SOME ASPECTS OF THE APPLICATION OF ECONOMIC EFFICIENCY CRITERIA IN A MILITARY ENVIRONMENT

BY

Malcolm Montague van Gelder

A thesis submitted to the Department of Accounting and Public Finance of the Australian National University for the degree of Master of Economics

Canberra, November 1973
"It must be our fixed determination to be as lavish of our energies for the good of the State as we are frugal in the expenditure of the resources placed at our disposal."

Maj. Gen. Sir Edward Hutton KCMG CB
Memorandum of the 1st General Officer Commanding of the Australian Military Forces, 30th January 1902
This thesis is my own original work based on the sources listed in the bibliography. Full acknowledgment is made of quotations in each chapter by use of reference numbers to the bibliography.

Signed

Date 29 November 73
ACKNOWLEDGMENTS

For the original inspiration and encouragement I am indebted to Dr Ian Bellany who in 1969 was a member of the Strategic and Defence Studies Centre of the Australian National University. His emphasis on the worthwhileness of the effort involved was the deciding factor in embarking on the project.

I am also very indebted to Mr H.T. Ford, Chief Finance Officer, Department of the Army. He always found time to discuss with me matters connected with the finance function of the Department.

For their patience in dealing with a "part-timer" and for their guidance and contributing remarks I am most grateful to Professor R.L. Mathews, Mr W.R.C. Jay and Mr H.G. Brennan of the Australian National University.

My thanks must go to my wife Helen who, in addition to her other tasks and responsibilities, typed my first draft, a laborious task, to John Desmond who read my draft and offered helpful suggestions, and finally to Elizabeth Bladon who typed the final draft so efficiently, accurately and with such good grace.

Needless to say, the author retains full responsibility for the content of this thesis and the opinions expressed therein.
PREFACE

In 1969 when the author first explored the application of economic efficiency criteria in the context of military expenditures, planning-programming-budgeting systems had reached their peak of popularity in the United States, were being actively explored in the United Kingdom and had been endorsed by the United Nations for use in underdeveloped countries. The Australian Treasury was closely watching developments in the field of modern budgeting almost, as it seemed, preparatory to the introduction of some new system to replace traditional budgetary methods.

In 1970 the Department of Defence tentatively introduced a Five Year Rolling Programme (called the "FYRP") and incorporated some elements of the United States Planning-Programming-Budgeting System (PPBS). The Treasury ventured no further than introducing a policy of "forward estimates of Commonwealth expenditure". Defence deliberately stopped short of a full-scale PPBS preferring to concentrate initially on the planning emphasis of such a system. Measurement of performance - considered to be such an essential feature of the original concept of program budgeting as developed in the United States - was omitted from the Australian Defence program budgeting "system".

Resistance to the budgeting initiatives of Defence became apparent not only because of lack of expertise in the Service departments - Navy, Army and Air Force and also Department of Defence - at all levels, but in lack of positive endorsement of the initiatives by the Treasury, by professional bodies and by the public generally. As FYRP was designed to serve the planning interests of Defence and not the more immediate interests of the Service departments, the lack of enthusiasm displayed by the latter was not surprising, particularly in the absence of very much pre-education.
All this was happening against the background of a Vietnam conflict when the attention of the Services was elsewhere other than on a new budgeting system which required the diversion of personnel resources into complicated and seemingly endless manipulation of figures. At the same time signs of disenchantment with PPBS were evident in the United States at all levels of government. Cities, counties, states, federal departments who had embraced the concept in the heyday of Defense Secretary McNamara (and after President Johnson's directive of 1965) found the exercise in responsibility accounting not sufficiently rewarding for the effort involved.

The author, in a number of papers and presentations, unashamedly advocated the introduction of an Australian version of PPBS to the Department of Defence and into government accounting generally, particularly emphasising the performance measurement aspect. It was apparent, however, that for a system to originate in the Department of the Army what was required was a degree of dedication to the cause and economic appreciation which was not sufficiently widespread amongst Army and civilian officers.

