmistakeably discrete and not continuous and since the SAS application of the test does not make use of the work of statisticians such as Pettitt and Stephens (1977) who have have extended Kolmogorv-Smirnov tables to be able to handle discrete data. Sprent [1981] however claims that applying the test to discrete distributions will result in a more conservative alpha than would have been obtained for a Chi squared test of the same distribution.

The test rejects Ho when the observed maximum deviation from the theoretical distribution has less than an alpha percent chance of having come from the appropriate point in the theoretical distribution. What is compared is not the actual distribution of observations with some standard or user specified theoretical distribution, but rather the actual largest deviation with D_n the Kolmogorov Smirnov test statistic for a sample of n observations. Dn is a distribution free statistic. SAS produces confidence intervals of 5% alpha showing the upper and lower bounds to Dn. For the two sample case, the observations are arranged in increasing magnitude, and their cumulative distributions are matched to

see what the probality is that the maximum difference could have occurred if both samples come from a common population. [Gibbons 1985 127-131].

E.12 ANALYSIS OF VARIANCE

E.121 PARAMETRIC ANOVA

ANOVA was originally used to overcome the multicollinearity problem of correlated independent variables in linear regression. ANOVA overcomes the multicollinearity contaminant be assessing not only the main effects of each independent (aka treatment) variable on the dependent variable but also assesing the effects of interaction between two or more variables on the dependent variable. Most textbooks still treat ANOVA as a strictly parametric test requiring normally distributed populations with equal variances and equal sample or cell sizes. This is because the validity of the F ratio test comparing between group variances with within group variances is the crticalally important ANOVA statistic, and it itself has parametric requirements to support the equivalence of preset alpha and actual alpha. Alpha is the probability of making the type 1 error of rejecting a true Ho, and it is vulnerable to inflation when sample variance inequality (heteroscedascity) inceases. However Scheffe [1959] has shown ANOVA to be robust to all violations of ANOVA assumptions except that of equal sample or cell sizes. SAS ANOVA confronted with unequal cell sizes first finds their harmonic grand mean and then applies the F test to them. It was therefore considered of interest to put the data from the experiments through the SAS ANOVA procedure, although the sample inequalities are large enough for some

distortion in the result to be expected and this in turn required using the ANOVA procedure under the General Linear Model (GLM) as a corrective to the parametric ANOVA analysis.

E.122 ANOVA UNDER THE GENERAL LINEAR MODEL

The GLM is essentially the model underlying linear regression using the general linear equation, y = a + bx. The general linear erquation is expressed in terms of a bx line on an x by y plane. The GLM extends this idea to three dimensional space whereby b becomes a matrix of coefficients, x a vector of independent variable parameters and a a vector of residual errors. Although the GLM requires the residuals to be uncorelated and homoscedastic and significance tests like the F test require them also to be multivariate normal, if this does not naturally occur, it "can be created by an appropriate orthogonal transformation", according to Barnett and Lewis [1984 p292].

Bruning and Kintz [1977] show how homoscedascity can be tested by F testing the sample variances one pair at a time, so long as the samples are all independent. Otherwise their correlation must first be assessed and taken into account. However ANOVA under the GLM is quite robust to heteroscedascity just as it is under imperfect fulfillment of the parametric assumptions [Glass and Stanley 1970].

The main reason for using GLM for unequal sample sizes has already been alluded to in chapter 9, namely its use of type III sums of squares in computing the F ratio. The type III hypothesis, often called the weighted squares of means model, underlying the test does not depend on cell sizes but only on which cells are being observed [Milliken and Johnson 1984 p186]. It is slightly less power efficient than the conventional ANOVA F ratio computation (type 1) but avoids the bias that

a type 1 computation brings to unbalanced cells under ANOVA [Littell and Lynch 1983 p764]. SAS outputs both type 1 and type III results so one can see the effect of imbalance on the F test results.

E.13 MULTIPLE COMPARISONS

Section 9.54 in chapter 9 introduced the need to control the experimentwise error rate when several samples are being tested and compared, so as to ensure the overall probability of type 1 error is kept at the alpha level of, in our case, 5%.

SAS gives control data about the experimentwise error rate (EER) in a number of ways as shown below. The following abbreviations are employed in the discussion;-

CER	Comparisonwise (single pair) error rate
OEER	The EER under Ho
PEER	The EER under Hp, the partial hypothesis
MEER	The maximum EER under both Ho and any possible Hp
a	The alpha desired for the results, here 5%
c	The total number of comparisons made
k	The number of means compared
n_i	The number of observations in cell i
s	The root mean square error for v degrees of fdm
t(a;v)	The critical value of students t at the given alpha for v degrees of freedom
m_i	The mean of the observations in cell i

The MEER can be controlled by setting the CER to the Bonferroni inequality which is simply a/c. In SAS the BON option with MEER<a

declares 2 means to show significant differences if

$$MOD[m_i-m_j]/s(1/n_i+1/n_j)EXP\ 0.5 >or= t(e;v)$$

where e=a/(k(k-1)/2).

Sidak's inequality provides a tighter bound where $CER=1-(1-a)^{1/c}$ which ensures MEER<or=a for any c comparisons. The SIDAK option in SAS declares significant differences between means if

$$MOD[m_i-m_j]/s(1/n_i+1/n_j)EXP\ 0.5 >or= t(e;v)$$

where e=1-(1-a)EXP(1/k(k-1)/2).

Scheffe designed his multiple comparison test for post hoc comparisons; i e when data reveal unexpected differences between sample means, as opposed to planned comparisons for which the Tukey and Sidak tests were designed. [Scheffe 1953].

Scheffe's test is more directly comparable with a normal ANOVA F test than the two previous tests because it only allows a contrast of means to be shown significant iff the overall F test is itself significant - this is a safeguard absent from the other EER tests. It is thus more conservative for multiple means comparisons (but not for merely repeated pairs comparisons). In SAS the SCHEFFE option declares two means to be significantly different within a significant overall F ratio if

$$MOD[m_i-m_j]/s(1/n_i+1/n_j)EXP0.5 >or= ((k-1)F(a;k-1,v)EXP0.5$$

where F(a;k-1,v) is the critical value of the F distribution at the desired alpha with k-1 df (degrees of freedom) on the numerator and v df

on the denominator. Klockars and Sax [1986] warn that type II errors are likely under the Scheffe test with a small number of comparisons, its conservatism being bought at the cost of power efficiency.

For repeated pairwise comparisons the most powerful test is the Tukey-Kramer test given in SAS by the TUKEY option and it declares significance if

$$MOD[m_i-m_j]/s((1/n_i+1/n_j)/2)EXP0.5 >or= q(a;k,v)$$

where q(a;k,v) is the alpha level of criticality for a t distribution of k independent normal random variables with v df.

The GABRIEL option in SAS is aimed at controlling the MEER when cell sizes are unequal. It declares a significant difference when

$$MOD[m_i-m_j]/s((2n_i)EXP(-0.5)+(2n_j)EXP(-0.5)) >or= M(a;k,v)$$

where M(a;k,v) is the alpha critical value of the maximum modulus t distribution of k independent normal random variables with v df. Still greater power is obtained by multi stage range tests available in SAS such as DUNCAN or REGWF, but the SAS Statistics manual cautions thus:

"Multi stage tests can be used with unequal cell sizes but the resulting operating characteristics are undesireable, so only the balanced case will be considered here. With equal sample sizes, the means can be arranged in ascending or descending order, and only contiguous subsets need be tested."[SAS 1985 p474].

Klockars and Sax [1986] echo this caution and point out that since Duncan and similar range tests proceed by *sequential* tests of significance between pairs, they are necessarily sensitive to sample

size differences. It was therefore decided to avoid the multi stage test options (unless sample sizes were roughly equal as for CORJ or TYPE) and it was thought not unreasonable to rely on a consensus among all of the other methods listed above to control the MEER. It was desired to avoid the temptation to "use a statistical sledgehammer to crack an observational nut" in ascertaining significant differences in result between accounts, question codes or more importantly from the contaminant viewpoint (especially that of selection) - between sample groups of subjects from different firms.

E.2 NONPARAMETRIC SIGNIFICANCE TESTS

E.20 NOTE ON INTERPRETATION

The tests in section E.2 are all concerned with the question of whether the different intances of speed or accuracy in each set are more than 95% likely to have come from the same population of groups, accounts, colours, question types or account types. The Ho in each case is that they have, but we must reject the Ho whenever the number given after "Pr>#" [# is any test statistic] is below 0.0500. Such situations are marked *** in the tables below.

E.21 BY GROUP

Analysis of Variance for Variable SPEED
Classified by Variable GROUP

GROUP	N	Mean	Among MS	Within MS
			9.500	4.294

H	30	6.678		
L	42	7.110	F Value	Prob > F
I	90	6.397	2.212	0.0100
C	36	6.731	***	
A	46	6.178		
B	120	5.919		
D	42	6.881		
J	36	6.759		
M	30	7.047		
E	60	5.939		
K	72	5.916		
F	36	6.176		
G	42	6.265		

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)

CHISQ= 33.708 DF= 12 Prob > CHISQ= 0.0007 ***

Median Scores (Number of Points above Median)
for Variable SPEED
Classified by Variable GROUP

GROUP	N	Sum of Scores	Sum H0	Std D Under H0	Mean Score
H	30	18.0	15.0	2.679	0.600
L	42	26.0	21.0	3.141	0.619
I	90	47.0	45.0	4.422	0.522
C	36	22.0	18.0	2.921	0.611
A	46	18.0	23.0	3.277	0.391
B	120	48.0	60.0	4.975	0.400
D	42	22.0	21.0	3.141	0.523
J	36	25.0	18.0	2.921	0.694
M	30	19.0	15.0	2.679	0.633
E	60	26.0	30.0	3.701	0.433
K	72	31.0	36.0	4.015	0.430
F	36	17.0	18.0	2.921	0.472
G	42	22.0	21.0	3.141	0.523

Average Scores were used for Ties

Median 1-Way Analysis (Chi-Square Approximation)

CHISQ= 22.812 DF= 12 Prob > CHISQ= 0.0294 ***

Analysis of Variance for Variable ACCURACY
Classified by Variable GROUP

GROUP	N	Mean	Among MS	Within MS
			6.889	1.054
H	30	3.233		
L	42	4.119	F Value	Prob > F
I	90	3.677	6.534	0.0001
C	36	2.972		***
A	46	3.434		
B	120	2.941		
D	42	3.119		
J	36	3.472		
M	30	3.600		
E	60	3.583		
K	72	3.833		
F	36	3.333		
G	42	3.619		

Kruskal-Wallis Test (Chi-Square Approximation)

CHISQ= 78.566 DF= 12 Prob > CHISQ= 0.0001

***

Median Scores (Number of Points above Median)

for Variable ACCURACY

Classified by Variable GROUP

Average Scores were used for Ties

Median 1-Way Analysis (Chi-Square Approximation)

CHISQ= 22.436 DF= 12 Prob > CHISQ= 0.0329

***

Conclusion. Systematic speed and accuracy differences exist between the sample groups.

E.22 BY ACCOUNT

Analysis of Variance for Variable SPEED
Classified by Variable ACCOUNT

ACCOUNT	N	Mean	Among MS	Within MS
			42.813	3.163
K	35	6.358		
KX	29	8.421	F Value	Prob > F
KY	24	7.308	13.534	0.0001
KZ	26	7.751		***
L	34	6.180		
LA	26	5.517		
LX	30	4.534		
LY	24	6.168		
M	55	5.825		
MX	58	5.347		
N	36	8.419		
NA	25	7.074		
NX	28	6.216		
NY	25	5.948		
O	26	5.825		
OA	30	9.102		
OX	24	4.792		
OY	34	6.249		
P	31	6.058		
PA	27	5.242		
PX	31	5.912		
PY	24	5.998		

Kruskal-Wallis Test (Chi-Square Approximation)

CHISQ= 196.29 DF= 21 Prob > CHISQ= 0.0001

***

Median Scores (Number of Points above Median)

for Variable SPEED

Classified by Variable ACCOUNT

Median 1-Way Analysis (Chi-Square Approximation)

CHISQ= 153.30 DF= 21 Prob > CHISQ= 0.0001

***

Analysis of Variance for Variable ACCURACY
Classified by Variable ACCOUNT

ACCOUNT	N	Mean	Among MS	Within MS
			3.597	1.079
K	35	3.142		
KX	29	3.724	F Value	Prob > F
KY	24	3.583	3.332	0.0001
KZ	26	3.692		***
L	34	3.294		
LA	26	2.230		
LX	30	3.766		
LY	24	3.958		
M	55	3.454		
MX	58	3.568		
N	36	3.833		
NA	25	3.240		
NX	28	3.428		
NY	25	3.640		
O	26	3.615		
OA	30	3.200		
OX	24	3.541		
OY	34	3.500		
P	31	2.935		
PA	27	3.481		
PX	31	3.387		
PY	24	3.375		

Kruskal-Wallis Test (Chi-Square Approximation)

***CHISQ=50.359 DF=21 Prob>CHISQ=0.0003

Median 1-Way Analysis (Chi-Square Approximation)

CHISQ= 31.954 DF= 21 Prob > CHISQ= 0.0592

Conclusion; Systematic speed and accuracy differences exist between the accounts, although the speed differences are rather more pronounced.

E.23 BY COLOUR OF QUESTION SHEET

Analysis of Variance for Variable SPEED

Classified by Variable COLOR

COLOR	N	Mean	Among MS	Within MS
			17.818	4.286
D	124	6.541		
G	93	6.231	F Value	Prob > F
L	124	5.873	4.157	0.0010
O	124	6.836		***
P	94	6.629		
Y	123	5.962		

Average Scores were used for Ties

Wilcoxon Scores (Rank Sums) for Variable SPEED
Classified by Variable COLOR

CLR	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
D	124	44901.5	42346.0	1984.4	362.1
G	93	32123.0	31759.5	1765.6	345.4
L	124	37216.5	42346.0	1984.4	300.1
O	124	46337.0	42346.0	1984.4	373.6
P	94	35233.0	32101.0	1773.6	374.8
Y	123	37092.0	42004.5	1978.2	301.5

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)

CHISQ= 17.912 DF= 5 Prob > CHISQ= 0.0031
***

Median Scores (Number of Points above Median)for SPEED
Classified by Variable COLOR

COLOR	N	Sum of Scores	Exp Under H0	SD Under H0	Mean Score
D	124	67.0	62.0	5.03	0.54
G	93	48.0	46.5	4.48	0.51
L	124	54.0	62.0	5.03	0.43
O	124	65.0	62.0	5.03	0.52
P	94	57.0	47.0	4.50	0.60
Y	123	50.0	61.5	5.02	0.40

Average Scores were used for Ties

Median 1-Way Analysis (Chi-Square Approximation)
CHISQ= 11.797 DF= 5 Prob > CHISQ= 0.0377
***

Analysis of Variance for Variable ACCURACY
Classified by Variable COLOR

COLOR	N	Mean	Among MS	Within MS
			2.178	1.149
D	124	3.443		
G	93	3.612	F Value	Prob > F
L	124	3.306	1.895	0.0931
O	124	3.508		
P	94	3.574		
Y	123	3.268		

Average Scores were used for Ties

Wilcoxon Scores (Rank Sums) for Variable ACCURACY
Classified by Variable COLOR

C	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
D	124	41990.0	42346.0	1884.19	338.6
G	93	34819.5	31759.5	1676.47	374.4
L	124	39837.0	42346.0	1884.19	321.2
O	124	44330.0	42346.0	1884.19	357.5
P	94	33792.0	32101.0	1684.03	359.4

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 9.6134 DF= 5 Prob > CHISQ= 0.0870

Median Scores (Number of Points above Median)
for Variable ACCURACY
Classified by Variable COLOR

C	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
D	124	14.0	16.3636364	3.41155298	0.112903226
G	93	17.0	12.2727273	3.03545151	0.182795699
L	124	18.0	16.3636364	3.41155298	0.145161290
O	124	14.0	16.3636364	3.41155298	0.112903226
P	94	16.0	12.4046921	3.04913580	0.170212766
Y	123	11.0	16.2316716	3.40081210	0.089430894

Average Scores were used for Ties

Median 1-Way Analysis (Chi-Square Approximation)
CHISQ= 6.2068 DF= 5 Prob > CHISQ= 0.2866

Conclusion. Systematic effects of question sheet colour on speed are found but not on accuracy.

E.24 BY CORJ

Analysis of Variance for Variable SPEED
Classified by Variable CORJ

CORJ	N	Mean	Among MS	Within MS
			5.74084683	4.38414036
C	340	6.24710784		
J	342	6.43060429	F Value	Prob > F
			1.309	0.2529

Average Scores were used for Ties

Wilcoxon Scores (Rank Sums) for Variable SPEED
Classified by Variable CORJ

CORJ	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
C	340	114116.5	116110.0	2572.56620	335.636765
J	342	118786.5	116793.0	2572.56620	347.328947

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)
S= 114117 Z= -.774713 Prob > |Z| = 0.4385

T-Test approx. Significance = 0.4388

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.60048 DF= 1 Prob > CHISQ= 0.4384

Median Scores (Number of Points above Median)
for Variable SPEED Classified by Variable CORJ

C	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
C	340	165.0	170.0	6.53354610	0.485294118
J	342	176.0	171.0	6.53354610	0.514619883

Average Scores were used for Ties

Median 2-Sample Test (Normal Approximation)

S= 165.000 Z= -.765281 Prob > |Z| = 0.4441

Median 1-Way Analysis (Chi-Square Approximation)

CHISQ= 0.58566 DF= 1 Prob > CHISQ= 0.4441

Kolmogorov-Smirnov Test for Variable SPEED
Classified by Variable CORJ

C	N	EDF at maximum	Deviation from Mean at maximum
C	340	0.5	0.593377960
J	342	0.4	-.591640393
-	----	----------	
	682	0.4	

Maximum Deviation occurred at Observation 459
Value of SPEED at maximum 5.80000000

Kolmogorov-Smirnov 2-Sample Test (Asymptotic)
KS = 0.032086 D = 0.064173
KSa = 0.837935 Prob > KSa = 0.4838

Analysis of Variance for Variable ACCURACY
Classified by Variable CORJ

CORJ	N	Mean	Among MS	Within MS
			0.121963922	1.15869592
C	340	3.42647059		
J	342	3.4532163	F Value	Prob > F
			0.105	0.7457

Average Scores were used for Ties

Wilcoxon Scores (Rank Sums) for Variable ACCURACY
Classified by Variable CORJ

CJ	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
C	114944.0	116110.0	2442.58590	338.070588
J	117959.0	116793.0	2442.58590	344.909357

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 114944 Z= -.477158 Prob > |Z| = 0.6332

T-Test approx. Significance = 0.6334

Kruskal-Wallis Test (Chi-Square Approximation)

CHISQ= 0.22788 DF= 1 Prob > CHISQ= 0.6331

Median Scores (Number of Points above Median)
for Variable ACCURACY
Classified by Variable CORJ

Sum of	Expected	Std Dev	Mean

C	N	Scores	Under H0	Under H0	Score
C	340	42.0	44.8680352	4.42259010	0.123529412
J	342	48.0	45.1319648	4.42259010	0.140350877

Average Scores were used for Ties

Median 2-Sample Test (Normal Approximation)

S= 42.0000 Z= -.648497 Prob > |Z| = 0.5167

Median 1-Way Analysis (Chi-Square Approximation)

CHISQ= 0.42055 DF= 1 Prob > CHISQ= 0.5167

Kolmogorov-Smirnov Test for Variable ACCURACY
Classified by Variable CORJ

CORJ	N	EDF at maximum	Deviation from Mean at maximum
C	340	0.9	0.155541047
J	342	0.9	-.155085581
	682	0.9	

Maximum Deviation occurred at Observation 335

Value of ACCURACY at maximum 4.00000000

Kolmogorov-Smirnov 2-Sample Test (Asymptotic)

KS = 0.008411 D = 0.016821

KSa = 0.219646 Prob > KSa = 0.9999

Conclusion. The Ho is supported as between question sheet types (c and j) both for speed and for accuracy. This is not consonant with the systematic colour effects found in the previous subsection, unless for example, there were order effects of question presentation within either or both the c set and the j set.