Whatever the faults of the PPBS mechanism and the demands it makes on the operatives, the basic philosophy is nevertheless a very valid one and the peripheral benefits which accrue to those involved can be very large. Whilst it can be argued that the Australian Defence organisation has been fortunate in that it did not wholeheartedly embrace a system which was already being discarded by the United States, it may also be argued that it missed out on a unique opportunity to explore more systematic methods of structuring its accounts, planning its expenditures and monitoring its performance.
Early philosophical rejection of the system as designed by Defence was evident in the decision to allow the Army to embark on a review of its own organisation, when clearly what was needed was review of the whole Defence organisation with a view to exploiting the full benefits of performance-oriented functional organisation. Program budgeting has been long recognised (relatively speaking) as a back door method of bringing about organisational changes. Why this is so is because an understanding of program budgeting inevitably leads to a disclosure of organisational weakness because of the spotlight thrown on organisation objectives. If the Service departments collectively form an administrative and operational entity, an understanding and acceptance of the principle underlying program budgeting would have ensured a collective rather than an elemental re-organisation.

Regardless of the reasons for rejection of program budgeting or its inherent weaknesses, it is maintained that there are certain outstanding ancillary benefits of the program budgeting concept which, now that they have been revealed, should be exploited. These include a more systematic appraisal of the costs and benefits of organisational endeavours, the derivation and recognition of programs of activity, and the new emphasis on the measurement of performance.

This thesis commenced with a determination to show that a program budgeting system could be introduced into the Defence group of departments as a major step in the attainment of greater economic efficiency in one field of government expenditure. To succeed completely it was necessary to devise a budgetary and accounting system which eliminated the need for the traditional input budgeting. A new system which merely ran in parallel with the old would be considered a duplication of effort, and wasteful of resources, even if it had a considerable
credit balance of benefits. The task of structuring all expenditures on an output or objective pattern was not necessarily an insuperable one (it was done in the United States, but as a complement not a substitute for the established methods of appropriation of and accounting for funds), but it became clearly impossible if the whole Defence group of departments and at least part of Australian government financial system did not change from an input to an output orientation. Conceptually it was possible for one department to change, particularly as an exercise in monitoring its own performance and, even allowing for the necessity for conversion of accounts and estimates at the point of comparison with other Service departments, in presentation to Treasury and the Parliament. In practice, it was not possible because the whole emphasis of Defence, Government and public scrutiny of military expenditure was on inputs and subjects of expenditure. There would be no feedback to test the meaning or validity of a new form of presentation of Estimates.

The author was not directly involved in Army finance nor was he in a position to influence the introduction or rejection of new systems of programming and budgeting. In any case, any initiatives the Army could have taken in exploring new systems of financial management were pre-empted by the directives of the Department of Defence during the last three years.

Thus the thesis has evolved. Where it set out to explore the application of all economic efficiency criteria in a military environment it has resulted in pursuing a few aspects only. Where it resolved originally to show how a full planning-programming-budgeting system could be introduced into a Service department it has settled for recommending the exploitation of the ancillary benefits of such a system, certainly those
benefits which can be painlessly exploited. This is the result of the author's attempting to develop a theme - one as interesting and emotive as program budgeting - against a rapidly changing background. In fact, the background was moving faster than the capacity or desirability of the author to adapt.
## CONTENTS

**PREFACE**

**INTRODUCTION**

**CHAPTER**

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Defence Economics</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>The System of External Financial Control</td>
<td>27</td>
</tr>
<tr>
<td>3</td>
<td>System of Internal Financial Control</td>
<td>49</td>
</tr>
<tr>
<td>4</td>
<td>Efficiency in a Military Environment</td>
<td>70</td>
</tr>
<tr>
<td>5</td>
<td>Development of Functional Costing and Allied Techniques</td>
<td>87</td>
</tr>
<tr>
<td>6</td>
<td>Towards Greater Efficiency in the Department of the Army</td>
<td>118</td>
</tr>
<tr>
<td>7</td>
<td>Derivation of Programs</td>
<td>149</td>
</tr>
<tr>
<td>8</td>
<td>Measurement of Performance and Selection of Criteria</td>
<td>164</td>
</tr>
<tr>
<td>9</td>
<td>Costing</td>
<td>180</td>
</tr>
<tr>
<td>10</td>
<td>Conclusions</td>
<td>198</td>
</tr>
</tbody>
</table>

**BIBLIOGRAPHY**
TABLE

1.1 Defence Expenditure 1971/72
1.2 Army Expenditure Estimates 1971/72
5.1 End Program Resource Requirement
5.2 United States Air Force Budget Codes
5.3 Expenditure by Fiscal Year

FIGURE

3.1 Finance Organisation at Army Headquarters (May 1971)
5.1 Life Cycle Funding Pattern
6.1 Decision-Making Process
6.2 Comparison of Cost Categories
8.1 Input, Process and Output Variables in the Educational Process
8.2 Input, Process and Output Variables in the Military Field
INTRODUCTION

The paper describes the military environment, expands on the nature of various economic efficiency criteria and then explores the existing application or the potential for such application in that environment.

A central theme is "program budgeting" with separate chapters being devoted to the introduction of program budgeting into the Australian Army financial system, the derivation of programs, the measurement of performance and the question of costing.

The description of the military environment is undertaken as a first step and this is done in the following chapters:

Chapter 1 Defence Economics (particularly that part which refers to defence expenditure generally and places the Army in perspective).
Chapter 2 The System of External Financial Control.
Chapter 3 The System of Internal Financial Control.

Chapter 1 is an introduction. Very early it points out that this study is concerned with the micro aspects of defence economics; in other words it is more concerned with exploring the attempts of a Service department to obtain value for money than questioning the size of the defence vote, or that department's monetary allocation.

The reader is reminded that defence rates very high on the ladder of "publicness" as a public good, and that it shares with other public goods all the problems associated with resource allocation and the attainment of efficiency. There are, however, techniques such as systems analysis, operations research, program budgeting and cost-benefit analysis which are the public sector's substitute for the market forces which operate in a competitive private enterprise system.
In the defence sphere, a major difficulty is the estimation of utility or military worth. The traditional place of the economist in military affairs and the modern relevance of economics and the economist in such affairs is referred to. Particularly when the resources of the nation are being asked to provide an increasing range of public goods other than defence, there must exist some mechanism for deciding what level of defence will be provided and what defence equipment and services will be produced within this level.

Economists and practitioners of the military art are being increasingly assisted by modern financial management techniques and data processing machines. Scientific management principles are being adopted and progress has been made in the development of theoretical structures for representing financial and organisational problems.

A brief look at levels of defence manpower and expenditures helps to put the Army in perspective, both nationally and in the defence sphere. The most disturbing feature which emerges is that the "maintenance" of the present force structure is attracting an increasing share of the total defence vote leaving relatively little for the acquisition of new equipment and hence the updating and introduction of new capabilities. This falling capital/maintenance ratio can be readily deduced from the relative movements in the numbers in the Permanent Forces and the size of the Defence Vote. This falling ratio can be partly combatted by increased efficiency in military expenditures. Therefore research into the application of economic efficiency criteria in the military environment is timely.

Chapter 2 provides a background against which the desirability of improved financial management within the Department of the Army may be judged. As with all government
departments, there is superimposed upon the Army a hierarchy of controlling and co-ordinating instrumentalities; these range from the Parliament and its Public Accounts Committee through the Auditor-General, the Treasury, the Public Service Board, to the Department of Defence. These agencies provide formidable constraints upon the unilateral introduction (into the Department of the Army) of improvements in the existing financial system.

The Army Department is different from most other Government departments or agencies in that it is almost exclusively a spending department and dual financial control is exercised by the Departments of the Treasury and Defence. In addition, the Army is in the somewhat invidious position of possessing not only a Chief of General Staff who is responsible for the operational efficiency (the effectiveness of its warlike function), but, a Permanent Head of the Department whose primary concern is accountability.

The Army, like the other two Services, is subject to a high degree of civilian control. The necessity or otherwise of this can be debated at great length because it is a deep issue involving Parliamentary control, ministerial responsibility and the very structure of Defence management. What can be concluded fairly confidently is that the more expert and experienced in financial matters that officials in the Service department and Department of Defence become, the less will be the requirements for stringent oversighting by the Treasury and other agencies such as the Auditor-General and the Parliamentary Accounts Committee.