E.25 BY TYPE OF ACCOUNT

Analysis of Variance for Variable SPEED
Classified by Variable TYPE

TYPE	N	Mean	Among MS	Within MS
			170.316716	4.14211702
N	341	5.83939394		
F	341	6.83885630	F Value	Prob > F
			41.118	0.0001
				***

Average Scores were used for Ties

Wilcoxon Scores (Rank Sums) for Variable SPEED
Classified by Variable TYPE

	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
N	101052.500	116451.500	2572.57727	296.341642
F	131850.500	116451.500	2572.57727	386.658358

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)

(with Continuity Correction of .5)
S= 101053 Z= -5.98563 Prob > |Z| = 0.0001
T-Test approx. Significance = 0.0001
***

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 35.830 DF= 1 Prob > CHISQ= 0.0001
***

Median Scores (Number of Points above Median)
for Variable SPEED
Classified by Variable TYPE

T	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
N	138.0	170.500000	6.53357420	0.404692082
F	203.0	170.500000	6.53357420	0.595307918

Average Scores were used for Ties

Median 2-Sample Test (Normal Approximation)
S= 138.000 Z= -4.97431 Prob > |Z| = 0.0001
***

Median 1-Way Analysis (Chi-Square Approximation)
CHISQ= 24.744 DF= 1 Prob > CHISQ= 0.0001
***

Kolmogorov-Smirnov Test for Variable SPEED
Classified by Variable TYPE

TYPE	N	EDF at maximum	Deviation from Mean at maximum
N	341	0.6	1.78705019
F	341	0.4	-1.78705019
	682	0.5	

Maximum Deviation occurred at Observation 293
Value of SPEED at maximum 5.90000000
Kolmogorov-Smirnov 2-Sample Test (Asymptotic)
KS = 0.096774 D = 0.193548
KSa = 2.52727 Prob > KSa = 0.0001***

Analysis of Variance for Variable ACCURACY
Classified by Variable TYPE

TYPE	N	Mean	Among MS	Within MS
			0.844574780	1.15763326
N	341	3.40469208		
F	341	3.47507331	F Value	Prob > F
			0.730	0.3933

Average Scores were used for Ties

Wilcoxon Scores (Rank Sums) for Variable ACCURACY
Classified by Variable TYPE

T	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score

N	115462.500	116451.500	2442.59641	338.599707
F	117440.500	116451.500	2442.59641	344.400293

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 115463 Z= -.404692 Prob > |Z| = 0.6857

T-Test approx. Significance = 0.6858

Kruskal-Wallis Test (Chi-Square Approximation)

CHISQ= 0.16394 DF= 1 Prob > CHISQ= 0.6856

Median Scores (Number of Points above Median)
for Variable ACCURACY
Classified by Variable TYPE

	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
N	38.0	45.0	4.42260911	0.111436950
F	52.0	45.0	4.42260911	0.152492669

Average Scores were used for Ties

Median 2-Sample Test (Normal Approximation)

S= 38.0000 Z= -1.58278 Prob > |Z| = 0.1135

Median 1-Way Analysis (Chi-Square Approximation)

CHISQ= 2.5052 DF= 1 Prob > CHISQ= 0.1135

Kolmogorov-Smirnov Test for Variable ACCURACY
Classified by Variable TYPE

T	EDF at maximum	Deviation from Mean at maximum
N	0.9	0.379071253
F	0.8	-.379071253

0.9

Maximum Deviation occurred at Observation 335

Value of ACCURACY at maximum 4.00000000

Kolmogorov-Smirnov 2-Sample Test (Asymptotic)

KS = 0.020528 D = 0.041056

KSa = 0.536088 Prob > KSa = 0.9361

Conclusion. All tests show very significant differences in speed between the with funds statement sets and the sets without. Conversely no test finds any significant difference between them as regards accuracy.

E.3 CORRELATIONS OF SPEED WITH ACCURACY

E.31 CORRELATION ANALYSIS BY CORJ

Significant correlations at 5% alpha are shown by ***

Calculation Questions Only			Judgment Questions Only	
Statistic	Speed	Accuracy	Speed	Accuracy
N	340	340	342	342
Mean	6.247	3.427	6.431	3.453
Std Dev	1.892	1.060	2.277	1.092
Minimum	2.450	0.0	1.433	0.0
Maximum	15.583	5.0	16.133	5.0
Pearson's Rho	minus 0.00399		plus 0.17276	
Ho Prob > Rho	0.9416		0.0013	

Conclusion; virtually zero correlation between speed and accuracy within either the judgment or the calculation responses.

E.32 CORRELATION ANALYSIS BY TYPE

Type F With Only			Type N Without Only	
Statistic	Speed	Accuracy	Speed	Accuracy
N	341	341	341	341
Mean	6.866	2.263	5.813	3.402
Std Dev	2.263	1.050	1.764	1.101
Minimum	2.583	0.0	1.433	0.0
Maximum	16.133	5.0	13.350	5.0
Pearson's Rho	plus 0.09894		plus 0.07724	
Ho Prob > Rho	0.0680		0.1547	

Conclusion; some insignificant positive correlation be tween speed and accuracy within both types of account, but the hypothesised correlation was negative.

E.33 CORRELATION BY SAMPLE GROUP

Abbreviations
Mn Mean SD Standard Deviation Sp Speed Ac Accuracy
Min Acc = zero and Max Acc = 5 for all groups except:
C D E G H J K M 1 - 5 and L 2 -5

ID	N	MnSp	SDSp	Min	Max	MnAc	SDAc	Rho	Pr>R
A	46	6.18	2.99	2.25	16.13	3.44	1.05	+0.13818	3598
B	120	5.92	2.57	1.43	15.58	2.94	1.12	+0.11696	2033
C	36	6.73	2.28	2.10	11.65	2.97	1.08	-0.03621	8339
D**	42	6.88***		2.62	3.37	15.05	3.12	1.11	+0.34148 0269
E	60	5.94	1.32	3.05	8.90	3.58	1.01	+0.13930	2885
F	36	6.18	1.26	3.73	8.72	3.33	1.12	-0.07882	6477
G	42	6.27	1.38	3.63	10.47	3.62	1.15	-0.03354	8330
H	30	6.68	1.87	3.83	12.57	3.23	1.10	+0.06579	7298
I	90	6.40	1.94	2.45	13.88	3.68	0.95	+0.05872	5825
J	36	6.76	1.36	3.80	10.18	3.47	1.00	-0.09045	5998
K	72	5.92	1.50	3.35	9.63	3.83	0.92	+0.04834	6868

L	42	7.11	2.24	3.33	12.55	4.12	0.63	+0.19518 2155
M	30	7.05	2.00	4.58	13.35	3.60	1.00	-0.06049 7508

Conclusion; no correlations significant except 34% positive for group D. This result makes the group D subjects outliers and exceptions in that only they appeared to benefit in terms of accuracy scores from spending more time studying accounts generally, and from studying type F (with funds statement) accounts in particular.

E.34 CORRELATION BY ACCOUNT

ID	N	MnSp	SDSp	MinS	MaxSp	MnAc	SDAc	L	H	Rho	Pr>R
K	35	6.36	2.00	2.65	11.65	3.14	1.50	0	5	+0.20227	2439
KX	29	8.42	2.40	2.97	15.58	3.72	0.70	3	5	+0.16603	3894
KY	24	7.31	2.36	3.35	14.60	3.58	1.32	0	5	-0.10997	6090
KZ	26	7.75	2.19	2.98	13.35	3.69	0.93	1	5	-0.09372	6488
L	34	6.18	1.17	3.02	8.20	3.29	1.00	1	5	+0.10068	5710
LA	26	5.52	1.55	2.92	8.90	2.23	1.48	0	5	-0.24497	2278
LX	30	4.53	1.07	2.25	6.38	3.77	0.78	2	5	+0.00172	9928
LY	24	6.17	1.37	3.55	8.37	3.96	1.08	1	5	+0.20787	3297
M	55	5.83	1.67	2.58	10.97	3.45	1.03	1	5	+0.02471	8579
MX	58	5.35	1.34	1.43	8.63	3.57	1.01	1	5	+0.08371	5321
N	36	8.42	3.13	3.52	16.13	3.83	0.91	2	5	+0.26895	1127
NA	25	7.07	1.22	5.03	9.85	3.24	0.88	2	5	-0.01029	9611
NX	28	6.22	1.62	2.08	8.65	3.43	1.07	1	5	+0.24752	2041
NY	25	5.95	1.32	3.72	8.70	3.64	0.81	2	5	-0.25180	2247

ID	N	MnSp	SDSp	MinS	MaxSp	MnAc	SDAc	L	H	Rho	Pr>R
O	26	5.82	0.51	4.80	6.85	3.62	1.06	0	5	+0.32459	1057
OA	30	9.10	2.39	5.10	14.55	3.20	1.19	1	5	+0.15831	4034
OX	24	4.79	0.56	3.62	5.83	3.54	0.59	2	5	-0.05685	7919
OY	34	6.25	2.24	2.10	11.55	3.50	0.79	2	5	+0.28294	1049
P	32	6.04	1.73	2.50	11.42	2.97	1.15	1	5	-0.03733	8393
PA	27	5.24	1.32	2.92	7.73	3.48	0.89	1	5	+0.14350	4752
PX	31	5.91	1.36	3.18	7.82	3.39	1.17	1	5	+0.15071	4184
PY	23	6.03	1.87	2.92	9.88	3.35	0.93	2	5	+0.45902	0276***

Conclusion; no significant correlation except Account PY at +46%

This result makes PY an outlier among the other type F accounts and among the accounts generally, suggesting the possibility that it alone has a funds statement worth spending extra time studying. The other possibilty, that the 2.76% chance of this high a correlation is merely coincidental, cannot be rejected at this stage, since the experimentwise error rate is not controlled until the figures go through the Scheffe, Sidak etc procedures later in this chapter. Before that happens, any one result significant at alpha = 5% is only to be expected with more than ten account groups even under purely random distributions of the speed and accuracy variables.

E.35 CORRELATION BY COLOUR OF QUESTION SHEET

ID	N	MnSp	SDSp	MinS	MaxSp	MnAc	SDAc	L	H	Rho	Pr>R
D	124	6.54	2.02	2.70	15.58	3.44	1.01	1	5	-0.13853	1249
G	93	6.23	1.53	2.65	10.90	3.61	1.07	0	5	-0.09177	3816
L	124	5.87	2.09	1.43	14.90	3.31	1.19	0	5	+0.20854	0201***
O	124	6.84	2.52	2.98	16.13	3.51	1.06	0	5	+0.09544	2917
P	94	6.63	2.04	2.10	14.55	3.57	0.99	1	5	+0.19297	0624***
Y	123	5.96	1.98	2.45	13.88	3.27	1.09	0	5	+0.15186	0936

Conclusion; Significant correlations of +20% for the light blue and pink question sheets. Since no such significance is found for the other colours in either the calculation or the judgment group, the possibility of systematic order effects is unexpectedly raised by this result. After all, the whole point of presenting three different orders of presentation for each question sheet was to mitigate any order effects.

E.4 PARAMETRIC ANOVA

E.41 ANOVA ON SPEED

IND VAR	DFM	MSM	DFE	MSE	F	Pr>F	RSQuare
Colour***	5	17.81	676	4.29	4.16	0010	0298
Account**21***		42.81	660	3.16	13.53	0001	3010
Type***	1	189.10	680	4.11	45.96	0001	0633
Type***	1	189.10			64.76	0001	
Account*21***		42.81			14.66	0001	
CJ	1	5.74			1.97	1614	
Typ*CJ	1	3.73			1.28	2587	
Acc*CJ**21***		9.10			3.12	0001	
Model***	635	2.92			8.43	0001	3138
Type***	1	189.10			65.81	0001	
Account**21***		42.81			14.90	0001	
CJ	1	5.74			2.00	1581	
Typ*CJ	1	3.73			1.30	2549	
Colour***	5	17.82			6.20	0001	
Acc*Col	104	3.64			1.27	0513	
Model***	548	2.87			3.70	0001	4728

Conclusion; each of the above tables shows that account type and account difficulty within type affect speed of processing as does question sheet colour, the three together explaining 47.28% of the variation in speed. However this is subject to the distribution of speed being appropriate for an ANOVA analysis, and the one respect in which we know for sure that it is not is the inequality of cell frequencies. In addition, we cannot by any means be confident the distribution is unskewed or that the subsets have roughly equal standardized variances.

The GLM results in the next section (E.5) do not rely on such assumptions.

E.42 ANOVA ON ACCURACY

IND VAR	DF	MSM	DFE	MSE	F	Pr>F	RSquare
Account	21***	3.56	660	713.18	3.30	0001	0950
Colour	5	2.18	676	1.15	1.90	0931	0138
Type	1	0.99			0.92	3388	
Account	21***	3.56			3.29	0001	
Typ*Acc	1	0.37			0.34	5604	
Model***	22	3.45	659	1.08	3.19	0001	0967
Type	1	0.99			1.00	3185	
Account	21***	3.56			3.58	0001	
Typ*Acc	1	0.37			0.37	5436	
CJ	1	0.12			0.12	7263	
Typ*CJ	1	0.77			0.77	3799	
Acc*CJ***	21	3.81			3.83	0001	
Model***	46	3.40	635	0.99	3.42	0001	1987
Type	1	0.99			1.03	3108	
Account**	21***	3.56			3.70	0001	
Typ*Acc	1	0.37			0.38	5372	
CJ	1	0.12			0.13	7221	
Typ*CJ	1	0.77			0.80	3724	
Acc*CJ***	21	3.81			3.96	0001	
Colour	5	2.18			2.26	0471	
Typ*Col	5	0.15			0.15	9786	
Acc*Col**	104	1.65***			1.72	0001	
Model***	133	1.96	548	0.96	2.03	0001	3302

Conclusion; the same remarks apply here as applied to the ANOVA of speed in the previous subsection , except that colour has no significant role in explaing accuracy variation and the total variation explained by the type*account*colour model is only 33.02%. In other words two thirds of the observed variation in accuracy is unexplained after eliminating the roles of account type, account difficulty and question sheet colour. This leaves subject variation as the probable major systematic explicator.

E.5 GLM ANOVA

E.51 GLM ANOVA ON SPEED

Key to column headings

IND VAR	Independent variables	Pr>F	Probability of >F
DF	Degrees of freedom	T1MS	Type 1 Mean Square
T3MS	Type 3 Mean Square	T1F	Type 1 F Value
T3F	Type 3 F Value	RSquare	

IND VAR	DF	T3MS	T3F	Pr>F	T1MS	T1F	Pr>F	RSquare
Type***	1	37.86	12.15	0005	189.09	60.71	0001	
Accont***21		35.57	11.42	0001	35.32	11.34	0001	
Typ*Acc	1	6.57	2.11	1470	6.57	2.11	1470	
Model***	23	40.75	13.08	0001				3138
Error	658	3.11						

Conclusion; 31.30% of the speed variation is explained by account type and account difficulty.

E.52 GLM ANOVA ON ACCURACY

IND VAR	DF	T3MS	T3F	Pr>F	T1MS	T1F	Pr>F	RSquare
Type	1	0.06	0.06	8082	0.99	0.92	3388	
Account**21***3.03			2.80	0001	3.52	3.25	0001	
Type*Account	1.34		1.24	2655	1.34	1.24	2655	
Model***	23	3.31	3.06	0001				0967
Error	658	1.08						

Conclusion; only 9.67% of the variation in accuracy is explained by account difficulty and virtually none at all by account type. This suggests the provision of funds statements has a negligible effect only in accuracy of accounts processing.

E.53 GLM SPEED GROUPINGS

Tukey, Bonferroni, and Scheffe's tests for speed by acount type all show the two types to be signicantly different with type F at 6.866 and type N at 5.813 minutes of processing time.

The maximum number of accounts subsets for speed was produced by the Duncan range test thus;

Set	Accounts
A	OA KX N
B	KX N KZ
C	KZ KY NA
D	KY NA K
E	NA K OY NX L LY P PY

F	K OY NX L LY P PY NY PX M O LA MX
G	OY NX L LY P PY NY PX M O LA MX PA
H	M O LA MX PA OX
I	LA MX PA OX LX.

the minimum number was given by the Scheffe test thus;

Set	Accounts
A	OA KX N KZ KY
B	KX N KZ KY NA K OY NX L LY P PY NY PX M O
C	KZ to O plus LA MX PA
D	KY to PA plus OX
E	NA to OX plus LX.

Both the above lists run in descending speed order from OA at 9.102 minutes to LX at 4.534 minutes. They show the accounts could not have all come from the same population of accounts as regards processing speeds, but that somewhere between 5 (Scheffe) and 9 (Duncan) different populations would be expected . However, if we exclude accounts outliers OA at the slowest extreme and both OX and LX at the fastest extreme, and bearing in mind that Duncans test prefers equal sample sizes which here we have not got, then under Sheffe's test we have only a little over a 5% chance of being wrong in assuming the rest of the accounts are from the same population of accounts. We have already seen that there is asystematic tendency for subjects to take longer over the the type F accounts than the type N accounts which in turn suggests that funds statements slow processing down rather than speed it up.

For accuracy the Scheffe test once more gives the fewest subsets of accounts with LY at 3.958 and N at 3.833 mean score being only in the more accurate set, and LA at 2.231 being only in the less acurate set. all the other accounts could have come from a common population. The Duncan range test gives 5 subsets with common memberships except for the following accounts which are in fewer than 4 sets as follows:

set	accounts
A	LY N LX KX KZ NY O
B	N to O and L NA
C	LX to O and L NA OA K
D	L NA OA K P
E	LA by itself.

This leaves only these accounts as capable of coming from a common population under the strict Duncan assumptions; KY MX OX OY PA M NX PX and PY.

All tests show that the mean accuracy for the judgment scores at 3.4532 is not significantly different from the mean score for the calculation questions at 3.4265. However significant differences were found for colour under Duncan as follows;

A	G P O D
B	P O D L
C	O D L Y

On the other hand Scheffe and the other tests did not find significant colour differences and we can perhaps ignore the Duncan results since they will be distorted by unequal colour sample sizes.