Chapter 4 is concerned with clarifying the term "efficiency" and examining the various interpretations which can be placed on the word, particularly in the military
environment which has just been described. This chapter looks at:

(a) First, the distinction between "efficiency" and "effectiveness".
(b) Secondly, economic versus engineering and technical efficiency.
(c) Thirdly, efficiency and the concept of optimality in the allocation of resources.
(d) Fourthly, a number of general approaches to the application of efficiency criteria in the military environment and in the broader field of government expenditure.

Such clarification paves the way for the isolation of possible efficiency criteria against which new administrative measures or financial planning devices can be judged. The difference between efficiency ("doing a thing right") and effectiveness ("doing the right thing") and a recognition that any looseness in the use of the two words can lead to conceptional difficulties are emphasised.

Having distinguished between the three efficiencies - economic, technical and engineering - it is resolved that, when the word "efficiency" is used and unqualified, in subsequent discussion, "economic efficiency" is implied. This means that costs are highly relevant, and that decisions and policies are "right" only at a point in time, because changes in factor prices alter the basis upon which such decisions and policies are deemed to be economically efficient.

Because static efficiency analysis cannot be conducted in the absence of an orderly and relevant assembly of statistical costing information (which implies a prior definition of goals and objectives) what is of particular concern is the form in which budgetary information is presented to administrators and legislators for decision-making. A technique of management accounting has been developed which is known variously as
performance budgeting, output budgeting, functional costing or program budgeting. In essence this requires re-casting of governmental accounts in such a way that the costs ("inputs") are allocated as far as possible to specific objectives of policy; an attempt is then made to measure the success or failure of the various activities ("programs") in attaining the objectives, so that it is possible to appraise cost-effectiveness or allocative efficiency.

Chapter 5 endeavours to show that functional costing and program budgeting systems are derivatives of scientific financial management and more specifically of the model building approach. Rather than being spectacular new breakthroughs in financial management, the techniques become no more nor less than more rational methods of accounting for and planning expenditure.

It is reasoned that, whether the emphasis be on ex-post analysis of costs as in functional costing or on ex-ante analysis of forward expenditure as in a "program budgeting system", it is necessary to develop a program structure based on the organisation's main objectives. An understanding of the concept of a major program (or objective or function) can be obtained from a study of the approach to program budgeting or functional costing in those countries which have embraced new accounting and budgeting ideas. Thus it is for other than historical reasons that the development of functional costing in the United States and the United Kingdom is studied.

In tracing this development in these two countries, it is possible to extract concepts and ideas which are applicable, when modified, to Australian conditions. Certainly Australia can learn from others' mistakes, and capitalise on the experience which those countries now possess in the application of financial management techniques.
It appears that the US Planning-Programming-Budgeting-System (PPBS) and the British style of functional costing are both predicated on the primacy of the planning function. Both styles emphasise the usefulness of the new budgeting technique in the role of planning, and both are concerned secondarily with financial control and management.

The British functional costing, which in its simplest form is a post analysis of costs of inputs by function or output category, pays quick dividends in guiding decisions for future allocation of resources. The many features of the US PPBS, namely the cost effectiveness studies, the systematic analysis of alternatives, a more definitive display of activities and elements, and crosswalk grids for the conversion of data from a planning to a management and control framework, can be utilised depending on the resources in terms of manpower and money which can be devoted to their exploitation.

Chapter 6 is mainly concerned with approaches towards the introduction of program budgeting into the Australian Army financial system, but it is mindful of other measures to promote efficiency. The Department of Defence has embarked on a modest Australian version of a PPBS in its Five Year Rolling Program; but the emphasis is on the needs of the Defence planners, and there has, to date, been no attempt to exploit fully the potential of a comprehensive PPBS by introducing a system which extends down to operating units and comprehends a connection between planning and accounting information.

Whilst lack of progress in the PB field in Australia can be put down to inertia or extreme caution, it can also be attributed to the lingering concepts of subject-of-expenditure budgeting (through resource control), "incrementalism" and the cash basis of accounting. A suitable PPBS for the Australian Army would achieve improvement in institutional arrangements.
provide systematic quantitative analysis and stress the importance of economic criteria in military decision-making. Its development should, however, recognise the peculiarities of the Australian defence environment.

It is recognised that it is inconceivable that the Army could introduce formal program budgeting independently of the other two Services and the Department of Defence. However, without speculating on the form program budgeting should take in the Defence group as a whole, an attempt is made in this chapter to apply a new budgeting system to the Army alone in the first instance. The Army budget can be expressed in terms of the Army's main objectives which are then expressed as programs and sub-programs, and budget headings such as Field Force, Training and Reserve Forces replace such administrative headings as Personnel and Maintenance. As part of the "package", the techniques of systems analysis and cost effectiveness can be used to decide priorities within programs.

The proposal does not exclude the retention of the normal administrative (input) budget for statutory accounting purpose. There is of course a case for certain rationalisation of the existing appropriation categories. Program budgeting is seen, however, as only one of many possible institutional arrangements for promoting administrative efficiency. The special problems of "assets consideration", the very nature of the Army's operations and that of performance measurement are examined.

The following three chapters are devoted to amplification of certain important aspects of the program budgeting concept:

Chapter 7 Derivation of Programs.
Chapter 8 Measurement of Performance and Selection of Criteria.
Chapter 9 Costing.
In Chapter 7, the various methods of deriving programs for an organisation are explored. These range from the selection of criteria from the more important texts in the field, the conceptualisation of objectives stemming from the organisation's basic missions or goals and the isolation of program structure "levels". It is concluded that the structure which does emerge from adoption of one or other of the above methods, or simply from a fresh uninhibited philosophical and behavioural approach, will undoubtedly be imperfect in the first instance. No one category scheme will fulfil all needs or satisfy all users.

It is reasoned that this imperfection is easy to accept if one is conscious of the dynamic nature of program structuring, recognising that an organisation's roles and missions and sometimes even basic objectives are continually changing. A PPB system should not necessarily stand or fall on the soundness of its basic program structure because this would be denying the usefulness of the accompanying tools and techniques of program analysis.

Chapter 8 points to the fact that developing means of measurement of performance and isolation of suitable criteria appear to be the most difficult tasks in establishing a PPBS. Particularly in a Service department which is not revenue-collecting and which produces a collective or public good as classic as defence, difficulty is experienced in expressing the service or work produced in meaningful performance terminology - of generating unique, simple, helpful measures of effectiveness.

Before the chapter proceeds to an identification of useful measures for measuring performance, the inadequacy of workload indicators, or detailed work efficiency indicators or secondary indicators such as instructor/student ratios, is highlighted. The advantages and disadvantages of various measures are outlined, the most prominent being:
Program size (or volume) indicators
Program effectiveness measure
Input, process and output variables
Quality indicators
Comparative indicators
Expenditure/output indicators
Operations indicators
Program impact indicators
Social indicators
Performance and non-performance levels of achievement.

It is frequently difficult to distinguish an indicator of program size (stated in terms of the major physical components funded by the program and to be used in providing the program services) from indicators of the volume of services produced by those resources. The products of military productive endeavour - ships, aircraft, battalions of men - tend to fall into this category. They are the indicators of program size, and yet at the same time represent the service provided in terms of latent military capability which may never be utilised.

It is reasoned that the military as an institution is little different from any other institution which is being increasingly sharply resource constrained. It should compete for funds on a basis of goal attainment and such goal attainment can only be demonstrated in terms of performance measurement. In a PPB framework the indications of output must be quantifiable and/or observable in some form.

The common accusation levelled at all attempts at performance measurement is that they lead to over-zealousness to attain measurable results at the expense of quality. Control standards in part can be used to counter this tendency and it is concluded that the advantages of performance measurement outweigh the disadvantages.
Chapter 9 is devoted solely to the question of costing. It is maintained that to know more about costs alone is better than nothing. In choosing between alternative pieces of equipment, weapons or even personnel manning strategies, the decision-maker would certainly rather have information about their costs alone than have no idea about either costs or effectiveness. Yet, as the previous chapters have shown, ignorance about effectiveness can make the value of cost information relatively low.