E.6 INFORMATION LOAD REGRESSIONS

E.61 ALL CUES

Regression of speed on accuracy

Constant		2.223342
Std Err of Y Est		1.913827
R Squared		0.002511
No. of Observations		682
Degrees of Freedom		680
R	0.050111	
X Coefficient(s)	0.045817	
Std Err of Coef.	0.035017	

Regression of speed on all cues

Constant		5.139780
Std Err of Y Est		2.025994
R Squared		0.065548
No. of Observations		682
Degrees of Freedom		680
R	0.256024	**
X Coefficient(s)	0.007766	
Std Err of Coef.	0.001124	

**significance of between 0.1% and 1%

Regression of accuracy on all cues

Constant		155.4398
Std Err of Y Est		69.08587
R Squared		0.000125
No. of Observations		682
Degrees of Freedom		680
R	0.011194	
X Coefficient(s)	-0.40361	
Std Err of Coef.	1.382566	

E.62 ABSOLUTE INFORMATION DIVERSITY

Regression of speed on columns

Constant	2.344269
Std Err of Y Est	0.624684

R Squared	0.004423
No. of Observations	682
Degrees of Freedom	680
R	0.066512
X Coefficient(s)	0.019868
Std Err of Coef.	0.011430

Regression of speed on totalled blocks

Constant	15.68429
Std Err of Y Est	3.989294
R Squared	0.004948
No. of Observations	682
Degrees of Freedom	680
R	0.070344
X Coefficient(s)	0.134228
Std Err of Coef.	0.072993

Regression of accuracy on totalled blocks

Constant	16.90991
Std Err of Y Est	4.017995
R Squared	0.004072
No. of Observations	670
Degrees of Freedom	668
R	0.063813
X Coefficient(s)	-0.13473
Std Err of Coef.	0.081525

Regression of speed on 1/columns

Constant	0.455119
Std Err of Y Est	0.100889
R Squared	0.007047
No. of Observations	682
Degrees of Freedom	680
R	0.083949
X Coefficient(s)	-0.00405
Std Err of Coef.	0.001845

Regression of accuracy on 1/columns

Constant	0.427915
Std Err of Y Est	0.101240
R Squared	0.000126
No. of Observations	682
Degrees of Freedom	680
R	0.011263
X Coefficient(s)	0.000595
Std Err of Coef.	0.002026

Regression of speed on 1/rows

Constant	0.022868
Std Err of Y Est	0.005752
R Squared	0.073423
No. of Observations	682
Degrees of Freedom	680
R	0.270968**
X Coefficient(s)	-0.00077
Std Err of Coef.	0.000105

**significance of between 0.1% and 1%

Regression of accuracy on 1/rows

Constant	0.017820
Std Err of Y Est	0.005975
R Squared	0.000364
No. of Observations	682
Degrees of Freedom	680
R	0.019087
X Coefficient(s)	0.000059
Std Err of Coef.	0.000119

Regression of accuracy on columns

Constant	2.484778
Std Err of Y Est	0.625972
R Squared	0.000314
No. of Observations	682
Degrees of Freedom	680
R	0.017727
X Coefficient(s)	-0.00579
Std Err of Coef.	0.012527

E.63 RELATIVE INFORMATION DIVERSITY

Regression of speed on rows/cues

Constant	0.146330
Std Err of Y Est	0.034383
R Squared	0.060006
No. of Observations	682
Degrees of Freedom	680
R	0.244963 *
X Coefficient(s)	-0.00414
Std Err of Coef.	0.000629

*significance of between 1% and 2%

Regression of accuracy on row/cues

Constant	0.120037
Std Err of Y Est	0.035463
R Squared	0.000000
No. of Observations	682
Degrees of Freedom	680
R	0.000380
X Coefficient(s)	0.000007
Std Err of Coef.	0.000709

E.64 REPEATED DIMENSIONS

Regression of speed on cues less rows

Constant	54.75859
Std Err of Y Est	51.15550
R Squared	0.055586
No. of Observations	682
Degrees of Freedom	680
R	0.235768 *
X Coefficient(s)	5.921573
Std Err of Coef.	0.936004

*significance of between 1% and 2%

Regression of accuracy on cues less rows

Constant	92.92116
Std Err of Y Est	52.63729
R Squared	0.000081
No. of Observations	682
Degrees of Freedom	680
R	0.009050
X Coefficient(s)	-0.24861
Std Err of Coef.	1.053392

E.7 CONCLUSIONS

The statistical processing has confirmed many of the tentative conclusions presented at the end of appendix D, except that there do appear to be order effects for sheets coloured pink or light blue. The accounts sequences are roughly equivalent, the c and j scores likewise. We can see that SCF OA performs badly relative to other SCFPs but SCF PA

does reasonably well. We cannot on this preliminary evidence support the optimism expressed in ED 54 about the user friendliness of the SCF compared to the old funds statements.

The most important conclusions however concern the two key Walker [1984] hypotheses of speed and accuracy. Funds statements have a significantly adverse effect on processing speed and a negligibly positive effect on accuracy, but both these main effects are very strongly interactive with and mediated by the character of the subjects themselves.

Regression of speed on cues less rows,

Regression of speed on rows/cues,

Regression of speed on 1/rows, and

Regression of speed on all cues ;

are the only significant information load results. This study therefore lends no support to any of the main information load paradigms that relate speed to accuracy. The tendency for more data (cues) to take more processing time, and thus to show slower processing speeds per accounts set, is scarcely surprising. That the number of rows in an accounting statement seems to carry more significance as an information dimension than the number of totallled blocks (such the current asssets block) or than the number of colums (comparative figures) is of rather more interest. It suggests accounts are read line by line with no systematic skipping between block totals, and raises the possibility that present block totalling and block heading patterns are not seen by users as simplifying the task of accounts interpretation. "Funds" represent a rather clear illustration of just such a failure of arithmetic aggregation to represent the outward manifestation of conceptual integration.

APPENDIX F

APPENDIX F
THE INTERNATIONAL FRAMEWORK OF ACCOUNTING: A REVIEW

F.1 INTRODUCTION

F.2 WESTERN ACCOUNTING HISTORY

F.3 ASPECTS OF EAST ASIAN ACCOUNTING

F.4 COMPARATIVE ACCOUNTING

F.5 HARMONIZATION AND THE IASC

F.6 CONCLUSION

APPENDIX F
THE INTERNATIONAL FRAMEWORK OF ACCOUNTING: A REVIEW

F.1 INTRODUCTION

It is strange that accounting predates all other recorded human activity, debate continues right upto the present about it is and what it ought to be. "Hindsight facilitates hypercriticism. While some may jest that accounting is the second oldest profession, intellectually it is in its infancy (or emerging therefrom)....It has never been regarded as a philosophy fundamental to human welfare. It has not had an Adam Smith or a John Stuart Mill." [Gaffikin 1987, 25/6]

In this chapter the historical forces shaping present day Anglo-American accounting are outlined and contrasted with those shaping Sino-Japanese accounting. The extent to which clusters of countries with similar disclosure policies has been established in the literature is addressed, followed by a brief survey of the theoretical frameworks so far advanced to explain such clusters. Finally the movement towards global accounting harmonization is examined and its implications discussed. The overall purpose of the literature search for this chapter is to provide a historical and geographical context within which funds flow statements generally and the external validity of this research particularly can be meaningfully discussed.

Throughout this chapter the following abbreviations are used;

AAA	American Accounting Association
AICPA	American Institute of Certified Public Accountants
APB	Accounting Principles Board
FASB	Financial Accounting Standards Board
IAS	International Accounting Standard
IASC	International Accounting Standards Committee
SCFP	Statement of Change in Financial Position
SFAS	Standard Financial Accounting Statement
SSAP	Statement of Standard Accounting Practice

F.2 HISTORY

F.21 PREHISTORY

Pictographs have been found on clay tablets in the Middle East dating as far back as 12000 BC. Also found were clay tokens whose shape and markings represented both a type and quantity of livestock. Tokens are believed to have been tranferred alomg with the livestock they represented as evidence of ownership transfer. Clay tablets replaced tokens as it became clear that pictographs on the envelopes comtaining the clay tokens did away with the need for the tokens themselves. [Schmandt-Besserat 1979].

By about 3000 BC early records are recogniseable as accounts, albeit mostly inventory lists, lists of commodities used for payment and simple journal entries. The invention of money is attributed to the Chinese around 2000 BC who also appear to have pioneered budgetary control and governmental accounting and auditing.' However, it was the scribe of Mesopotamia who was most readily identifiable as the predecessor of today's accountant. "At school special emphasis was placed on learning commercial terms and phrases. In fact, in Latin and many languages the standard phrase for parsing is *amo* (I love), but in Mesopotamia, the aspiring young scribe parsed with 'I count'"[Green 1930 29/30].

The Greeks possessed a sophisticated system of public affairs accounting and auditing and enterprise management accounting, according to the Zenon papyri. Virtually nothing of Roman accounting survives, since they kept their records on perishable wax tablets.[Most 1982]

F.22 MEDIEVAL HISTORY

In 1178 the merchants of Genoa advanced money to their government in a series of transactions that created the Bank of St George, the earliest Western bank. [Littleton 1933]

In 1202 Leonardo of Pisa introduced to Europe Arabic numerals and zeroes. "It should be noted however that the rules of the bankers' guild invariably prescribed the use of Roman numerals in making ledger records. The idea prevailed for a long time that such numerals made fraudulent alterations more difficult. But there was nothing in this restriction by the guild to preclude other informal uses of Arabic numbers." [Littleton 1933 p21]

Although the medieval banks may have invented double entry, the oldest surviving record reflecting its principles is the Giovanni Farolfi branch ledger in Salon, France for the year 1299/1300. Luca Pacioli is considered the father of modern accounting because his "Method of Venice" became the model for subsequent textbooks on accounting. In 1494 he published his *Summa de Arithmetica* which contained two chapters ("de Computis et Scripturis") describing double entry bookkeeping. In 1514 Pope Leo X appointed him to the Chair of Maths in the Sapienza University in Rome. The first professional organization of accountants was founded in Venice in 1581, and so the method of Venice was spread throughout the world by a combination of translation, plagiarism and trading. By 1775 double entry had spread to Germany, Belgium, Holland, Britain and Iberia.[Most 1982]

F.23 THE RISE OF THE COMPANY

The earliest companies were royally chartered monopolies like The Russia Company [1555], the East India Company [1600] and the Hudsons Bay Company [1670]. Among the reasons Irish gives for the Tudor and Stuart preference for monopolies in international trade, particularly striking is the following [Irish 1947 p483]:-

"The peoples of distant countries did not distinguish between individual merchants. As all Chinamen look alike to us, so all Englishmen or even all Europeans were alike to them. An unscrupulous trader, who cheated, robbed, or killed a native, escaped the consequences of his crime and left them to be borne by his countrymen who sought later to carry on the trade. The home government could not punish such offences, and it should not let them continue. It required, therefore, that a man proposing to trade in a distant country should have an interest in the permanent welfare of the trade, by making him contribute money to the association, and subscribe to its rules."[Irish 1947]

At the end of each voyage accounts were taken out, distributions made and each particular venture liquidated. The balance sheet thus began life as a liquidation statement.[Irish 1947]

In 1613 the East India Company had its capital subscribed for four years, instead of as previously by venture subscriptions. In 1657 its new charter established the principle of permanently invested capital, while preserving a limited right to transfer individual shares without an

intricate liquidation of accounts on each transfer. Permanent capital changed the previous liquidation basis of accounting whereby each subscriber received a sum at the end of each venture without any need to partition it between income and capital components. Irish quotes Littleton [op cit 138-9] re the separation of ownership from active control, thus, it "meant that statements separate from the books would soon be highly desireable because of the number of people who had contributed capital and who would desire information about their venture. "

The industrial revolution brought large scale production beyond the reach of most single families, and also sharpened greatly the difference between the time period needed for production and that needed to amortize equipment. The demand for capital involved increasing numbers of investors and savers so that the finance function became separate from the management function, this phenomenon being sometimes termed the managerial revolution. It created the divorce between internal and external accounting.[Most 1982]

F.24 THE VICTORIAN ERA

Four factors contributing to financial secrecy in the nineteenth century:-

1.No tradition of publicity

2.Belief that information would benefit competitors.

3.Belief that caveat emptor applied to securities as if they were sui generis with general goods and chattels.

4.No belief in any public right to corporate information.[Hawkins 1963]

The first break came in the UK when the 1844 Companies Act required directors to supply shareholders with an audited balance sheet annually.[Most 1982]

Limited liability itself arrived with the 1856 Companies Act and the 1862 Act enabled it to be available to any who elected to have it. As case law evolved, the preservation of capital and protection against fraud on creditors and investors became outstanding features. Legal decisions and business practice combined over time to produce conventions rather than principles concerning the income capital boundary.[Irish 1947]

Originally, English company legislation called for the preparation and filing of accounts for the protection of creditors and for the information of shareholders. The English Act of 1844 enunciated minimum requirements for the books; it made definite rules as to audit, and provided for due publicity through the publication of the balance sheet. Accent was placed on the prevention of fraud and on accounting for capital, rather than on a true determination of income. In fact no profit and loss account was required.

Proper books of account were not mandated until the 1929 Act required money payments and receipts, assets and liabilities and all sales purchases and stock in trade to be recorded in the books. It also prescribed the annual publication of a P&L account but not its contents.[Irish 1947]

F.25 US DEVELOPMENTS

The process of acceptance of the 1894 reporting standard for balance sheets agreed at the meeting of the American Association of Public Accountants was slow. [Previts 1984 p4]. The resolution was "that the method of stating should be in order of quickest realization", the reverse of the British order. A comment by Robert Montgomery, US born auditing author and early CPA leader, at the 1904 World Congress of Accountants, on a paper by Arthur Lowe*p+2Xs Dickinson, UK born managing partner of the US offices of Price Waterhouse, indicates the continuing UK influence. Montgomery said the UK order was "hardly the general practice" and that the proposed US order "conveys the status of the business better." This imples a comparatively greater interest in the US in liquidity since the proposed order puts liquidity literally first. This greater focus on liquidity in the position statement may be an early factor leading to the eventual *absence* of focus thereon in the pre SFAS 95 model of the SCFP in the USA.

Dickinson's paper at the 1904 Congress greatly influenced the format of the US income statement at its earlest stage of development.[Previts 1984]

Paton in his Accountants' Handbook noted [1922 p109] the inceasing importance of the Income Statement "and the present-day tendency to regard the balance sheet as the connecting link between successive income statements." Irish [1947 p71] thought this "arises largely from the basic truth that there is an increasing separation of the personalities of ownership and administration. It is further affected by the growth of some corporations to miniature empires in which so many people have a direct or indirect interest."

The New York Stock Exchange required from 6 January 1933 that companies seeking a listing must henceforth provide audited financial statements.

On 29 May 1933 FDR requested Congress to enact a Federal securities bill which would add "to the ancient rule of caveat emptor, the further doctrine,'let the seller also beware'". Congress signed the Securities Act on May 29 with the long title of "an act to provide full and fair disclosure of the character of the securities sold in interstate and foreign commerce". [Edwards 1956]

During the forties, the income statement overtook the balance sheet in importance, in the US. George O May [1943] called the balance sheet a collection of "nonhomogeneous residuals" and this to Taggart [1953] "comes near to being the truth. If stocks are LIFO while debtors are near liquid, then the whole is meaningless. The meaning of certain balance sheet items is still comprehensible, but the balance sheet as a whole now fully deserves the suspicion in which it has always been held by those non accountants who feel that the monotonous balance of the two columns of figures is just too slick to be anything but phony."[Taggart 1953].

Solomons [1961] observed:"..just as in the first half of this century we saw the income statement displace the balance sheet in importance, so we may now be de-emphasizing the income statement in favor of a statement of fund flows or cash flows...my own guess is that so far as the history of accounting is concerned, the next twenty five years may subsequently be seen to have been the twilight of income measurement."[Solomons 1961, p283] This very wrong prediction does capture the extent to which the funds statement was seen in the fifties and sixties as having promising information content. Thereafter measurement corrections rather than supplemental disclosures or reformulations came to be viewed as more

effective solutions to the shortcomings of the income statement.

In 1958 the AICPA Special Committee on Research Programs recommended the formation of the APB and of a research basis for its deliberations. The Sprouse-Moonitz principles study appeared at the end of April 1962 as APB 1. In the foreword was a statement by the APB that the study was a valuable contribution to accounting thinking but "too radically different from present generally accepted accounting principles for acceptance at this time." It did accept *An Inventory of Generally Accepted Accounting Principles* in March 1965 as a desireable piece of codification. Principles were induced from practice rather than deduced from any a priori conceptual framework.[Moonitz 1974, p28]

The Wheat Committee [AICPA 1972] was charged to consider the feasibilty and desirability of establishing a Commission to study and recommend an organizational structure for advancing the formulation and modification of GAAP and for the issuance of authoritative pronouncements concerning the application of such principles [AAA 1971,p174] It recommended the establishment of the FASB. Soon after that the Trueblood Study Group concluded that the basic objective of financial statements is to **aid in economic decision making.** This has been cited as a the primary objective of accounting reports ever since. Financial statements, per the Trueblood Report, should do three things, viz.;-

1.Assist in predicting, comparing and evaluating the earning power of enterprises.

2.Report both historical cost and current values which differ significantly.

3.Separate information which is factual from information which is interpreted.[Previts 1983]

F.26 EARLY THEORIZING IN THE USA

Historically there have been three approaches to the development of accounting theory, viz:-

1.Personification theories which ascribed to an account the qualities of a person who received and gave, treated each account as an extension of the proprietor's and/or regarded each account as a clerk receiving or ceding value on behalf of the proprietor.

2.Proprietorial theories which classified accounts into personal and real, for persons and owned objects respectively. As the P and L account developed, real accounts spawned the subset nominal accounts for the period phenomena. In 1795, Edmond Degrange in "La Tenue des Livres Rendue Facile" published in Paris, divided real accounts into five classes; cash, goods, bills receivable, bills payable and profits & losses. Followers of his were known as the "cinq-contistes" or five account school.

3.Entity theories, which have become the conventional wisdom.

Vatter [1947] attacked the proprietary view of accounting as untenable when share capital is recorded at anything other than its current stock market value. "The simple notion of profit expressed as the personal gain of the proprietor cannot be applied to the corporate situation in which owner-stockholders are constantly moving in and out of the area of proprietary interest."[p6].

The entity theory, that the company has a life and accountability of its own, is a view he attributes to Paton and Littleton [1940].He quotes one of its critics, "Accounting theory would probably be more realistic

if it accepted as its basis the fact that the corporation is an association of flesh and blood persons who enjoy special privileges because they have complied with certain legal requirements".[Husband 1938].

Husband's [1938] article asserts that although the entity theory is the dominant accounting paradigm, the practicing accountant is quite happy to shift to the proprietary theory "when it suits his convenience".

One of the first attempts in this century to provide a sound theoretical framework for accounting was Sprague's "The Philosophy of Accounts"[1907]. He saw accounting as a branch of maths whose principles were thus determinable by a priori reasoning "and do not depend upon the customs and traditions which surround the art.[p ix]" The main significance of this work was its recognition of the need for the development of a more formal methodology for the long term development of the discipline. Previously, accounting rose no higher than technical manuals.[Gaffikin 1987]

Paton's "Accounting Theory" [1922] searched for the analytical and empirical premises on which accounting rests, including a whole chapter on the formal assumptions of accounting. His "assumptions" tended to be his own view of what the accountant assumed, in his opinion.[Gaffikin 1987]

Canning's "Economics of Accountancy" [1929] presented an economist's critique of accounting and moved inductively part of the way towards building a model useable both by accountants and economists.

During the thirties there were several theoretical efforts [AAA 1936, Scott 1931] of which one of the most systematically empirical attempts to induce principles was made by Sanders et al [1938].

Littleton [1933] thought the "antecedents" of bookkeeping were;-

1.A Material (something which needs to be reworked)
    a.Private property (power to change ownership)
    b.Capital (wealth productively employed)
    c.Commerce (interchange of goods)
    d.Credit (present use of future goods)
2.A Language (a medium for expressing the material)
    a.Writing (a means of making a permanent record)
    b.Money (medium of exchange, common denominator)
    c.Arithmetic (a means of computation)

These elements when energized by favorable economic and social conditions produce:

3.A Methodology (a plan for systematically rendering the material into the language).

The appearence of the Paton and Littleton [1940] monograph, *Corporate Accounting Standards* added importantly to the emerging academic framework for accounting. It was based on the fundamental assumption that accounting was an allocation process, guided by a matching concept, and principally oriented to the historical cost valuation model.[Previts 1984]

After the War, the academic community explored alternatives to proprietary and entity orientations although only Vatter's [1947] fund theory of accounting attracted any significant attention.

A coherent and very influential attempt at theory was provided by Paton and Littleton [1940], the more so as the former was an a priori deductivist while the latter was a historically oriented inductivist.

Littleton's "Structure of Accounting Theory" [1953] was strongly inductive albeit yielding only "low level empirical generalizations" [Gaffikin 1987 p23 interpreting a criticism by Deinzer 1965, p56]. However it can be seen as turning point in accounting academics' attitudes to methodology which has ever since been largely inductive.

F.27 EUROPEAN WORK TO 1960

As for Britain, Gaffikin [1987 p24] observes:"In Britain, accounting was not considered worthy of academic status. Accounting education thus stressed technical and legal procedures; 'theory' was superfluous." This had ceased to be true by the early seventies, arguably upto ten years earlier, but this section is only concerned with outlining the historical context in which present day funds statement formats were forged, and they were already in their present form by around 1960.

Rene Delaporte was arguably the most important French theorist. He stressed the importance of the accounting equation and saw accounts as showing value itself derived from legal rights or discharge of legal obligations. [Delaporte 1936].

The major German theorist was Eugen Schmalenbach who founded both business economics and what he called dynamic accounting,as described in his 1916 book of the same name. He said too much reliance was placed on the balance sheet whose ingredients even when accurately valued, did not add up to the total value of the firm. The P and L account should be developed and become the main report, with the balance sheet becoming merely the step between two income statements.