Planning-programming-budgeting-systems were designed to analyse the objectives of an agency or department, to develop alternative means of reaching those objectives and to identify the most effective alternatives in terms of benefits and costs. The importance of costs emerges particularly when it is difficult or improper to measure the benefits of a particular program. When the benefit cannot be completely expressed in dollars, cost effectiveness analysis can be used to compare alternative ways of executing the program.

The chapter identifies a number of different types of costs and explains them. The three cost categories of research and development (R & D), investment and operating costs - which correspond to the three main phases in the life of a weapon system - are defined and illustrated. More basic costs such as "marginal", "incremental", "sunk", "fixed", "variable", "total", "externalities", "opportunity" and "controllable" are also defined. This is done, not because each type of cost is always relevant, but to ensure that each is at least considered and thus consciously excluded or otherwise.

The chapter then discusses in turn the various techniques for estimating costs, the special problems in cost analysis presented by price level changes and uncertainty, and the conceptual difference between cost-benefit analysis and cost effectiveness techniques.
It is explained that the terms "cross-walk grid (or matrix)", "translation grid" and "budget cross-walk" are simply synonymous technical PPBS labels for the technique of translating PPBS program costs and funding into the normal input budget format.

Finally, in the context of procurement and cost effectiveness, it is reasoned that it would be inconsistent to argue for or against a defence purchase solely on the strength of one "externality" such as internal employment or even the building of a national defence industrial infrastructure.

The concluding Chapter 10 outlines the advantages of planning-programming-budgeting-systems, the pitfalls and difficulties in the introduction of a comprehensive system and the reasons for the adoption of such a system within the Army. The main lessons which would appear to have been derived from the recent experience of the Australian Department of Defence in introducing a form of PPBS are included. The chapter acknowledges that what commenced as an ambitious attempt to define and apply efficiency criteria within the Department of the Army has lapsed by default into a consideration of certain aspects of government financial activity and a detailed look at the important elements of program budgeting.

In summary, the effort in presenting the thesis has provided an insight into the external and internal financial control operating from without and within a government department; it has attempted to reveal the relevance of economic efficiency criteria to the internal administration of the department; it has traced the growth of program budgeting and sought to determine the usefulness of program budgeting techniques in the Australian defence environment. In this latter aspect, it has placed emphasis on the derivation of programs, on the measurement of performance and the selection of performance criteria, and on costing generally.
The thesis pleads the case for systematic (albeit imperfect) analysis, and reasons that, with a systematic exposition of assumptions and presentation of data, it is possible for issues to be discussed with much less scope for misunderstandings about issues concerning objectives, resource allocation between objectives, and input/output relationships. Systematic analysis, and program budgeting is of this nature, is at least communicable.
Chapter 1

Defence Economics

1.1 General

Insofar as this study is principally devoted to an examination of the internal management of the resources assigned to the defence effort, it is therefore concerned with the micro aspects of defence economics. It is not concerned with the size of the defence vote or the proportion of Gross National Product or of governmental expenditure which it represents, but how well the money is spent once it is allocated. It seeks to explore a government department's inherent weaknesses in obtaining value for money and to suggest methods of improving performance in such an important field of public endeavour.

The subject of defence economics may be likened to a giant spectrum. At the macro end stands the question of the share of the nation's resources which should be devoted to defence rather than to competing civilian programs. In the middle there stands the question of allocative efficiency in the disbursement of the total defence resources amongst competing military programs. At the other end there is the question of the efficiency (and effectiveness) with which government agencies, the Services and the other members of the defence group of departments spend the funds entrusted to them. This study stands at the latter end of the spectrum and seeks to examine the inner financial mechanism of the defence establishment (and in particular, one department - the Department of the Army) and to consider the applicability of accepted economic efficiency criteria.

Although business boards have often been set up in the past to assist the Services in the conduct of military affairs, generally the scrutiny of military expenditure has been directed to ensure that such expenditure conforms to Treasury and other regulations. In other words, care has been taken to see that the money has not been misspent in a legal sense with not a great deal of regard to whether the money has been spent
efficiently or effectively. This state of affairs is occasioned by the nature of defence as very much a public good, and the difficulty of measuring "military worth".

1.2 Defence as a Public Good

Among the more influential of the "theories of public goods" is Samuelson's formalisation of the proposition (55) that the characteristic of the "pure" public good is that whatever amount of it is made available, is in fact available to everyone, and one person's "consumption" of it does not detract from the amount available to others. Defence is a close approximation to the "pure" case because a single decision about defence has to be made for all in a community (each person cannot have his own chosen amount) and once that amount is provided, everybody gets it whether he likes it or not; and one person's enjoying it to the full does not prevent another person from enjoying it to the full also.

Defence rates high on the ladder of "publicness" as a public good because it is virtually impossible to exclude it from people (education and health services are to a certain extent excludable), and because consumers of the good called defence are not "rivals" (55 p.6). (A good is said to be "excludable" if its supply can readily be arranged in such a way that in order to use it one must pay for it. When "rivals" consume goods they reduce the amounts available to others.) The point made is that defence not only has unique problems in its own right, but shares with other public goods all the problems associated with resource allocation and the attainment of efficiency.

"The reason the efficient use of military (and other government) resources is a special problem is the absence of any inbuilt mechanisms, like those in the private sector of the economy, which lead to greater efficiency. There is within government neither a price mechanism which points the way to greater efficiency, nor competitive forces which induce government units to carry out each function at minimum cost."
Because of the lure of profits and the threat of bankruptcy, private firms are under pressure to seek out profitable innovations and efficient methods .... In government .... there is scope for "Parkinson's Law", personal idiosyncracy and uneconomic preferences of officials to take hold, because the costs of choosing inefficient policies do not impinge upon the choosers." (16)

In other words it is the resource allocation problem that is theoretically solved by the market forces which operate in a competitive private enterprise system, but which do not or are not allowed to operate in the public sector. Thus the Department of the Army is not unlike any other government department in this respect; where it may differ - and this is partly the major consideration of this thesis - is the extent to which it is ready to grasp modern techniques of systems analysis, operations research, program budgeting and cost benefit analysis which have been designed to overcome the problem of ensuring efficient resource use in the public sector. These techniques are the public sector's answer to the oft-implied criticism of inefficiency.

1.3 Military Worth

In the defence sphere the estimation of utility or military worth poses a major difficulty. In some instances, military worth may be defined rather precisely as the capacity to inflict specified damage upon an enemy under described technological conditions (8). In other instances, normative judgments often need to be made in seeking to measure such things as the increased effectiveness of front-line units resulting from changes in support facilities, the benefits of realistic training or the potential fighting effectiveness of field force units.

In the market place money serves as the common denominator of worth and costs, and opportunity cost is the individual's way of deciding upon a course of action (through a
consideration of the costs and benefits of the forgone alternative). In the defence sphere there is no methodology which permits an expression of ultimate military worth in terms of money and thereby enables direct comparison with costs. Notwithstanding the difficulties in making judgments of military worth, and judgments in regard to the allocation and projection of costs for the purpose of deriving opportunity costs, these judgments still provide the basis for the choice between military alternatives.

1.4 The Traditional Place of the Economist

The traditional concerns of economists in military affairs have never been disputed. Nor will they be discussed in this paper, except in this section in order to identify and isolate the area of immediate interest. The traditional objectives of war economists have been:

(a) Mobilisation of a country's resources to support a war effort. This involves a greater concentration of industrial and primary production effort than is possible within a free market mechanism. It encompasses conversion of industrial capacity to military uses.

(b) Maximisation of total supply in both the industrial and primary fields. This will involve the optimal allocation of resources not only between the military and civilian sectors, but also within the civilian sector by controls, rationing and other methods.

(c) War and economic progress or the impact of defence spending on the longer term questions of economic growth and stability. This question or objective receives more attention in times of peace or limited war (such as Vietnam). It is closely related to the objective of optimal allocation.