F.28 ANTICIPATIONS OF AGENCY THEORY

Berle and Means [1933] writing on the increasing separation of ownership from management, observed such separation increased the importance of the stewardship function of accounts.

A propos the separation of ownership from control, Vatter [1947 p107/8] wrote:- "In this situation management is indeed far removed from the application of neat theories of authority delegations following the lines of property rights; management is not the servant of the proprietors but rather the conciliatory agency between two or among several of these groups.

All business units are but parts of a greater whole; vice versa, most business units are themselves but combinations of smaller units. A thing or situation which may be a most useful and workable unit of business from ome point of view is likely to prove awkward and unsuited to other users and conditions. In the last analysis the notion of a unit of business is but a means of specifying the area of attention - a delimited and prescribed set of activities which give rise to the kinds of data with which accounting is to deal. Some such unit must serve as the basis for accounting: but it must be a unit devoid of personal implications and at the same time sufficiently definite to make clear just where its boundaries lie; it must be one that may be applied to various forms of organisation and different kinds of activities; and it must be one that has definite relation to the processes and the results that accounting is expected to achieve. Such a unit is to be found in the concept of a fund". He acknowledges the terminological difficulty and favours a definition that really amounts to a sinking fund:-"a segregation of

assets for a given purpose" and this involves "a partial recognition of the set of separate operations which pertain to those assets". However this vagueness is quickly made worse."In fund accounting a fund is not mere cash resources, and it is more than a mere collection of assets set aside for a particular purpose. The accounts of each fund recognize not only all the asset items but also all the equities that pertain to that fund; in addition, there are also present complete classifications of revenue, expense and income accounts. These, taken together, provide a general ledger trial balance complete in all respects as to the operations covered by the definition of the fund."[Vatter 1947]. What is being attempted in the above is a justification of fund accounting on proto agency theory grounds. It militates against an all financial resources view of funds as such an aggregate cannot by definition have a particular purpose in any tactical sense.

The theoretical aspects of accounting measurement, such as HC vs CCA etc are beyond the scope of this thesis.

The history of the funds statement itself is dealt with in Chapter 4.

F.3 ACCOUNTING IN EAST ASIA

F.31 INTRODUCTION

Gray [1985 p40] wrote: "Consider first the area of comparative international acccounting. In retrospect, most of this work has been restricted to the United States, the Soviet Union, and Continental European countries, particularly France, Germany and the Netherlands. Surprisingly, there has been very little study of accounting in British Commonwealth countries, either developed or developing. Clearly, there is considerable opportunity for further work to include South American countries and Far Eastern countries." Although since 1985 a number of studies on Japanese accounting (q v section F.33) have been published in English, the quotation is only marginally less true in 1990 than it was in 1985.

April 1987 was the crossover when the value of the Japanese stock market topped US$2688 trillion in capitalization, overtaking the US's $2672.

The two most dominant cultures and economies in East asia belong to China and Japan. Hong Kong's colonial status has meant that its regulatory framework has been British. The colony's trading, banking and managerial personnel, however, are significantly affected by their Chinese background and by the consciousness that Japan has overtaken the USA in economic gravitational terms. This necessitates a brief excursion into Sino-Japanese GAAP and the Asian accounting context more broadly. This is what is attempted in the next three subsections.

F.32 CHINA

Chinese accounting received its first state backing during the Ming Dynasty, more specifically 1408, when Emperor Yung Lo ordered merchants to keep proper books for tax purposes and to prevent fraud. Government

officials were apparently reviewed monthly. Minimum disclosure requirements were; name, tradename and nationality of ships, credentials and quantity of merchandise.[Jong 1976] Thus, right from the start, accounting was to the Chinese a burden imposed by a dictatorial state rather than, as in Venice, an organic outgrowth of trading and management practice.

Popular command of literacy and numeracy was sufficiently diffused by the 19th century to enable most urban shop apprentices and an indeterminate minority of peasants to keep accounts. [Rawski 1979].

"Lacking numerical place notation and relying on the abacus as a computing crutch, the Chinese failed to create a double entry system of bokkeeping. Lacking a separation between household and business activities, their so called 'closed' family firms rendered 'accountability' unnecessary."[Weber 1961]

However western double entry book-keeping was introduced in 1875 under Emperor Kwang Hsu. Even then, transactions were not logged in chronological order but grouped at random before being posted to ledgers which were never reconciled. One book, the Hung Chang, served as a master ledger which yielded an annual trial balance but that did not in turn yield final accounts.[Jong 1976]

Gardella [1983] takes issue with Jong about the randomness of recording order in the Chinese ledgers. [p289]"The Chinese books of the 19th and early 20th centuries that I have seen appear to be continuous records, and documents examined by others indicate that credit transactions were both extensive and rationally classified."

Chan [1977] contrasted the pioneering role of the banks in fostering Anglo American accounting procedures with the reluctance of pre-republican Chinese merchants to accept dividends below 7-10% on equity which made equity scarcely distinguishable from loans.

In addition to internationally accepted accounting principles, PRC accountants apply other unique principles including: the principle of control by the masses and the principle of indicating specific funds for specific purposes. [Zhou 1988].Joint ventures prepare one set of accounts for the capitalist investors, one for the PRC Ministries, neither conforming necessarily or consistently to any particular GAAP [Yam 1986].

F.33 JAPAN

The basic postulates of accounting in Japan were laid down in 1949 by the Ministry of Finance (MOF) in its still applicable *Financial Accounting Standards for Business Enterprises*. They comprise the consistency, going concern, historical cost and matching principles. In 1963 the Commercial Code and Securities and Exchange Law prescribed the annual presentation of a position, income and appropriation statement together with supporting schedules including changes in capital, changes in bonds, changes in fixed assets etc. There was and is no need to aggregate the schedules into an SCFP. Notes (trade bills) are the normal mode of credit trading so they tend to exceed receivables and payables on the balance sheet. A uniquely Japanese feature of the income statement is its classification of all items between ordinary and extraordinary. [JICPA 1987 20-28].

The Ministry of Finance (MOF) is advised by the Business Accounting Deliberation Council (BADC) whose members come from a variety of backgrounds in industry, accountancy, government and the universities. The BADC prepares standards called Business Accounting Principles in

response to specific requests from the MOF who then publishes them. They bind all companies that have to report to the MOF under the Securities and Exchange Law. BADC members tend to have accounting backgrounds so the Principles stress income measurement and shareholder protection rather than asset valuation and creditor protection to a greater extent than the Justice Ministry Code. Publicly listed conpanies prepare 2 sets of statements, to comply with the different requirements of the 2 different ministries. Net income will be the same, fortunately, under both procedures.

Japanese companies rely heavily on debt rather than equity as their principal source of finance, mainly provided by banks. Short term finance largely comprises fixed interest 90 day promissory notes and longer term finance may consist of an informal agreement to roll over these notes for a number of years. Short term debt often finances a substantial proportion of fixed assets (which include intangibles and investments). In many cases banks own a large, even the largest, slice of the firm's shares. Shares tend to be held on a long term basis, and this together with the importance of the banks, means there is less focus on short term earnings information than in Anglo countries. [Campbell 1985 p158]"The banks have direct access to their clients' accounting information, and so have relatively little influence on external financial reporting."Indeed it might be argued that the banks have an interest in minimizing such disclosure, thereby preserving information asymmetry in their favour.

The Commercial Code requires companies to transfer an amount equal to at least 10% of its declared dividends to a legal reserve until the reserve reaches 25% of the capital stock account. This resembles but exceeds French and German legal reserves, and it may not be distributed but may be capitalised. This is to protect creditors from the possibility of a profligate dividend policy.

Ministry of Justice staff, who are responsible for administering the Commercial Code, tend to be trained in the law rather than in accountancy. Consequently as in Germany, the protection of creditors assumes as much importance as the protection of shareholders reflecting "the apparent belief of the legal profession" [Campbell 1985 p155] that this is the proper state of affairs.

[Campbell 1985 p167]There is no requirement to publish a funds flow statement but extensive cash flow information is obligated in the non financial supplementary schedules filed with the MOF. The statement makes no attempt to provide a link between the annual profit and the changes in liquid funds. Instead it provides a summarized quarterly receipts and payments account.

In 1978 JICPA's Committee on the Financial Reporting System recommended that an SCFP be produced as did study groups of the Japan Accounting Association in 1985 and 1986. About 20% of Japanese companies provide SCFPs in the English versions of their accounts. Only 3 IASs have been accepted in Japan: #1 on disclosure, #3 on consolidations and #10 on post balance sheet events. [Kozuma 1987].

Investment advice as a profession only arrived in Japan in 1965 and still far more reliant on institutions than individuals for its customer base. [JICPA 1987 p18].

Japanese auditors work much more closely with their clients while still preserving their independence, but the biggest difference from the West is in the numbers of accountants; only 8579 in Japan compared with nearly a quarter of a million in the US. "The problem is that the profession had to start from scratch with the CPA law of 1948 and the

tough set of examinations has had a failure rate in excess of 92%" [Holloway 1989, p75]. These are not circumstances supportive of extensive accounting rule making and policing.

"The problem is that there is no pressure for greater corporate disclosure in Japan. Outside shareholders are simply not interested in that kind of information. It is the Ministry of Finance which is entirely responsible for pushing companies to cough up more financial information...Since Japanese accountants already have more business than they can handle, the drive for greater disclosurew will have to come the MOF - or from overseas." [Holloway 1989 p75]

The effects of US Japan accounting differences exaggerates the real underlying economic differences, as shown in the comparative ratios below taken from Choi [1983];

Ratio	**USA**	**Japan**
Current	1.9	1.2
Quick	1.1	0.8
Debt equity	0.5	0.8
Interest cover	6.5	1.6
Return on net worth	0.14	0.07

The higher debt equity and lower liquidity in Japan is sustainable where banks are major providers of finance and are closely related to their customers.

Large Japanese MNCs prepare English language versions of their accounts. These generally have to comply with the regulations of the stock exchange on which the shares are listed, which means English language Japanese accounts reflect Anglo-American GAAP rather than normal Japanese practice.

F.34 EASTERN ASIA OVERVIEW

Regional markets have grown far faster than the quality of public accounts. "Statutory disclosure and regulatory supervision vary from stringent in Singapore to abysmal in Indonesia." A region wide effort to improve the quality of accounts is nonetheless under way, driven by a combination of Anglo-American investors, the local affiliates of the big six accounting firms and interventions by the Korean and Singaporean governments. Escalating insurance premiums following the Carrian and Panelectric scandals both of which involved as yet unsuccessful negligence suits against the auditors,have been a factor in the new activism. [Friedland 1989].

Japan has lagged far behind other advanced countries in standardizing their accounting. 1989 was the first year that Japanese consolidated accounts were mandated. They are still not required in Indonesia, Taiwan, Thailand or South Korea. The standard of public accounts in Indonesia, Taiwan and Thailand has failed to keep pace with the exponential growth of their stockmarkets. "In terms of standards and practices, the Commonwealth countries and Hong Kong are the most advanced." Standards and practices based on the US model prevail in Indonesia, the Philippines, Korea , Thailand and to a lesser extent Japan and Taiwan where accounting is driven mainly by tax considerations. "The US model is considered more rigorous than British accountancy standards and less flexible in its application to local conditions." [Friedland 1989, p71]

The Table below highlights some key areas of under disclosure in Asia;-

REGIONAL DISCLOSURE REQUIREMENTS [Friedland 1989]

Country	Consolidation	Dirs Rem	Rel Pty Trans
Hong Kong			not yet
Indonesia	sometimes	no	no
Japan	supplement	no	sometimes
Malaysia			
Philippines	sometimes	no	
Singapore	sometimes		intercorporate
South Korea	sometimes	no	sometimes
Taiwan		no	no
Thailand	sometimes	no	intercoporate

India has recently decided to open its capital markets to foreign investors but its own GAAP are not fully codified, especially in the key areas of inventory and depreciation where there is no comparability inside the country yet [Khambata and Khambata 1989].

Audit and tax work makes up around three quarters of most Asian accounting firms' revenues compared with just over half in Europe. A tie up with a member of the Big Six is advantageous for Asia's local accounting partnerships. In exchange for a contribution to the parent for joint expenses such as advertising, product development and liability insurance, they gain instant credibility and access to multinational client referrals. They are also given an edge in recruitment. This is important when less than 150 accountants qualify every year in Korea and in Hong Kong there is one public accountant for every 1300 people compared to Britain's one for 350.[Friedland 1989]

F.4 COMPARATIVE ACCOUNTING

F.41 INTRODUCTION

Weirich et al [1971] distinguish world accounting with its latent universal GAAP from international accounting which addresses each country's own GAAP.International accounting is classified into four main subjects: comparative, harmonization, specific issues and management accounting.[Gray 1985]

Comparative accounting includes the description and analysis of accounting systems at the national level, their historical evolution, comparative reporting systems and classification of accounting systems by patterns of development. One of the earliest comparisons was by Kirkman [1971] who argued the UK could learn from US disclosure treatments of the cost of sales, stock valuation, depreciation and information concerning sources and uses of both cash and working capital.

F.42 CLUSTERS

F.421 THE TWO APPROACHES

Some writers have attempted to explain differences in accounting standards and their implementation across countries in terms of environmental characteristics - deductivism [Choi 1974, AAA 1976, Choi and Mueller 1984,Nobes and Parker 1981].

Others have have clustered nations on the basis of their accounting

behavior and attempted to relate these clusters to environmental variables - inductivism [Goodrich 1982, Nobes 1983, Frank 1979, Nair and Frank 1980, Da Costa et al 1978].

F.422 DEDUCTIVISM

Mueller [1967] was one of the earliest to use the deductivist approach to accounting classification. He saw four patterns;-

1.Macroeconomic- business accounting serves the purposes of national economic policies.

2.Microeconomic-accounting as a branch of business economics.

3.Independent discipline-accounting as a service function derived from business practice.

4.Uniform accounting - accounting as a means of administrative control.

Mueller [1968] thought similarities were as important as differences between various countries' GAAP. In his grouping of international practices, he aggregated together "the developing nations of the Far East" which already excluded Japan. His article concluded that American GAAP should not be arbitrarily enforced in other countries but that complete international diversity of accounting principles was undesireable and unnecessary.

The AAA [1977] report asserted the existence of five international accounting zones:- British, American, Franco-Latin, German-Dutch and Communist.

Nobes [1983, 1984] adopted and extended Mueller's approach, also ignoring culture but introducing hierarchy, and addressing the issue of what classification itself is for.

Nobes [1985 174/5] cites the AAA [1977, p77/8] as having laid down four necessary conditions of effective classification.

1.Consistency of application of classification criteria, which conversely implies different purposes for a classification system leads to the use of different characteristics.

2.Thoroughness. An effective system will contain enough subsets to exhaust a given universe.

3.Exclusivity. No element can fall into more than one subset.

4.Preservation of hierarchical integrity, so that for example in the Linnaean system a species is amember of a genus in turm a member of a family *in all cases for all elements.*

Classifications of accounting are criticised for

1.Lack of precision in definition of what is to be classified,

2.Lack of a model with which to compare statistical results,

3.Lack of hierarchy to add subtelty to the prtrayal of size differences between countries,

4.Lack of judgment in the choice of important discriminating features.

Nobes [1985] claims to attempt to solve the above in his post 1982 work, with its focus on measurement and valuation. His system divides developed western countries into two classes: micro based and macro based - this being strongly supported by his factor analysis. The micro class has 2 subclasses; theoretical whose only species is Holland, and pragmatic which has 2 families: UK influenced (Australia, NZ, Ireland and UK itself, and US (USA and Canada). The 3 macro subclasses are continental (an empty set), economics comprising only Sweden; and government which has 2 families: tax based (Italy, France, Belgium and

Spain) and law based (Germany and Japan).

F.423 INDUCTIVISM

Price Waterhouse conducted three surveys of international accounting practices: 1973 (38 countries), 1975 (46) and 1979 (64).The most important inductivist work was by Nair and Frank [1980]. They used the PW survey data to generate five clusters of measurement practices and seven of disclosure practices. The hypotheses that (a) cultural and economic variables might be more closely associated with disclosure practices, and (b) trading variables might be more closely associated with measurement practices were not supported.

In 3 of their studies, Frank and Nair used the PW survey data as input into factor analysis to generate groups based on the single factor on which the country had the highest loading. They dichotomised the 1975 survey data between measurement and disclosure practices, clustering each separately. They found the two cluster patterns to be significantly unlike each other [Nair and Frank p436]. Nair's [1980] update using the 1979 data found similar clusters.

Nair and Frank's [1980] disclosure groups based on the Price Waterhouse [1975] data disaggregated the 1973 Coninental European cluster to form a Scandinavian cluster (group 6), a Franco Belgian Latin American cluster including Zaire (group 1), a Dutch Canadian Irish cluster including the UK (group 4), an American German Filipino Japanese cluster (group 3) and a Swiss Italian cluster (group 7). There was also a Commonwealth cluster (2) and an Argentinian Indian one (5). The Commonwealth split between groups 2 and 4 may be the result of EEC entry, but South Africa stayed with group 2 while Rhodesia went with the UK to group 4. These disclosure groupings are quite different from the measurement groupings.

In each of their studies Frank and Nair rotated their initial factors orthogonally, which depends for its validity on the assumption that the underlying factors are uncorrelated. In this case that means that the countries have nothing in common. Doupnik [1987] therefore used oblique rotation instead (of the 1975 data and his own 1983 follow up data). Hong Kong was not listed in his groups but it would clearly have been in the UK group along with Singapore, Australia and South Africa. His factor analyses of the 1975 and 1983 data supported only the limited conclusion that during the 8 year period harmonization occurred on a noticeable scale only between the South American and Southern Europe country groups.

Goodrich [1986] factor analysed the political cicumstances of 54 countries to see if the results displayed clustering significantly like the AAA [1977] morphology and his own earlier clustering [Goodrich 1980]. Goodrich's 1980 clustering had five groups factor rotated to maximise the US UK distance. The result is that his groupings are so unlike those of anyone else that the UK stands at the top of his group 3 followed by a list that embraces not only the expected cases of New Zealand, Hong Kong and Singapore but also the unexpected cases of France, Canada and the Philippines. Former French colonies on the other hand were in group 5 along with Jersey, Italy and the Netherlands.

There were strong positive correlations between centrist political systems and "non-disclosure accounting types" and between polyarchic political systems and both the British and the inflation focussed accounting groupings.

Chang and Most [1981] looked in 1976 at the comparative information contexts of the UK, US and New Zealand for investment decisions. Their respondent groups all rated the annual report the most important source of information except the financial analysts groups in the UK and NZ who rated it second after newspapers and magazines. NZ institutional investors rated the SCFP second after the income statement.

F.43 CONTINGENCY FRAMEWORKS

F.431 INTRODUCTION

Culture in Hofstede's [1984 p13] often cited definition, is a "collective programming of the mind which distinguishes the members of one human group from another."

"Contingency theory postulates that the effectiveness of the organization in coping with the demands of its environments is contingent upon the elements of its various subsystems..being designed in accordance with the demands of the environment with which they interact."[Burrell and Morgan 1979 quoted without page reference by Thomas 1986, p254]]

Examples of applied contingency theory per Thomas [1986] are Bailey [1975] who attributed UK-USSR differences in accounting to differences in ownership, Gray [1980] who attributed Franco-German accounting conservatism to the greater importance of bank sourced funds over equity when compared the UK situation, and Nair and Frank [1980] who tested the association of differences in measurement practices with differences in cultural and structural economic variables.

Schreyogg [1980] criticized the contingency paradigm for being deterministic because it is based on three premises;

1. There is only one best satructural answer to a specific contextual situation.
2. The environment is taken as given with no allowance being made for the possibility of its being influenced by the organization.
3. The performance criteria are externally defined and exogenous to the organization.

However, these criticisms do not really seem to apply to the accounting use of contingency theory, and their applicability to general management theorizing does not concern us.

F.431 THE MARKET BASED CONTINGENCY EXPLANATIONS

Four studies which looked at the comprehensiveness of annual accounts found America, Canada and Britain the most comprehensive; Germany, France and Switzerland the least [Barrett 1976, Lafferty and Cairns 1980, Choi and Bavishi 1982, Cairns et al 1984].

Choi [1974] reported empirical support for the competitive disclosure hypothesis: i.e. Disclosure increases significantly upto the point of initial issue of a corporate share tranche in a sizable capital market but stabilizes thereafter.

In a number of comparative empirical studies by Gray [1978 a b c] support was obtained form European data for the hypothesis that the extent of financial disclosure is correlated with the development and efficiency of national equity markets. His study of 72 large company reports in Britain, France and Germany [Gray 1980] also concluded that regulatory and capital market differences directly affect the amount of

profit disclosed. France and germany were shown to be much more conservatrive in their reporting practices than britain, reflecting the relative strength of equity compared with loan and government capital in Britain's case.

Gray [1980] suggested reasons why different countries have such different disclosure levels. Specifically, he attributed the greater conservatism of France and Germany than the UK to the dominance of loan financing over equity financing in those two countries. Loan creditors do not want generous measures of distributable profit relative to equity investors" preferences. Bankers have direct access to company records and do not wish to share the resultant information.

The main influences on French corporate reporting are the close relationship between tax accounting and financial accounting, the national accounting plan and the Commission des Operations de Bourse. The influence of the profession is growing but is nowhere near as strong as in the Anglo countries.[Nobes and Parker 1985 p93]

German accounting reflects 'principles of orderly bookkeeping' which derive from company mercantile and tax law. Statements are more conservative, more tied to historical costs and more uniform than in the Anglo countries. Unpaid capital, losses and other negative liabilities are shown as assets, while some of the large number of types of reserves are treated as provisions. [Nobes and Parker 1985 p123].

German long term liabilities to shareholders' funds is 4:1. There is a very strong emphasis on solvency shown in very conservative methods of asset valuation and revenue recognition within a rigid legal framework [McComb 1979 13/14].

European companies listed on the London Stock Exchange not only comply with exchange disclosure requirements, but in many cases exceed them, probably because of the desire to make the most of international capital markets. [Meek and Gray 1989].

Betas are said to reflect the extent to which companies are affected by the general economic climate [London Business School 1981, p12] so Thomas [1986 p258] felt able to choose it "as the most appropriate measure of the stable-dynamic dimension of environmental uncertainty" which is a major causative factor in contingency theory; and to choose alpha to represent the"heterogeneous-homogeneous dimension of environmental uncertainty" [ibid] since "specific risk is said to reflect the extent to which companies are diversified" [London Business School, loc cit]. These assumptions underlay his hypothesis that the greater the environmental uncertainty, the greater will be the need for forecast information so that high risk companies (as defined) "tend to make some reference to future profits in their interim reports whereas those with low risk do not." His results lent support for this hypothesis at the 10% level of significance.

His findings on the treatment of research and development expenditure were that a company's risk had no bearing on its propensity for deferring develop[ment expenditure. Insofar as differential risk represents differential environmental uncertainty and insofar as the latter represents the differences in circumstances which SSAP 13 specifies as permitting such deferral, then "the argument for allowing a choice of methods becomes exceedingly weak [Thomas 1986, p266]. This has implications for the international harmonization of accounting standards; in that if differences in circumstances are not relevant to different accounting practices, then the case in favour of flexibility is greatly

weakened.

Pratt and Behr [1987 p2] advance a transactions cost explanation."Market participants invest in external reporting systems because these systems reduce transaction costs by inducing managers to provide unbiassed reports. ..Participants are essentially substituting the costs of the reporting system for the transaction costs associated with incomplete and asymmetric information."Environmental factors which underlie the substitution attitudes between transaction costs and reporting costs include the number and complexity of capital market transactions, the dispersion of market participants, the ratio of managers to owners and the opportunism of market participants. It is suggested that capital markets characterized by a small number of relatively simple transactions, centralized, non-opportunistic participants and a high manager to owner ratio induce a smaller investment in the reporting system. The case of the US as against Switzerland is held to lend support for this approach.

Dahlman [1979 defined transaction costs as resource expenditures resulting from a lack of information, and identified three types of such costs, each representing a phase in executing a transaction.

1.Search costs incurred to locate trading opportunities and identify their characteristics,

2.Bargaining and decision costs incurred in investigating and negotiating mutually agreeable terms and conditions, and

3.Policing and enforcement costs incurred to preclude ex post facto violations of the agreement by one or both of the transacting parties.

In addition, any asymetry in the distribution of information between the parties in a component of transcation costs [Jensen and Meckling 1976].

Accounting standards can reduce transaction costs by inducing managers to provide reasonably uniform and unbiassed reports. The optimum investment in buiding and maintaining standards of reporting occurs at the point where one dollar of marginal reporting cost reduces total transaction costs by exactly one dollar. Larger markets have both larger transaction and larger reporting costs than do smaller markets, so of course have higher optima. If the owner/manager ratio is high as in the US, and if competitive pressures fail to induce managers to provide unbiassed reports, a larger investment in the reporting system is required than in a country like Switerland where a combination of competitive pressure and low owner/manager ratios mean the optimal investment in the reporting system is reached relatively more quickly. The turning point of the parabola will be lower for the US. The competitive pressure to disclose effect is ascribed to Williamson [1975] who noted that as the number of new market participants increases, competitive pressures increased to cause more disclosure by participants. Choi's [1974] contribution has already been noted.

In large and highly complex capital markets characterized by widely separated market participants, high levels of opportunistic behavior are expected. Conversely in smaller more concentrated stock markets neither opportunism nor cheating are very much valued or very much evident. [Pratt and Behr 1987 p12]

In Switzerland the banks have access to firms' internal records as result of their financial importance to their clients. " Such an evironment fosters little need for reporting standards, auditors or legally enforcible contracts." [Pratt and Behr 1987 p16]. Capital owners

in America cannot demand access to a firm's internal records so must rely on an external reporting system.

Since individualism is more pronounced in America, opportunism is more prevalent. Income smoothing and the creation of undisclosed reserves through asset undervaluation are facilitated by enabling powers granted to directors by Article 663 of the Swiss Code of Obligations section of the Federal Articles. Only banks and insurance companies have to publish their accounts; other concerns may but need not.

"In international standard setting, the rate of substitution between transaction costs and reporting system costs in a particular reporting jurisdiction can provide a key indication of the willingness of that jurisdiction's market participants to bear the costs of such standards. With its relatively small markets, Switzerland, for examnple, would be expected to resist the imposition of costly and extensive reporting standards from outside international orgaizations" as it has done with EEC Directives which of course do not bind or even necessarily influence non member countries. However even Swiss firms disclose much more in international markets than at home...In other words as these firms move into capital markets where more transaction costs are driven down by a given investment in the reporting system, they are increasingly willing to incur the costs of more extensive reporting."[Pratt and Behr 1987 21/2].

Biddle and Saudagaran [1989] reported rather strong evidence to support the view that international firms are significantly deterred from listing on stock exchanges with extensive disclosure requirements. To explain the paucity of foreign listings on American exchanges relative to their copiousness on Swiss, Frankfurt's and Luxembourg's ones, this is plausible. It is somewhat less plausible as an explanation of the success of the London self-styled International Stock Exchange in attracting more foreign listings than any other stock exchange has done.

Balakrishnan et al [1988] note that segment disclosure requirements have been a major disincentive to listings in the US by foreign firms. Similarly the 1933 Securitities Act pre-registration advertising of an issue from anywhere it could reach the US. However the SEC's 1982 Integrated Disclosure System relaxed some of the disclosure requirements for foreign issuers.

F.432 THE CULTURE BASED CONTINGENCY EXPLANATIONS

Values have been defined as"a broad tendency to prefer certain states of affairs over others" [Hofstede 1980, p19]. Values at the collective level represent culture; thus culture describes a system of societal or collectively held values. The justifications assigning culture a major role in perceiving how social systems change proposed by Harrison and Mckinnon [1986, p239] were that culture influences the norms and values of such systems and the behaviour of groups in their interactions within and across systems.

Hofstede induced four dimensions from very extensive cross cultural surveys his team conducted in over 50 countries [1980, 1983]. Their labels are Individualism, Power Distance, Uncertainty Avoidance and Masculinity. He defined these [1984, 83/4] as condensed below.

Individualism denotes a loose social framework in which people are supposed to take care only of themselves and immediate family. It is opposite to collectivism where some social group, often bonded by blood

relatedness, is expected to look after its members in exchange for unquestioning loyalty.

People in large power distance societies accept a hierarchical order in which everybody has a place without need of justification, whereas in small power distance societies people strive to reduce inequalities and demand justification for any that persist.

Strong uncertainty avoidance societies maintain rigid codes of belief and conduct, and are intolerant of deviations from the norm. The opposite case has a more relaxed atmosphere where "practice counts more than principles and deviance is more easily tolerated."

Masculinity denotes a society's preference for heroism, assertiveness, material success and achievement as opposed to the feminine themes of relationships, modesty, caring for the weak and the quality of life.

Respectively the above dimensions address issues of social interdependence, the handling of inequalities, the need to control an uncertain future or instead to adapt to it, and the allocation of social roles to the sexes.

Gray [1988] relates Hofstede's four dimensions to four "values" of accounting practice, thus:

Accounting Values	**Relationship with societal values**	
	+ve	**-ve**
Professionalism	Individualism	Uncert Avoidance
Uniformity	Uncertainty Avoidance	Individualism
Conservatism	"	"
Secrecy	"	"

Four hypotheses are posited to link the polarities to the dimensions, viz:-

1: The higher a country ranks in terms of individualism and the lower it ranks in terms of uncertainty avoidance and power distance then the more likely it is to rank highly in terms of professionalism.

2:The higher a country ranks in terms of uncertainty avoidance and power distance and the lower it ranks in terms of individualism then the more likely it is to rank highly in terms of uniformity.

3:The higher a country ranks in terms of uncertainty avoidance and the lower it ranks in terms of individualism and masculinity then the more likely it is to rank highly in terms of conservatism.

4:The higher a country ranks in terms of uncertainty avoidance and power distance and the lower it ranks in terms of individualism and masculinity then the more likely it is to rank highly in terms of secrecy.

Empirical tests of those hypotheses are in the future awaiting further work to operationalize the link between accounting practices and values and to assemble the relevant cross cultural data coherently.[Gray 1988,p14]

In Gray's [1988] article is a figure titled "Accounting systems: authority and enforcement" with horizontal axes for flexibility-uniformity and vertical for statutory control over professionalism, the Anglo socities are placed as exteremely professionalist flexible whose opposite pole of uniform statutory control are the less developed Latin nations. The sole occupant of the flexible statutory control quadrant is the Asian Colonial set comprising Singapore and Hong Kong, while the rest of Asia and Japan are placed south west of less developed Latin in the uniform statutory control quadrant.

In the figure "Accounting systems: measurement and disclosure", optimism:conservatism delimits the horizon while secrecy over transparency identifies the meridian. Once again the Anglos are in the far south west with their transparent optimism but this quadrant also houses the Nordics somewhat nearer the origin and the Asian colonials nearly on the origin. All the other groupings are in the north east quadrant of conservative secrecy once again featuring less developed Latin as the outlier.

Perera [1989] represents the relationships in a different schedule, thus;

Social Dimensions	**Accounting Values**	**Accg Pract**
Individualism/collectivism	Professionalism	Authority
Strong/weak uncty avoidance	Conservatism	Measurement
Long/short power distance	Uniformity	Application
Masculinity/femininity	Secrecy	Disclosure

The difference between the Anglos and the Europeans' approach to accounting can be culturally explained because economic growth in Anglo-America co-incided with classical liberalism and laissez faire attitudes to government. Individuals needed to be induced to invest with suitable reports and prospectuses. The French tradition is of government planning and economic intervention, with accounts serving macro planning ends; so the dominant French influence is the nationwide General Accounting Plan. The Anglos score high on individualism relative to the Europeans, and this is associated with expected positive professionalism and with negative uniformity, conservatism and secrecy.

Finally, it is instructive to note how far Hong Kong is from Britain on most of Hofstede's dimensions and which other nations are most like Hong Kong in each principal characteristic. The Table below presents this data. It offers little cultural justification for the Hong Kong tradition of doing accounting the British way.

TABLE

Country	Power Dis		Uncert Avoid		Indivm		Masc	
	X	R	X	R	X	R	X	R
Hong Kong	68	37/8	29	4/5	25	16	57	32/3
France	68	37/8	31	6/7	63	29/30	60	26/7
Sweden	86	36/41	29	4/5	86	36/41	5	1
Chile	71	40/1	71	40/1	23	15	35	22
Greece	43	17/8	5	1	28	8	57	32/3
Britain	35	10/12	35	6/7	46	22	41	14/6
*UK/HK(X)%	58.33		120.69		184.0		71.93	
+ABS2(HK-UK)R	53		4		12		35	

X is the index score R the country rank
* identical scores of HK to UK would give 100

+ identical rankings of HK and UK would give 0

Source - Hofstede's "Dimensions of National Cultures in 50 Countries and 3 Regions [1983].

F.5 HARMONIZATION AND THE IASC

F.51 INTRODUCTION

[Nobes and Parker 1985 p3]"It is also possible to satisfy oneself that, where accounting methods do differ, the differences are justified by differences in the economic, legal and social environment and are not merely the accidents of history. Such accidents are unlikely seriously to impede harmonisation."

In the view of Nobes and Parker [1985, p9]:"Six countries can be identified as vital in any attempt at worldwide harmonization, that is, the USA, the UK, the GFR, France, the Netherlands and Japan. At present even these six have quite widely different financial reporting systems. These existing differences can be largely explained in terms of legal systems, types of business organization and sources of finance, the influence of taxation and the strength of the accountancy profession."

F.52 THE ARGUMENTS IN FAVOUR

Choi and Mueller [1984] list the rise of multinationals as the major reason for the internationalization of accounting, and even assert [p7] the latter process to be a significant facilitator of international capital markets.

Multinationals are the greatest beneficiaries of international standardization in that it costs far less to comply with one universal standard on say consolidations than to comply with 100 different variants in 100 different financial jurisdictions. Accounting staff transferability is also enhanced.[Nobes 1985 p332]

Choi et al [1973, 1974] see international accounting standards as helping to meet the needs of international investors around the world.

Mason [1977 1978] identifies 11 classes of user who would benefit from international standardization. Investors, multinational corporations, international accounting firms, regional economic groups, developing countries assumed to be keen to avoid set up costs and other groups like banks.

F.53 THE ARGUMENTS AGAINST

"It is not at all obvious that British accounting would be more suitable for the bulk of German companies than German accounting is! It is quite possible that a standardised system like the French plan comptable might be more suitable than Anglo-Saxon accounting for developing countries with few listed companies,.." [Nobes 1985 p341]

A large difference exists between the Anglos and the Europeans on the role of the corporation in society [Samuels and Piper p95].

Price Waterhouse's W E Parker at the 1964 Fifth UEC Congress opined

that to the British standardization on a national scale, far less an international one, would be fraught with dangers of inflexibilty as regards classification and presentation without achieving uniformity of principle.

Although harmonization is one of its explicit objectives, the Confederation of Asian and Pacific Accountants may be too heterogeneous to form a viable accounting standards cluster in the opinion of Choi [1981 p31]. He suggested that its subset the ASEAN Federation of Accountants, founded in Bangkok in 1977, may be more viable in the function he attributed to it, viz;"to buffer individual ASEAN countries against the wholesale adoption of international accounting pronouncements that may not be suitable to local circumstances". Is that for or against harmonisation ? Holmes [1988] had no doubts about regional standardization. He argued in an *Accountancy* editorial [1988] that the apparent attractions of regional harmonization as an interim measure may blind us to its potential for distraction from, and impedance of, global harmonization.

Vatter [1947] quotes from May [1943], "There are some who argue that accounting is not, and cannot be logical; they point out that 'the rules of accounting, even more than those of the law, are the product of experience rather than of logic.'"Does experience point to harmonization, one might ask.

More generally, Von Colbe [1983] asserted his five theses:

1.Since optimum forms, contents and extents are not yet identified, it is not possible to specify the direction in which accounting should standardize or harmonize.

2.Different goals of accounting demand different methods of accounting.

3. Low levels of harmonization in the EEC and the world reflect disparity of goals.

4.Harmonization has been demanded from the viewpoint of the uses but the producers' costs have been neglected.

5.The economic consequences of rules vary from country to country.

"The general dichotomy between shareholder/fair-view presentation and creditor/tax/conservative presentation is an obstacle sufficiently difficult not to be overcome without major changes in attitudes and law." [Nobes 1985 p334]

Also, to the extent that the economic consequences of standards vary between countries barriers against harmonization similarly vary.

Winn [1978] attributes the economic consequences of accounting to the absence of efficient markets, especially when government is one of the transacting parties. Tax revenue is affected by income measurement and convention choices as well as corporate avoidance policy and capital investment decisions.

As an example of the economic consequences of accounting standards, Dhaliwal [1978] reported his sample of multiproduct firms showed a fall in cost of capital (required return for risk) whem line of business reporting requirements were introduced by the SEC (with effect from 31-12-1970).

Bailey [1982] and Samuels and Oliga [1982] thought there is no such thing as a conceptual framework applicable in all countries. Samuels and Piper [p151] opined;"Research in international accounting suffers from the lack of an appropriate perspective or frame of reference." No

accounting harmonization would be possible though, without prior or at least concurrent harmonization of economic and social frameworks. For example, Bailey [1984] showed how the USSR withdrew from Eurpean accounting congresses once it committed itself to a unified system of national economic accounting.

Samuels and Oliga [1982] asserted that where eco-social, cultural and other contextual differences are not only pronounced but also in a dynamic and fluid state, international accounting standardization is very questionable. Wilkinson [1965] argued that accounting was never sold by country A to country B on the basis of convincing arguments, but rather when B had no body of accounting principles in the first place, and A's investors are a significant factor in B's companies. This applies particularly to LDCs that are ex colonies.

F.532 LDCs

Enthoven [1973] mentions France's Plan Comptable Generale with approval for its usefulness to national planning, its consciousness of social accounting dimensions, and its uniformity of valuation, disclosure and terminology. "A more comprehensive uniform plan, along the lines of the French Plan, is most relevant and useful for [developing economies]. Fiscal uses are paramount in accounting designs."

The evolution of accounting in developing countries was addressed by Briston [1978] who argued the harmfulness of adopting the Anglo-American way of accounting with its orientation to private shareholders if the more important perspective was that of national economic polanning and control, as it was for LDCs. Perhaps now hge would have asked if French ex colonies such as Morrocco have benefitted from inheriting a Plan Comptable appproach from France.

Raoul Dominguez of the Inter American Bank mentioning the minor role of accounts in enterprise evaluation [SID 1976, 13-15]comments; "Lacking broadly based investment by numerous minority shareholders, the need for the protection afforded by the regulation of enterprises has not been felt, and this extends even to the accounting aspects. Business affairs are frequently conducted in secrecy. Rather than relying on their clents' financial statements - in which they have little confidence- financial institutions emphasize other factors in their credit investigations, such as reputation and personal knoeledge of the owners of the borrowing enterprises and substantial security pledged in the form of personal property Financial accounting is often limited to the deficient recording of transactions; it is rudimentary and not kept upto date. It is maintained solely for the purpose of satisfying the formalities required by law and the tax authorities." Enthoven [1985 pp199/200].

Briston [1978] attacked the move to international harmonization under Anglo hegemony as irrelevant to the needs and hostile to the self develpment of LDCs. He said once an accounting profession and reporting system has been established, it becomes very difficult to modify either.

Enthoven [1985 p210] reported his experience that in 3rd world countries, "Accounting as an intellectual discipline is not well established; it is still taught as a technical skill only." However, one of the justifications advanced for harmonization through such a medium as the IASC is the "free gift" to LDCs argument. Once they are 'developed' enough to have a recognizable accounting profession, there will be a set of ready made accounting standards for them gratefully to adopt. In view of the Anglo-American nature of IASs, it would be interesting to read research findings concerning the use made of IASs by France's ex

colonies.

F.54 HARMONIZATION HISTORY

F.541 INTRODUCTION

Scott's [1980] 40 odd experts chose international accounting standards as one of the three most important problems (the other two being international auditing and exchage translation) from a list of 88 possible problems.

Schweikart [1976] observes that an early proposal to harmonise international accounts was made by Kraayenhof [1960] but the difficulty of national environmental differences was from the start a principal objection [Fantl 1971].

F.542 THE EARLY FIXATION ON TIME

At the 1929 International Accounting Congress in New York, Irving Fisher argued for international standardization of measurement in accounts but he meant time (a 13 month year of equal four week months) not money. [Samuels and Piper 1985].

Littleton [1933 10-11] after mentioning the continuous nature of business costs and the artificiality of associating expenses with any one parcel of goods, adds:- "But man is strangely agricultural in his traditions, even though society has become industrial. Time was when the recurring cycle of the year was of immense significance to him, for seed time and harvest both came in the course of the earth around the sun. And man still thinks he must reckon results in terms of the accidental period involved in such a circuit...And so accountants are asked to to perform the hopeless task of taking this economic continuum, of chopping it into arbitrary and meaningless lengths called years, and apportioning to each such year a proper part of the cost of a building which will last fifty years, of a machine that will be used for twenty years, of a blast furnace which will last ten, and of a stock of coal bought in December which will all be consumed before spring again appears.

Nine tenths of the problems of the accountant are due to this demand to express results in terms of years."

Says Irish [1947 p69],"It is now realized that the allocation of income to specific time periods must be a matter of estimate, largely tentative and conditional...Conventions have been established, though they leave room for considerable variation in results.

This issue is relevant to the question of funds flow statement usefulness. As will be seen in Chapter 5, a major criticism of the working capital oriented funds flow statement is the lack of sharpness of such a concept of funds. Had Littleton's argument of half a century ago been attended to, there might now be a wider appreciation of the merely temporal difference between cash and working capital definitions of funds.

F.543 NATIONAL METHODS OF HARMONIZING

In 1977 the SEC required Japanese companies to file accounts in accordance with US GAAP as Japanese GAAP were so different but was willing to accept foreign reports if accompanied by a statement

reconciling them to the net income that US GAAP would have produced [Most 1984 80/1].

Secondary statements are prepared for foreign countries.Choi [1980] investigated primary and secondary reports issued by Hitachi and found little difference beween financial ratios composed from the two reports.

Most [1984] recommended that the profession draw up criteria for enabling a choice to be made between a secondary statement and a reconciliation statement.

F.544 THE IASC

Cooper's Sir Henry Benson set up the Accountants' International Study Group in 1966 for the US, UK and Canada, to help him build an international practice. The Tenth International Congess of Accountants held in Sydney in 1972 accepted the need to set up a fully international body. The resultant IASC held its inaugural meeting of six nations on 29 June 1973. Benson [1976] predicted that this new body would be 'of dominating importance in the presentation of financial statements by about the year 2000'.

The original nine members of IASC were Australia, Canaa, France, Japan, Mexico, Holland, the UK with Ireland, the USA, and West Germany [Benson 1976].

From 1 January 1984 all the member states' professional accounting bodies in IFAC (itself founded in 1977) automatically acquired membership of IASC.

In a 1986 interview IASC Chairman John L Kirkpatrick expressed his belief that the US profession and the largest international professional firms should provide a leadership role in the *acceptance* of interbational standards. The major obstacles facing the IASC in his view were existing national laws and tax reporting techniques that understate net income. He regarded IAS 3 on consolidations as having been the most successful of the 26 thitherto issued. He hoped to see a pro forma statement for all companies worldwide. [Slipkowsky 1986].

Mintz [1978] compared and contrasted the US with the international accounting standard setting process in the late seventies. The principal similarities were;-

1. the desire to narrow the areas of alternative accounting practice,
2. the solicitation of comments from interested parties during the process of establishing standards,
3. the need to balance the often conflicting interests of the parties affected.

The main differences were;-

1. lack of international procedures to ensure viewpoints of all interested parties are adequately represented,
2. lack of adequate documentation detailing the analysis made in selecting alternative accounting standards,
3. lack of a clearly defined authority, enforcement mechanism or disclosure of recalcitrants internationally.

He made these recommendations:-

1. the establishment of an international SEC with a code of ethics,
2. since environment is tightly associated with accounting, only countries whose economies are primarily financed through private capital markets should be members of the IASC,
3. a conceptual framework should be developed from which IASs could be deduced.
4. the IASC should issue discussion papers as preludes to adopting

standards,

5. only companies operating in more than one country should be obliged to comply with IASs.

A majority of the recommendations have since been adopted, although the chain of causation is not clear.

F.55 IASC EFFECTIVENESS

International standards do not derive from an internationally agreed conceptual framework, but rather from committee consensus susceptible to lobbying as shown by Watts and Zimmerman [1978]. Laughlin and Puxty [1982] prefer to see a conflict between different groups' worldviews rather than different groups' narrow self interests. This may be a distinction without a difference.

Walker [1978] argued that if IASC were merely a paper tiger, groups would not have have wasted resources in lobbying it. He showed that for IAS3 on group accounts IASC simply catalogued those technical procedures on which representatives of different national bodies could agree, irrespective of the conflict between the rationales underlying the various national practices. Stamp [1972] did not believe universal accounting standards could possibly be developed except at a ridiculous level of generalization, because of cultural, developmental and other international differences. Stamp [1982] said a conceptual framework needs general agreement on the overall objectives of financial reporting, general agreement on the needs and nature of various groups of users and the identification of a set of criteria to be used in choosing between alternative solutions to standard setting problems in either national or international standards.

Aitken and Wise [1984] in their eponymous paper asserted "the real objective of the IASC "was to improve the decision making ability of multinational investors. Other promised objectives had not been achieved on account of low compliance, especially not the objective of greater comparability. Two other objectives mentioned by Wyatt [1989] in his review are developing a basis for LDCs to follow as the profession being to emerge in these nations, and focussing on the accountability of multinational companies. It is not generally agreed that success has crowned the realization efforts in pursuit of these objectives.

"It is the countries influenced by the Anglo-American tradition which are most familiar with setting accounting standards and are most likely to adopt them professionally. It is not surprising, then, that the working language of the IASC is English, that its secretariat is in London, that all the Chairmen and Secretaries have been from countries using Anglo-Saxon or Dutch accounting, and that most standards closely follow or compromise between US and UK standards."[Nobes 1985 p340] Those countries without pre-exsting national standards who have adopted the IASC set include Kenya, Malaysia, Nigeria, Pakistan, Singapore and Zimbabwe, all of whom might sooner or later have followed British standards. Kenya also uses them but writes them in simpler English first before the KICPA promulgates them.

Canada is regarded as a world leader in its endeavours to support the objectives and activities of the IASC. [Irvine 1988].

Bromwich and Hopwood [1983] argue:"There is reason to believe that accounting standards and regulations often reflect the concerns of society with a lag. In other words, today's accounting reflects

yesterday's concerns."[p7].

A lag is also thought to exist in setting standards subsequent to social and political change, while cultural factors may inhibit changes in accounting standards. In particular, the speed of change in the US of accounting standard setting appears to be considerably greater than in other countries which may be partly attributable to cultural factors [Bloom and Naciri 1989]. These reflections raise but do not answer the question of the relevance of standards to current economic decision making. They suggest implicitly a difference in the speed of adaptation to new conditions between the US and Japan that is not apparent in areas other than accounting.

Differences between the UK and the US have decreased since the IASC was founded although not because of it to any great extent. For example, the US adoption of the current rate method of currency translation in FAS 52,1981 and the UK move to capitalisation of leases in SSAP 21,1984 were not mainly caused by a desire for transatlantic harmonisation. [Nobes 1985 p337]

Walker [1978] points out the contrast between the IASC members agreeing to use their best endeavours to ensure compliance with its standards and the US practice of only compelling compliance with an IAS that the FASB adopts or the UK and Australian stances of not requiring compliance with any IAS in conflict with their own SSAPs. This is one reason why in 1978 the IASC aimed to harmonize the national accounting standards themselves.

In their fourth study Nair and Frank [1981] examined 131 practices for 37 countries reported in all 3 surveys. They found the number of practices agreed on by a majority of countries increased from 8 in 1973 to 49 in 1979 and that the topics on which the IASC had pronounced were associated with the practices for which harmonization was detected.

Doupnik and Taylor [1985] found Europe in 1979-83 had the lowest level of compliance with IASC standards of 5 broadly defined geograhical areas. Britain, France and Holland showed significantly greater compliance than the German speaking countries and Southern Europe. EC members showed greater compliance than non members but this difference had narrowed by 1983. Disclosure requirements attracted more conformity than measurement practices did.

Taylor et al [1986] analysed returned questionnaires from accounting firms in 33 of the 93 then member countries of IASC about IASs 1,2,3,4 and 7 (respectively covering accounting policy disclosure, inventory, consolidations, depreciation and Statements of Changes in Financial Position.) Respondents were asked to signify their agreement on a five point Likert scale to 4 statements a propos about standard. "Your nation's present financial reporting practices-

1.Were highly comparable before this IAS became effective.

2.Are highly comparable now.

3.Were highly consistent before this IAS became effective.

4.Are highly consistent now.

In every case respondents deemed both comparability and consistency to be greater now than before the standard became effective. This is particularly marked for IAS 7 relative to the other standards but the international distribution of the improvement was a little harder to interpret as shown below.

EXTRACT FROM EXHIBIT 2 p7 of Taylor et al [1986] for IAS 7

	National Standards		International Standards	
	comparability	consistency	comparability	consistency
Anglo American				
Previous	3.9	3.9	3.3	3.6
Present	4.4	4.6	4.0	4.2
Difference	0.6	0.8	0.8	0.6
European				
Previous	1.7	2.7	2.8	3.1
Present	2.5	3.1	3.6	3.6
Difference	0.8	0.4	0.8	0.6
Other				
Previous	2.5	3.2	3.2	3.5
Present	3.4	3.9	4.3	4.3
Difference	0.8	0.7	1.1	0.7
Probability of F				
Previous	.0072	.1993	.7404	.6393
Present	.0039	.0182	.1490	.1542
Difference	.9992	.7413	.7736	.9198

These results suggest IASC has assisted the harmonization of SCFPs. Similar tables for other IASs are shown in Taylor [1986] which provide clear though slightly weaker evidence of harmonization driven by the IASC.

F.56 IASC's PLANS

The main purposes of the IASC's new framework [IASC 1989 section 1] are to help develop future accounting standards, to promote harmonization of all aspects of accounting regulations and to assist national standard setting bodies in developing national standards.

"In those cases where there is a conflict, the requirements of the international accounting standard prevail over those of the framework" [sec 3].

"While all the information of these users [listed in sec 9] cannot be met by financial statements, there are needs which are common to all investors. As investors are providers of risk capital to the enterprise, the provision of financial statements that meet their needs will also meet most of the needs of other users that financial statements can satisfy" [sec 10].

"The objective of financial statements is to provide information....that is useful to a wide range of users in making economic decisions."[sec 12]

"Those users who wish to assess the stewardship or accountability of management do so in order that they may make economic decisions. These decisions may include, for example, whether to hold or sell their investment in the enterprise or whether to reappoint or replace the management."[sec 14]

Underlying assumptions of accounts are accrual basis [sec 22] and going concern [23] while report usefulness is said to derive from understandability [25], relevance [26-8], materiality [29 & 30], reliability [31 & 32], faithful representation of events [33 & 34], preferring substance over form [35], neutrality [36], prudence [37], completeness [38], comparability [39-42], timeliness [43] and the surplus of users' benefits over peparers' costs [44].

Just as the above shows clearly the Trueblood influence, so section 18

(with its identification of the need to specify separately operating, financing and investment funds) prejudges the funds flow question in favour of SFAS 95.

F.6 CONCLUSION

In this chapter an overview has been attempted of the broad history and geography of accounting. Explanations in depth as to why accounting varies are of very recent origin, although accounting itself is older than any written language. The prevailing paradigm, adopted by the IASC and others, is that accounting is, or ought to be, useful for making economic decisions. Opposed to that view is the evidence mentioned in Chapter 2 that most accounting numbers are ignored by their so called users. Some therefore see accounting as ritual [Cooper 1982 q v chapter 2] or as an essentially political process [Lowe et al 1983 q v chapter 3, Watts and Zimmerman 1978].

Attempts to clarify national accounting practices into groups have been successful enough and adequately enough replicated to be ab*p+1Xle to simplify the question of comparability into an exercise in reconciling less than ten groups rather than more than 150 nations. However, the most successful harmonizing agent, the IASC, has now explicitly stated [IASC 1989] its previously implicit adherence to the equity driven Anglo-American model of good accounting. This reflects no obvious consensus on the best way to do accounting on the part of the Franco-German-Sino-Japanese-Latin American and LDC groups; quite the contrary. In the field of funds flow statements, only the Anglo-American groups have taken them seriously, and there is a large difference between British and American funds statements that cannot easily be explained by cultures, markets or ministries, as will be discussed in the next two chapters.

What this chapter has established is the increasing importance of the IASC in international accounting. In 1989 its position moved from the inductivist position of its principal national colleague organizations to the deductivist position of erecting a (quasi?) conceptual framework from which its future standards can be derived. At the heart of that framework lies an adherence to accrual accounting and the matching principle that does not readily facilitate the cash flow accounting prefigured by section 18.

APPENDIX G

APPENDIX G RESEARCH DESIGN: A REVIEW OF THE PRINCIPLES THAT AFFECTED THIS STUDY

G.1 INTRODUCTION

G.2 PRINCIPLES OF RESEARCH DESIGN

G.3 CONTAMINANTS OF VALIDITY

G.4 THE CAMPBELL AND STANLEY PARADIGMS

G.5 STATISTICAL PROCESSING ISSUES

G.6 DESIGN OF PREVIOUS STUDIES

G.7 CONCLUSION

APPENDIX G RESEARCH DESIGN: A REVIEW OF THE PRINCIPLES THAT AFFECTED THIS STUDY

G.1 INTRODUCTION

This Appendix discusses the testability of the propositions in the literature highlighted in Volune 1 of this work and reviews the principles of sound research design.

G.2 PRINCIPLES OF RESEARCH DESIGN

G.21 TESTABILITY AND FALSIFIABILITY

It is generally accepted that knowledge in the social sciences progresses within the Popperesque doctrine of falsifiable hypothesis testing. The following hypotheses derived from Chapter 2 through 7 may therefore be eliminated from further consideration on the grounds that they contain metaphysical, non falsifiable and/or subjective evaluations at their heart.

Chapter 2

1. Hong Kong share price movements reflect market manipulation to a significantly greater extent than they reflect accounting information around the time of earnings announcements or annual general meetings.

Chapters 3 and 7 on Information Processing

1. Accounting data is less important to bankers' loan decisions than personal contacts, visits and/or qualitative information.

2. Insufficiency of evidence is associated with overconfidence in a judgment.

3. Accounts analysts are unable to define accounting terms.

4. Funds statements increase task complexity for accounts readers.

5. Judgment questions have higher task complexity than calculation

questions.

Chapters 4 and 5

1.SCFPs make clearer the extent to which a firm can grow from self financing.

2.An SCFP sharpens awareness of the difference between earnings and liquidity.

3.An SCFP improves accuracy in assessing the appropriateness of a firm's financial management to its financial situation.

All the above have terms in them which involve subjective value judgments such as "appropriateness" in the last quoted hypothesis. The next category of hypotheses to be eliminated are those which would necessitate observation of subjects on at least two occasions, as subjects were simply not available to the writer on more than one occasion each.

Chapter 2

1. Hong Kong investors display regular and pronounced functional fixation on accounting earnings.

Chapters 3 and 7

1.Familiar financial terms are more rapidly processed than strange terms are. (A pretest could be used to establish which terms were 'familiar' but this would have unacceptably high test sensitization and reactivity effects).

The next type of hypothesis to be eliminated is one whose contructs are so broad that falsification by one operational definition of the

construct is insufficient to falsify the hypothesis under alternative operational definitions.

Chapter 2

1. Hong Kong accounts have no traceable effect on Hong Kong share prices.

Chapters 3 and 7

1. Disconfirming evidence seen late in the search process after a view has been formed is ignored.

2. Accounting data is less important to bankers' loan decisions than personal contacts, visits and/or qualitative information.

3. Insufficiency of evidence is associated with overconfidence in a judgment.

4. Higher task complexity causes greater use of simplifying strategies and heuristics.

5. More 'old' information does not add to information causing overload symptoms.

6. The Pachella model - moderate speed stress reduces accuracy only slightly.

7. Learning effects cause improvements in speed and accuracy in answering successive presentations of the same question even for successively different accounting data sets. (There are other possible explanations of any such 'result' including history, maturation and selection-maturation interaction, which could not realistically be controlled with a sophisticated user sample.)

Chapters 2,5 and 8

1. Possibly as a result of the cultural gap between the UK and Hong Kong, investors and lenders in the territory do not attach much importance to local accounting reports.

2. Any economic consequences of accounting will only arise in efficient capital markets.

3. Hong Kong banks have little confidence in financial statements produced by clients.

4.Working capital and liquid funds are more familiar to Hong Kong analysts than other SCFP bases or formats.

5.Familiar financial terms are more rapidly processed than strange terms are.

6. Funds flow from operations affect stock prices in a significantly different way from earnings.

7.SCFPs make clearer the extent to which a firm can grow from self financing.

Finally Walker's hypotheses subsume the following hypotheses in every important respect;

Chapters 5 and 6

1.An SCF produces better speed and accuracy in processing than an SCFP.

2.An SCFP sharpens awareness of the difference between earnings and liquidity.

3.An SCFP improves accuracy in predicting financial distress.

3.An SCFP improves accuracy at predicting future earnings.

The shortlist of testable propositions emerging from the above pruning exercise are these;

1. The longer the time taken to search data, the more accurate the final decision will be.

2. Accounting data is less important to bankers' loan decisions than personal contacts, visits and/or qualitative information.

3. The SDS Hypothesis, that information load increases have inverted U effects on speed and accuracy.

4. Higher task complexity causes greater use of simplifying strategies and heuristics.

5. More information in dimensions already presented to the reader does not add to information causing overload symptoms.

6. [However] - small differences in error rate could be associated with large differences in speed, especially at high levels of accuracy.

7. The Accumulator model -stress on speed lowers the readers' critical values for accumulation of data before release as shown by lower accuracy achievements.

8. Iselin's weakly supported conjecture - more dimensions of information cause decreases in accuracy.

9. Possibly as a result of the cultural gap between the UK and Hong Kong, investors and lenders in the territory do not attach much importance to local accounting reports.

10.Vertical eye movements by local accounts readers in Hong Kong slows their processing speeds.

11. Hong Kong banks have little confidence in financial statements produced by clients.

12.An SCFP improves accuracy in predicting financial distress.

13. Funds flow from operations affect stock prices in a significantly different way from earnings.

14.Cash flows cannot be calculated from funds flows.

15.Funds flows show significant positive correlation with earnings.

16.Funds flows have predictive validity for future cash flows.

17.Direct format SCFPs lead to more accurate solvency judgments than indirect formats do.

18.Funds flows are better than cash flows in ex ante discriminating failed from unfailed firms.

Walker's 4 Hypotheses

Walker's H1

There is no difference in the time taken by readers of annual reports to assess a firm's position and prospects when they are given financial statements which (a) include funds statements (b) do not include funds statements.

Walker's H2

There is no difference in the consensus secured among readers of annual reports who (a) are provided with funds statements (b) are not provided with funds statements.

Walker's H3

There is no difference in the confidence reflected by readers of annual reports who (a) are provided with funds statements (b) are not provided with funds statements.

Walker's H4

There is no difference in the accuracy achieved by readers of annual reports when assessing aspects of a company's financial position and performance when those readers (a) are provided with funds statements (b) are not provided with funds statements.

In proceeding to the research design, the central purpose of the experiments was to test W 1 and W 4 and the control of contaminants was planned on this basis. It was judged that the validity of most of the other short listed hypotheses would be greatly affected by the results of testing Walker's H 1 and H 4.

G.22 VALIDITY

G.221 CONSTRUCT VALIDITY

"Construct valididation is involved whenever a test is to be interpreted as a measure of some attribute or quality which is not 'operationally defined'" [ibid] "A construct is some postulated attribute of people assumed to be reflected in test performance" [Cronbach and Lee 1955 283].

"Whether or not an interpretation of a test's properties or relations involves questions of constuct validity is to be decided by examining the entire body of evidence offered, together with what is asserted about the yest in the context of the evidence". [Cronbach and Lee 1955 284]"A necessary condition of scientific admissability of a construct is that it occur in a nomological net, at least some of whose laws involve observables"[Cronbach and Lee 1955 290]. That net is the interlocking system of laws within which something occurs.

"Unless substantially the same nomological net is accepted by the several users of the constuct, public validation of the construct is impossible"[Cronbach and Lee 1955 291]

Construct validity associates a test with its underlying construct. It requires a demonstration that the construct exists, that it is distinct from other constructs and that the test measures only it. It is evidenced by agreement with other tests of the same construct (convergent validity) and by disagreement with tests measuring other constructs (discriminant validity). It is important that the convergent correlations are higher than the divergent ones. Content validity refers to the construct traits the test taps.[Kidder 1981]

Validity in research concerns tapping the right construct. Research instruments tap a construct via its operational definition which will always be somewhat out of focus from the definition of the construct arising from the relevant theoretical framework.

Cronbach and Meehl [1955] first used term construct validity to apprise generalizations about higher order constructs from research operations.

Construct validity is facilitated when 3 different operations triangulate the referent with strong convergence.

If the independent variable is linearly related to the dependent variable across the whole continuum of the former, then whether an experiment shows covariation of the two is critically dependent on the level of independent variable used. To guard against this threat, especially where treatment effects are weak at best, many levels of the independent variable need to be sampled and many levels of the dependent variable measured.

Related to construct validity quite closely are concurrent and criterion validititities. Concurrent validity is the ability of a test to distinguish between individuals already known to differ in the relevant respect.

Criterion validity relates test scores to external variables or criteria, which includes predictive criteria. Its main problem is the appropriateness of the criterion. Predictive validity is the abilility of a test to predict future differences between respondents.

G.222 FACE VALIDITY

Face validity is the consensus among a panel of judges on the validity of the test and is largely subjective. It is this level of validity that GAAP may be said to possess.

G.223 CONTENT VALIDITY

"Content validity is established by showing that the test items are a sample of a universe in which the investigator is interested" [Cronbach and Lee 1955 281].

Content validity is the representativeness or sampling adequacy of

the content of the measuring instrument. It is basically judgmental.

G.23 INTERNAL VALIDITY

Internal validity is present when we infer that a relationship between two variables is causal when its, or that the absence of a relationship implies the absence of a cause. External validity is present when we correctly infer that the presumed causal realtionship can be generalized to and across alternative measures of the cause and effect and across different types of persons, settings and times.

Randomized assignment to groups rules out most internal validity contaminants, whereas the quasi experiment has to rule them out one by one.

G.24 METRIC AND STATISTICAL VALIDITY

G.241 MEASUREMENT

Measurement is a relation. The measurement range should be isomorphic to the domain, reflecting its transitivity chains and for interval and ratio scales its degees of difference. What is measured is not the object or its properties but the indicants of those properties. Properties are items like heat that have various manifestations some of which are usable as indicants for measurement.

S S Stevens (Science 684, 1946 p.677-80) invented the 4 well known classifications of measurement - nominal, ordinal, interval and ratio. These are briefly discussed in the next paragraphs, by way of setting the stage for considering the appropriate scale for the construct accuracy that is used in this study.

"Yes" and "no" are elementary partitions of a universal set into

exhaustive mutually excusive subsets, a necessary step in all enumeration. Telephone numbers are mutually exclusive and exhaust the universe of connected paid up telephones.

For ordinal scales there must be transitivity, which does not always apply, as when say Mrs A dominates Mr B and Mr B dominates Miss C it does not follow that Mrs A dominates Miss C.

Ordinal scales are not necessarily ranked. It is only necessary that the distance between the integers on the scale be indeterminate or unequal distances apart. Since the measured variable and the construct of interest cannot be directly quantitively correlated, they have only epistemic correlation, so the variable has to be validated by correlating it with another variable whose closeness to the construct is already accepted.[Kidder 1981]

Statistics to be used with ordinal scales include rank order correlation coefficient, Kendall's W, rank-order anova, medians and percentiles.

The interval scale introduces a standard interval like foot, metre and most of normal measurement standards. No longer just greater or lesser but (greater by a definite quantity. Scale could be composed e.g. to evaluate teachers but such a scale should have standardized intervals across central point. The zero point of an interval scale is arbitrary. Mean, standard deviation, t & z tests, predict moment correlation are appropriate statistical tests.

The ratio scale begins at true zero where there is a total absence of the quantity being measured. Something like availability cannot be zeroed nor can someone be twice as available as someone else. The Fahrenheit temperature scale is only interval because 80`F is not twice as hot as 40`F and it has negatives which true ratio scales cannot have.

Length is ratio and can't be negative (-5 ft. long). All statistics are possible.

The relevance of the above discussion to this work concerns the construct of accuracy in answering the 5 questions per account presented to each subect. Each question was to be answered "yes", "no" or "not sure." Clearly a nominal scale will capture this, but it will not address differential degrees of difficulty or fineness of judgment involved in correct answers in the more difficult circumstances, such as with insurance accounts. A fully interval scale or ratio scale would be inappropriate because degree of difficulty and fineness of judgment are both concepts involving considerable subectivity, Also, it could be argued that differential allocation of 'marks' to answers requires advising subects of the marking scheme, and this in turn biasses their responses in a way that destroys any hope of external validity. An ordinal scale seemed to be the most appropriate but some interval characteristics to reflect the most obvious and uncontroversial differences in difficulty were introduced as follows

Actual response	Correct response	Score attributed
p [=not sure]	p	8
n	n	5
y	y	5
n	n or p acceptable	3
y	y or p "	3
p	either of the above	3

x [=a blank]	all cases	0
y or n	p	0
p	y or n	0
y	n or p acceptable	(3) [=minus 3]
n	y or p "	(3)
n	y	(5)
y	n	(5)

These marks were applied to each answer to each question through a transformation routine after inputting the raw yes, no, blank and not sure answers.

G.242 STATISTICAL VALIDITY

Statistical conclusion validity is reflected in type 1 and 2 error rates, confidence intervals, sample sizes, and is threatened by;-

1. low statistical power -type 2 error from small samples or small alpha

2. violated test assumptions -of normality, common variance & uncorrelated errors

3. fishing and the error rate problem -multiple comparisons of means increase the chances of type 1 errors of wrong failure to accept the null hypothesis which is what Tukeys or Scheffes multiple comparison tests try and correct

4. reliability of measures - lower it is, higher the standard error of the estimate - can be reduced by using longer tests or bigger groups as these are more stable than smaller units, but this involves fewer degrees of freedom.

Statistical tests are concerned with error from random rather than sytematic sources.

Statistical Conclusion Invalidity arises from inadequate answers to 3 questions

1. Is the study statistically sensitive enough to make a reasonable statement about the relationship between variables.

2. Given 1, does evidence support covariation between presumed cause and effect.

3. Given 2, what is strength of that covariation.

Flux in measures or sampling units, and repeat measures, will give distorted results. Also there is a need to balance type I risk against type II:

1. rejecting a decision that is actually true

2. accepting a decision actually false

Risk of one varies inversely with risk of other. With 0.05 significance level, there is a low risk of rejecting a true but a higher one of accepting a false null hypothesis.

Violated Statistical Test Assumptions. e.g. that groups have similar variances, normal distribution of means or at least no skew, etc. Seriousness of violation a function of robustness of test.

Fishing Error Rate Problems. At the 0.05 significance level one out of twenty hypotheses will be statistically significant without being theoretically significant so there is a danger of falsely concluding covariation is present when it isn't (type 1). The more hypotheses, more tests etc. the more spurious significance is present. This is an

especial danger in larger samples arranged into over ten groups. The SAS package used to process the data in this work produces control information such as Scheffe sets that enable this problem to be managed.

G.25 CONCLUSION

Internal,statistical,construct and external validities cannot all be maximized in any one design. The design should reflect the validity priorities and trade them off accordingly. For research on treatment effectiveness, internal, external, statistical then construct will be a suitable ordering. Internal validity isthe sine qua non of causal inference.

Randomization does increase internal validity but only as regards selection linked threats. Only generalization to the immediate parent population can be cofidently inferred, so if half the room has x and the other half y, generalization beyond the totality of the people in the room is hazardous.

G.26 RELIABILITY

Reliability limits validity - the validity of a measurement can never exceed the square root of its realiability. [Lord and Norick 1968 p72] Reliability is extent to which same instrument used at different times or by different people produces the same results. There are 4 ways to test it.

1. test - retest
2. split half
3. multiple forms
4. average interrelation

1. Test Retest

In the test-retest correlation method, the same instrument is administered twice and the scores on each occasion correlated. A high correlation across occasions means the test is reliable. It is not so much reliability as mere stability which is measured here.

2. Multiple (Alternate) Forms

Different forms of instrument administer same sample and should give same result, but if they don't, it may be that instruments are not equivalent or that lst instrument not reliable. This was the method used in this study, strengthened by the presence of the M/MX (Tesco) Accounts in both the main and second sequence of Accounts sets. The two sequences were successfully gauged for their equivalence of effects.(See Appendix E).

3. Split Half Technique

In split half correlation between two halves of an instrument where over half the questions tap the same contstruct, the correlation between the scores on the first half with those in the second half represents the intrument's reliability. What is counted as half is not fixed. It could be all the odd numbered questions, the first and third quartiles, etc.

4. Average Correlation

With average item total correlation, each item is correlated with the total score excluding the item itself. All those correlation coefficients are then averaged and the result shows how far each item taps the same construct.

Similar to the previous method is the average inter item correlation which correlates every item score with every other item score.

G.27 QUESTIONNAIRE DESIGN

The goals of questionnaire design are to collect information relevant to the study's objectives with maximum validity and relaibility. There should be a rationale both for why the question is asked and also what will be done with the answers. Co-operation is highest and distortion lowest when the questions are easy, can be answered quite quickly and are neither embarrassing nor threatening.

Checklist [from Warwick and Lininger 1975]

1.Are the words used simple, direct and familiar to all respondents ?

2.Is the question as clear and specific as possible ?

3.Are multiple and multi part questions avoided ?

4.Are loaded and leading questions avoided ?

5.Is the question applicable to all respondents ?

6.Will answers be biassed by subjects' normal style of response ?

7.Can the question be shortened without loss of meaning ?

8.Are subordinate clauses put before their main clauses, to prevent subjects jumping the gun in their answers ?

Walker's questions were reviewed in the light of the eight criteria above and sharpened in consequence, as outlined in Chapter 8.

G.3 CONTAMINANTS OF VALIDITY

G.31 INTERNAL VALIDITY

G.311 HISTORY - events between pretest and posttest. Collier's 1944 study of effects of nazi propaganda material was confused by the effect

at the same time of Paris falling. Random assignment of common population to c (control) and e (experimental) groups is said by Campbell and Stanley [1966] (hereafter CS) to be the best preventative because then both are exposed to the same history.

G.312 MATURATION - internal developments in the same period as the treatments and observations. For example, 'What is important' as an interview question just before lunch is apt to be food - bias introduced by time with respect to the internal situation of the subject. Same preventative as history.

G.313 TESTING - effects of test 1 on scores of test 2. Masters & Johnsons sex habit research was influenced by subject knowledge of being object of research - observation was reactive. Pretest and no pretest groups necessary to allow for this.

G.314 INSTRUMENTATION - changes in calibration or of scorers. The US Bureau of Census found new interviewers consistently count slightly more respondents as unemployed than old interviewers.

G.315 STATISTICAL REGRESSION-selection on the basis of extreme scores will cause a subsequent observation to show regression to the population mean.

Regression to the population mean arises from initial selection or subsequent comparison being made on the basis of extremity of scores like overweight, top 5% of IQ etc.

Scale reliability affects measurement error - the greater the reliablity is, bigger the probability of regression.

It can be controlled by subtracting regression effects of an equivalent control group from e group's score - so long as subjects were

randomly assigned to e and c in the first place.

G.316 SELECTION - bias when subjects are assigned to e and c on other than a random basis. Interviewers given a choice tend to prefer corner houses to intra block ones so relevantly richer people are oversampled. Random assignment of a common population to different groups is said by CS to be the only preventive.

G.317 SELECTION-MATURATION INTERACTION - selection bias made worse by maturation. As when 2 groups of students are aptitude tested but one is more highly motivated in the first place than the other (motivation is included in maturation). Similarly when volunteer samples comprise the e group.

G.318 MORTALITY - differential drop out rates between the groups causing nonequivalence. It erodes the initial equivalence of groups to terminal inequivalence. One should not, however, select on a post treatment basis because then selection bias makes the groups non equivalent.

G.32 EXTERNAL VALIDITY CONTAMINANTS

G.321 INTERACTIVE EFFECT OF TESTING - respondents' sensitization causing unrepresentativeness. This concerns changes in subject caused by the measurement process itself e.g. with free medical exam leading to improvement in health habits. Similar question can sensitise subject to an issue he did not previously care about. So any post test with or without X will show effects of 01 - 01 becomes a kind of X.

G.322 SELECTION-TREATMENT INTERACTION - as G.321 above but from sensitivity to the treatment. Samples differentially selected from group

that is to be characterised may give responses unrepresentative of that group. Especially with volunteer samples where some far more likely to volunteer than others, e.g. if research volunteers overrepresent pot users also onto other drugs, so conclusions about pot per se unrepresentative though they could be more representative of people using a variety of drugs.

G.323 REACTIONS TO THE EXPERIMENTAL SETTING - as above but from sensitivity to the setting of the treatment or observation. E.g. with marijuana research, subjects may react to questions about smoking marijuana to fullfill "stoned" expectations like saying "wow man" instead of acting naturally. These types of reactive effects are short term, confined to the duration of observation, unlike testing effects, but vitiate X validity just as much.

G.324 MULTIPLE TREATMENT INTERFERENCE - both the above testing contaminants for repeated treatment of the same respondents. When X is repeatedly presented to subjects, effects may differ from those of a single presentation. E.g. c group does not drink, e group drinks scotch odd days other liquor even days - no X validation for scotch only drinkers.

G.325 IRRELEVANT RESPONSIVENESS OF MEASURES

If simple measures of complex phenomena include irrelevant components, spurious effects can arise. E.g. measuring effects of marijuana on heart beat with a stethoscope may pick up effects of hyperventilation due to fast inhalation due to excitement unrelated to marijuana (history /maturation). Similarly, asking group members to score preferred associates in group may show spuriously low scores because members prefer association with people outside group. Multiple

measures combat this (exemplifying the law of requisite variety).

G.326 IRRELEVANT REPLICABILITY OF INDEPENDENT VARIABLES

Replication of variables may fail to include that component of the variable largely responsible for that variable's effects. E.g. effect of inducing fear of cancer on smoking habits. If fear was induced because of eloquence of experimenter, replications of his lecture by others may show no effect - an irrelevant replication.

G.4 THE CAMPBELL AND STANLEY PARADIGMS

G.41 CONVENTIONS

X = Exposure of people to an experiment variable or event whose effects are to be measured.

O = Observation or measurement process.

R = Random assignment to separate treatment groups.

Parallel rows not separated by dashes represent comparison groups equated by randomisation whilst dashes mean non randomised separation.

G.411 KEYS TO CONTAMINANTS IN THE SECTIONS FOLLOWING

H History Mat Maturation S Selection T Testing

Mor Mortality Sel-mat Selection maturation interaction

T-X Interaction of testing and treatment

Reactivity means reactivity of subjects to settings

Mult X Interference Multiple Treatment Interference

G.42 THE 16 TYPES OF DESIGN AND THEIR CONTAMINANTS

G.421 INTRODUCTION

The task of theory-testing data collection is primarily to reject inadequate hypotheses so that quasi experiments are better than no experiment at all. Successful theories are rarely proven by experiment, but only escape being refuted by them. So a null hypothesis could be rejected or fail to be rejected but not, logically, tentatively accepted. Hume stressed the impossibility of deductive proof for inductive laws.

Varying degrees of confirmation are conferred upon a theory through the availability of plausible rival hypotheses to account for the data. The fewer such rival hypotheses, the greater the degrees of confirmation. This fewness is "the epistemological counterpart" of the tentative affirmation of theory afforded by hard experimental settings. Contaminants each represent a rival hypothesis to the hypothesis that the experimental variable had an effect. Controlling for contaminants is rendering them ineligible to be a rival hypothesis. In quasi experiments, uncontrolled contaminants must be carefully considered: the more implausible the hypothesis that contaminant operated, the more valid the research. The more numerous and independent the ways in which effect of X is demonstrated, the less plausible and less numerous become rival hypotheses. Like the method of difference, other things affect 0 at other times but X affects 0 at all times. "The assumption of finite causation" (Underwood 1976 p.6) applies viz. "If we are ever able to generalise, it is because the great bulk of determining factors can be disregarded".

G.422 PRE EXPERIMENTS

1. One Shot Case Study X 0

Contaminants;-H Mat Sel Mor

This is not relevant to the present work where inter group comparisons are the crux of the work.

2. One Group Pretest Post Test Design 01 X 02

Contaminants;-H Mat T I Sel-mat

This design is only applicable to a single group and it involves pretesting its subjects, so it is also irrelevant to the present work.

3. Static Group Comparison X 0

O

Contaminants:-S Mor Sel-mat

A group experiencing X is compared with a group which has not e.g. comparing performance of teachers with degrees with those without. No means of being sure groups would have been equivalent but for the X. Selection bias is thus intrinsic to the design especially if 01 group sought the X for various reasons and 0 did not or if X only available to certain kinds of people. E.g. suppose a study finds 1st year students more attractive to male respondents than 3rd year ones, does it mean studying causes loss of looks or looks cause girls to drop out and marry? Neither: the 3rd year suffers the effects of "experimental mortality" so there are fewer girls in it than in the first year - and fewer boys.

G.423 TRUE EXPERIMENTS

4. Pretest Post Test Control Group DesignR 01 X 02

R 03 04

Contaminant:-T-X

Adds a control group to design 2, but it also requires each subject to be pretested (at O1 and O3) which is inappropriate in the present work.

5. Solomon Four Group Design

R O1 X O2
R O3 O4
R X O5
R O6

No serious contaminants

This is the first design so far whose design takes account of external validity, by parallelling design 4 with both c and e groups lacking the pretest, so main and interactive effects of testing itself are made measurable. However once again the pretest makes the design irrelevant to the present work.

6. Pretest Only Control Group Design

R X O1
R O2

No serious contaminants

Within the limits of confidence stated by the significance tests employed, randomisation of assignments to groups can achieve equivalence without need for pretest. This design can be used instead of the previous 2 designs in most circumstances. It uses the last 2 of Solomons groups and controls for testing effects but does not measure them as it does not pretest, so Solomons design is preferable if a pretest is essential and mortality/history/maturation is not a big risk.

Design 6 is "the only setting for which the t test is optimal" and even here its power could be increased by blocking on subject variables

like GPA, prior grades etc. ANOVA procedures an F test for multiple groups which does essentially the same job as the t test does for two groups.

G.424 QUASI EXPERIMENTAL DESIGNS

Quasi experiments are researches where we lack full control of scheduling experiment stimuli (the when and to whom of exposure and ability to randomise exposures) but can control the when and to whom of measurement. It is especially important to be aware of which variables are uncontrolled here.

The task of theory-testing's data collection is primarily to reject inadequate hypotheses so that quasi experiments are better than no experiment at all. Successful theories are rarely proven by experiment, but only escape being refuted by them. So a null hypothesis could be rejected or fail to be rejected but not, logically, tentatively accepted. Hume stressed the impossibility of deductive proof for inductive laws.

In quasi experiment, uncontrolled contaminants must be carefully considered: the more implausible the hypothesis that contaminant operated, the more valid the research. The more numerous and independent the ways in which effect of X is demonstrated, the less plausible and less numerous become rival hypotheses. Like the method of difference, other things affect 0 at other times but X affects 0 at all times. "The assumption of finite causation" (Underwood 1976 p.6) applies viz. "If we are ever able to generalise, it is because the great bulk of determining factors can be disregarded".

7. Time Series Experiment

01 02 03 04 X 05 06 07 08

Contaminants:-H T-X

8. The Equivalent Time Samples Design

X1O XoO X1O XoO

Contaminants;-T-X, Reactivity, Mult X Interference

Both the above two designs require testing the same subject group on two or more occasions which was not possible in this work, so there is no point in discussing them further.

9. Equivalent Materials Design

MaX1O MbXoO McX1O MdXoO

Contaminants;-T-X Mult X Interference

This design requires exposure to pretests (the two earlier Xos and X1s) so is not relevant to this study.

10. Non equivalent control group design 0 X 0

O O

Contaminant T-X

Like design 4 except that e and c groups don't have pre experimental sampling equivalence but instead are such naturally occurring non equivalent sets as school classes. X however is randomly assigned to one or other set. Unlike design 4 which randomly assigned subjects to e and c from a common population. Once again, however a pretest is essential to the design.

11. Counterbalanced Designs

	Time 1	T 2	T 3	Time 4
Group A	X1O	X20	X30	X40

Group B	X20	X40	X1O	X30
Group C	X30	X1O	X40	X20
Group D	X40	X30	X20	X1O

Contaminant Multiple X Interference

Experiment control is achieved or precision is enhanced by entering all respondents into all treatments. These are also called rotation experiments, crossover designs or switchover designs. The Latin square is typically used in counterbalancing. The 4 experimental treatments are applied in a restrictively randomised manner in turn to 4 naturally assembled groups or to 4 persons. This design has 3 classifications: groups A-D, occasions 1 to 4 and treatments X1 to X4. Each classification is orthogonal to the other 2 in that each variate of each classification occurs equally often (once for a Latin Square) with each occasion equally represented, so differences in scores cannot be attributed to selection, practice effects, history etc. In Anova terms this design appears to provide data on 3 main effects in a design with the number of cells usually required for just 2. This elegance however has a cost - what presents as a main effect of any one classification could instead be a complex interactive effect between the other two. Differences between effects of Xs could be disguised because of simultaneous interactions between occasion and group. Selection of groups may cause interaction with history maturation etc, because the assignment to A through D is not random. Also, certain sequences of X treatments could have systematic effects arising from the sequence itself rather than from the X content. These dangers can be reduced by replicating the research with a different Latin square design. For the single piece of research, the strength of this design is the consistency gained through the internal replication. To make that consistency more

apparent, the main effects of occasions and groups could be removed by expressing the 0 of each cell as a deviation from the row and column means: then rearranging the matrix with Xs as column heads.

12. Separate Sample Pretest Post Test Design R 0 (X)

R X 0

Contaminants H Mat Mor Sel-mat

12(a)R O(X)

R X O

R O (X)

R X O

Contaminants;-Mat Mor

12(b) R O1 (X)

R O2 (X)

R X O3

Contaminants;-H Mor

12(c) R O1 X O2

R X O3

Contaminants;-H Mat Mor

This is another set of designs dependent on pretests.

13. Separate Sample Pretest Posttest Control Group Design

R 0 (X)

R X O

R O

R O

Contaminant Sel-mat

So is this one where control of history and maturation effects are the point of the design.

The remainining three designs are not relevant to the present study so are merely listed to give a complete picture of the standard designs.

14. Multiple time series design 0 0 0 0 X 0 0 0 0

This design is not relevant to this work.

15. Recurrent institutional cycle design: A patched up design

Class A					X	01
Class B1				R	02 X	03
Class B2				R	X	04
Class C			05	X		

General population controls for Class B 06

General population controls for Class C 07

This design involves both pretests and public data to supply observations 06 and 07.

16 Regression Disconuity Analysis

This is a time series analysis of the effect of a specific event on the series path.

G.43 GENERAL DISCUSSION OF DESIGN

The more similar the groups are, the less necessary is a pretest to establish any differences.

Design 11 (counterbalanced designs) treat and posttest x groups y treatments on z occasions, assigning x[i..n] to y[n] and to z[n]. Each classification is orthogonal since each variate of each classification occurs equally often (once for a Latin square) with each variate of each

of the other classifications. This design thus provides data on 3 main effects for x, y and z with the number of cells usually required for 2. But the cost of this efficiency is that what presents as a main effect of say x could merely be a significant complex interaction of yz. These problems can be reduced by randomizing the sequence order and by overbalancing the square so some group-treatment-occasion cells occur more than once. Different materials should also be used as replication tests of the treatment materials used in the main tests - especially for any interaction between the main tests' treatments.

G.5 STATISTICAL PROCESSING ISSUES

G.51 ANOVA AND CAUSALITY

Sober [1988] uses the question of whether a person's height is due more to genes or more to environment to illustrate the limitations of ANOVA in elucidating causality. There is difference between that question and the question of how much variations in either one of the two causal factors cause variations in the dependent variable. The first question is effectively meaningless and can only be answered when rephrased in the terms of the second question. However even the second question cannot be answered "locally". It requires instances of variation in environments and genes, cross sectionally across a sample of people or longitudinally along a time line with one person where the gene variable is itself a constant. "Locality" here means the presence of a continuous path which is both traced and palpable between cause and effect. Locality fails in cases where causes are not *sufficient* for their effects. A match being struck causes a flame with locality being

satisfied, but it only does so if it is dry and if there is adequate oxygen. Whether one event causes another can depend on features of the world external to them both.

A given treatment can be embedded in different experimental designs. Plants of the same genes can be exposed to contrasting environments, which will give a genetic main effect of zero. Alternatively different types of plant can be grown in identical environments to give environmental main effects of zero. A mix of genes and environments will lead to a conclusion via ANOVA that both play a role in growth. The ANOVA result is here a stict artefact of the experimental design itself.

A second reason for rejecting ANOVA as a device for explaining a singleton effect is shown in the example of considering the effects of environment and genes on the dependent variable of number of heads per single animal. ANOVA would lead us to suppose neither environment *nor genes* had any effect at all.

In the case of a single person's height's dependendence on genes and environment, we can at least in theory consider what height would have been obtained in series of alternative feasible environments or with alternative genes (rendered feasible by restricting the gene population to lineal ancestors only); each alternative being termed by Sober [1988] a counterfactual. Now in some populations genetic variation is great but not environmental variation, such as in Singapore; whereas in others such as Japan the opposite is true. Whether genes or environment matter more in explaining height through AVOVA depend on features of the world external to any one individual's environment and genes, namely their membership of one population rather than another. The question of causality is non local in this situation.

For it to make sense how much a cause contributes to an effect, the

causes must be commensurable in the way they produce their effects. Thus in physics the contribution of electrical forces and gravitational forces to a body's acceleration are precisely ascertainable using the equation F=ma;force equals mass times acceleration where all three variables are reducible to a common metric of energy. However with the question of height, manipulation of counterfactuals might show genes explaining 80% of height variation, environment 20%. However if there is little genetic variation in the population actually used to sample the three variables, then we would obtain a different and less valid (externally and generally) result. This shows that statements about how much genes and environment each contribute to a person's height are separate from statements about whether genes or environment made the greater difference. In the case of the physics question,causality is well defined and local ; in the case of nature and nurture, it is neither. How much a cause contributes to its effect is an inherently local question but the question of how much difference a cause makes need not be. Thus, how much gun angle and how much muzzle velocity contribute to actual distance travelled by a projectile cannot be ascertained since the two factors are differently measured. How much difference each factor makes can be answered by bringing in the counterfactuals of differing angles and muzzle velocities. These counterfactuals become nonlocal if, for example, no change in the muzzle velocity is possible with this particular make of gun, as the question of what other angles the gun might have had now becomes a matter of speculation rather than experimentation.

Causes may not be necessary for their effects. it follows that a causal claim is not refuted only by demonstrating that the effect would

have happened in the absence of the putative cause. However it is possible for a factor to be a definite cause but have zero magnitude. For example, if a gangster is killed by a shot fired by policeman, the cause of death is obvious. However if there were several policemen in the posse and if one had not shot to kill, another or several others would have done, then the cause "a shot by Sergeant Friday" is a cause of zero magnitude. Varying the factor, identity of policeman, will not be associated with any variation in the effect of interest, the death of the gangster. Causes remain causes even when thay make no difference.

In the case of the Walker [1984] inspired design of the present study, ANOVA type procedures are used to assess the effects of two different levels of the variable type (within which is nested the variable account) on the two separate dependent variables, accuracy and speed of responses to accounts processing questions. The purpose of the previous discussion was to point up the limitations of ANOVA in explicating causality. The maximum that this work would claim if it were shown that funds statements are associated with faster responses or more accurate ones is that fund statements constitute incremental information content as evidenced by either or both of those processing resposes. This would be a less sweeping claim than asserting that funds statements cause faster or more accurate processing of accounts.

G.52 FACTORIAL ANALYSIS OF VARIANCE

ANOVA analyzes the independent and interactive effects of 2 or more independent variables on one dependent variable, for which the model is

$y=a+A+B+AB+e$ where a is the grand mean,A and B are main effects of A and B; AB is their interactive effect and e is error.

Crisscross interaction is called disordinal and is typified by the

following cell pattern;

	A1	A2
B1	30	20
B2	20	30

else it is ordinal as 30 20

20 20

If the numbers in the cells of a factorial design are unequal and disproportionate from row to row or column to column, the orthogonality or independence of the independent variables is impaired. If we have 50 females and 50 males and want to divide the 100 equally between Tories and Labourites, that will be unlikely especially if politics is less than wholly correlated with sex. One can make adjustments of the data, or one can equalize the groups by elimination of subjects at random. The best solution however is to use multiple regression analysis which gives the same result as ANOVA if there are equal ns and experimental variables.If even these are unequal, then the multiple regression based general linear model produces F tests in its ANOVA subroutine on SAS that picks up the effect of such inequality by enabling a comparison to be made between the balanced F ratio using harmonic means to artificially equalize cell sizes on the one hand, and the unbalanced (type three) F ratio on the other hand. Such a procedure was necessary in the present work, as will be elaborated in the next three chapters at the appropriate points.

If A and B main effects have statistically significant F ratios, interpretation is obvious, but if the AB interaction is also significant, then one cannot then say the main effects are significant under all conditions - the main effects' strength vary with the relative

strength of the other independent variable.

Within group variation includes both true variation between units in the group and error which is assumed to be normally distributed with zero mean relative to the group mean.

Orthogonality is important because the effects of each factor can be calculated and interpreted independently of the effects of every other factor. However the benefits of simpler calculation is no longer important in the computer age. Orthogonality implies balance [Mead 1990]. To control variation between units, randomized block design evolved. This was against a background of needing to solve least squares equations without a computer. Balance in incomplete block design was achieved through symmetry over all treatments leading from equal pairwise occurrence of all treatment pairs. The matrix of least squares equations reduces to a common diagonal and a common off diagonal element. All blocks still had to be the same size.

Marrying treatments to observation units "by determining allocation systems to provide efficient and valid answers" to the research questions is the final phase of designing a research project [Mead 1990 p158]."The concept of replication requires that the differences between units to which a single treatment is applied are of the same nature as those between units to which different treatments are applied."[ibid]. The amount of replication depends on how much sampling error we can tolerate for each treatment but "It may sometimes be necessary to use an unequal replication to reflect the greater importance of some questions."

Two designs compare 9 treatments in a 3 by 3 structure in 18 blocks

of 2 units. A has all pairs with one factor at a common level; B all pairs having different levels for both factors. A is twice as informative about interactions as B; B twice as informative as A about main effects, as in B all blocks contribute main effect information for both factors.

Code

a b c

d e f

g h i

A connections

ab bc ac ad dg ag be eh cf fi ci gi df bh

B connections

ae af ai af ah bf bi bg bd fh fg fd id hd gc

Variance is minimized for a single linear main effect on the following variation of A and B ;

ab ac ad ae bc bd ce bh ch df di eg eh fg fh gi hi

This one minimizes variance for linear interaction and quadratic interaction;

ab ac ad ae bc bd ce bh ch df di eg ei fg fh fi gh gi.

G.53 THE DANGERS OF UNBALANCED CELLS

To illustrate the effects of unbalanced data on the estimation of differences between means and computation of sums of squares, consider the data in this two-way table:

	B	
	1	2

	1	7,9	5
A	2	8	4,6

Within level 1 of B, the cell mean for each level of A is 8; that is, $y_{11}=(7+9)/2=8$ and $y_{21}=8$; hence, there is no evidence of a difference between the levels of A within level 1 of B." Similarly for levels of A within level 2 of B as both have cell means of 5. It would seem there is no difference between the levels of A; but the marginal for row 1 is (7+9+5)/3=7 and for row 2=(8+4+6)/3=6. The difference of 1 between the two row means may be wrongly interpreted as measuring an overall effect of factor A. Actually the difference between the marginal means measures the effect of B as well as of A. More precisely the difference between the row means in any 2 by 2 table is (a1-A2)+(1/3)(B1-B2) where A1 is the mean value of A at level 1 [of A itself] etc.

The normal ANOVA null hypothesis about A that is tested is A1=A2=0. However with an unbalanced layout such as the 2 by 2 table shown above, the PROC ANOVA F test actually tests if (A1-A2)+(B1-B2)/3=0

"In summary, a major problem in the analysis of unbalanced data is the contamination of differences between factor means by effects of other factors. The solution to this problem is to adjust the means to remove the contaminating effects."[SAS 1985 p103].

For a recently published and very full discussion of the unbalanced cell problem in the context of the matrix manipulations underlying the general linear model, see Searle [1987] especially pages 459-465.

PROC GLM provides four types of sums of squares (hereafer SS) to handle the balance problem, but the type 1 SS is the same as the ANOVA SS, so takes the means unadjusted as above. Its use is to provide a benchmark against which other types can be placed to appraise the effect of the lack of balance.

Type 2 SS for an effect U, which may be a main effect or an interaction, is adjusted for an effect V *iff* V does not contain U. Thus for a two factor structure the main effects A and B are not adjusted for the A*B interaction because the A*B interaction contained both A and B. A is adjusted for B and vice versa while the A*B interaction is adjusted for the two main effects. Type 2 SS are

"mainly appropriate for situations in which no interaction is present. It is the analysis presented in many major statistical textbooks and is often referred to as the method of fitting constants. Its logic is to test interactions first, and to delete them from the model if insignificant, then to test the main effects, each adjusted for the other. If the interaction is significant howver, then "main effects analysis should be abandoned and attention should focus on simple effects." (which is at the cell level rather than the variable level) [SAS 1985 p104].

Type 3 SS is the complete least squares analysis, associated with the partial SS and corresponds to Yate's weighted squares of means analysis."

Its principal use is in situations that require a comparison of main effects even in the presence of interaction. Each effect is adjusted for all other effects. In particular main effects A and B are adjusted for the interaction A*B. If the model contains only main effects, then type 2 and type 3 analyses are the same." [SAS 1985 p104]

Type 4 SS are the same as type 3 unless there are empty cells in which case type 4 SS are more appropriate.

PROC GLM outputs types 1 and 3 by default.

G.54 CONTROLLING THE FISHING ERROR RATE

With comparisons among three or more means with an 0.05 probability of making the type 1 error (false rejection of the null hypothesis) on each comparison, it is intuitively clear that as the number of comparisons between pairs of means rises, the chances of at least one type 1 error rises in step. By the time we reach 10 means, there are 10(10-1)/2=45 pairs to compare. If the comparisons are independent, then

the upper bound to the probability of making at least one type 1 error (the most pessimistic scenario), this being usually termed the experimentwise error rate, is $1-(1-0.05)^{45}=0.90$ or 90%. An alpha acceptable for single comparisons quickly becomes unacceptable for multiple comparisons. Usually experimenters are concerned to test a complete null hypothesis (henceforth abbreviated to Ho) that all means are equal, but sometimes it is known that only some of the means are expected to be equal and this partial null hypothesis (Hp) gives rise to different level of control for the experimentwise error rate from the level applicable to Ho. SAS gives control data about the experimentwise error rate in ways which are described in section 12.13 in chapter 12.

G.6 DESIGN OF PREVIOUS STUDIES

G.61 INFORMATION STUDIES

Designs used by Casey [1980a], Snowball [1980] and Iselin [1988] were reviewed in Chapters 5 and 7, and will not be repeated here.

G.62 WALKER AND BRADBURY/NEWBY

Walker extruded from the literature 4 testable hypotheses that are designated W1 to W4 in this work. The literature claims for funds statements were made the basis for 5 calculation and 5 judgment question. 100 sujects received the c questions, the other 100 the j questions. The 200 subjects comprised 20 each of first year students, of advanced accounting students, of academic accountants, of accounting practitioners and of financial analysts. At each sitting of the 20 person group, six full annual reports inclusive of all the usual matter. The reports were presented to matched subject pairs in a random accounts

order except that each member of a pair received them in the same order and each received three reports with funds statements and three without. All the funds statements followed the all financial resources approach and all were Australian albeit with the names fictionalized. The reports had 9 pages excluding the one page funds statement. Speed, accuracy, confidence and consensus were gauged from the responses.

The Walker design used non random groups but randomized the presentation of funds statements within those groups. Chi squared and Fishers exact test were used to process the results. Thus for each matched pair we have the C&S design 6, the posttest only control group design where X is the funds statement itself. For the whole experiment we have design 11, the counterbalanced design, but with only two Xs with or without funds statements, only three "times" of presentation of a pair of accounts (one with and one without) but we have 5 rather than 4 groups. Thus we are far away from a La*p+3Xtin square or true counterbalance. However, we have gone a little part of the way there and are certainly beyond mere fivefold replication of design 6. Design 6 is the true experiment whereas design 11 is only a quasi experiment, but we are necessarily in the latter situation when we lack control over the 'when' and 'to whom' of exposure to X [CS 1966 p34]. Since the Walker groups are non randomly selected overall and since the times at which the subjects are available is obviously not under experimental control, we are on safer ground in assuming quasi experimental conditions than true experimental ones. All of these remarks apply to the present work pari passu to Walker's.

In the Walker questionnaires, one of the c questions, c5, necessitated a subjective judgment as to whether capital expenditure had been 'significant.' All of the judgment questions involved considerable

elements of subjective judgment. Resposes allowed were yes, no or not sure. No evidence is available on the accuracy of the model answers used to judge accuracy of responses or whether more than one alternative answer was acceptable in any specific question on any specific accounts set. Thus it is not possible to evaluate the validity or reliability of the accuracy results.

Bradbury and Newby used 30 financial analysts to ask 2 j and 3 c questions on the same full annual report and claim to have protocol analysed each subject's response to each question in order to record actual use or non-use of the funds statement. The design is therefore 30 one shot case studies without randomization, control group proxies or reliability safeguards. It thus has little value as a design precedent worth following.

G.7 CONCLUSIONS

Only CS designs 3, 6 and 11 are applicable to the present work and they respectively represent pre experimental, true experimental and quasi experimental designs. Walker's use of design six within non randomly given sets of people is a worthwhile precedent to follow but control of contaminants could be improved overall if the overall experiment came nearer to true counterbalance than Walker did.

Administration of both questionnaires and accounts would need to avoid order effects. Selection linked effects would need to be controlled as regards accounts and gauged as regards subject groups. Full accounting reports would only add to search time and thus facilitate maturation (boredom) effects, especially after a fullday's office work, so only the accounts themselves would be presented.

Moreover not only the questionnaires but also the accounts themselves would need to be colour coded to minimise mismeasurement of processing time in a room of over six subjects. Given that speed is a continuous variable and that accuracy can be scored on an albeit crude interval scale, there is no reason to limit statistical processing to chi squared as if one were dealing solely with nominal scales. However, it would not be permissible to ignore the assumptions of normality, equal variance and balanced cell numbers implicit in parametric ANOVA F tests. In chapter 8, the design and administration of the experiment is described and the samples of subjects, of accounts and of questions are analysed. In Appendix D, the results are given by way of descriptive statistics. In Appendix E, the results of statistical processing by the SAS package are given and discussed. Chapter 9 extracts the main messages of the information in those two appendices and discusses them. Chapter 10 examines the conclusions that can be drawn from them, both in terms of the usefulness of funds statements and the extent of any explanatory power attributable to the information load models in Chapter 7.

APPENDIX H

APPENDIX H

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