(d) Waging of economic warfare. (It was stressed repeatedly by Clausewitz that the conduct of national defence does not admit of a purely
military judgment and that none of the principal plans that are necessary for the conduct of war can be fashioned without some insight into the political, economic and cultural attributes of the warring nations (52). Means of waging economic warfare range from positive measures such as building up the economic strength of one's own country and allies, encouraging international trade as a means of lessening tension and the chances of war, and use of foreign aid, to negative measures in the form of embargos, tariffs, regulations, prohibitions and stockpiling.

(c) Alliance policy, in so far as it affects collectivisation of economic resources.

(f) Improving the public acceptability of defence expenditures by influencing the direction of expenditures, e.g. by procurement policies to foster local industrial development, by concentrating military complexes in economically backward areas, and more recently incorporating military expenditures into counter-cyclical spending programs.

I have mentioned that the above objectives are those of war economists but the distinction between a so-called war economist and a peace economist, who admits the necessity of some military expenditure in peacetime or periods of limited war, is only one of degree. As an illustration:

"In time of war, economic organization aims (or should aim) at maximizing military worth while maintaining a given level of consumers' welfare; in time of peace, the aim of economic organization is to maximize consumers' welfare while setting aside adequate resources for a given military preparedness for defence. The former requires the maintenance of a given consumers' welfare with a minimum of resources, the latter calls for the production of maximum consumers' welfare with a minimum of resources; and it is apparent that the formal
conditions of achieving either of these aims are exactly the same. The principles, therefore, that govern economic organisations in peace apply pari passu in war ...... the conditions of efficiency ...... may be applied either to the civilian sector of a war economy or to a war economy as a whole, regarding the armed forces as a giant consumer". (47 p.259)

1.5 The Modern Relevance of Economics and the Economist in Military Affairs

Economics has a necessary place in the scheme of military affairs (even though this may be disputed by those practitioners of the military art who do not have to consider the origins of the resources at their disposal) because there are not enough resources to produce everything the country would like to provide for its defence. Like human wants, defence needs that can be satisfied by consuming goods and services may be regarded for all practical purposes as insatiable - there is no absolute level of defence towards which we can realistically strive. Thus there must exist some mechanism by which it is decided what level of defence will be provided and what defence equipment and services will be produced within this level.

Further evidence of the relevance of economics is provided by the following problems which all have a bearing on the effective allocation of the resources devoted to defence. First, it can be shown that value depends on relative scarcity and relative wants. A change in the military operational environment, a change in the range and likelihood of defence commitments or a change simply in fighting techniques can negate the expected benefits of long-established methods or previous investment in expensive military equipment or training.

Secondly, a plan is only the best available if no small changes would effect an improvement. The estimation of the effects of various small changes in a plan may give some indication of whether it is close to the best possible, and will indicate the direction of changes that would at least improve the plan even if they would not make it optimal. (94)
The central conceptual problem following from this is
to determine a level of suboptimization that is neither too
small nor impractically large for the problem at hand.\(^{(18)}\)

Thirdly, it must be recognised that events in the
past are not directly relevant to current choice. For example,
as with all sunk costs, the cost of a resource purchased in the
past and subsequently held in stock is not a relevant measure
of the cost of using it on a current activity.

1.6 Relevance of Financial Management

Financial management has relevance here because
nearly all administrative decisions have financial implications. A single decision, in addition, will often have consequences
with financial implications in several different parts of an
administrative unit. An important function of financial
management is the co-ordination of the various decisions taken
within an organisation so that they are mutually consistent,
having regard for the financial aims and constraints of that
organisation.

The growth of governmental functions and services has
led to a new emphasis on administrative accountability and
responsibility, and a corresponding dependence upon machines to
process data and expedite decisions. Increasingly, data
production is regarded as a creative activity aimed at improving
management, not as the dead art of book-keeping for the sake of
financial post-mortems on the weaknesses of the organisation.\(^{(87)}\)

Scientific management principles are being introduced
to help rationalise or systematise administrative procedures. It is not only a mechanism for pinpointing and periodically
checking responsibility for action, thereby improving control
over current administrative action, but is becoming an
indispensable tool for future planning; public administrators
may now plan, program and budget more extensively and with
greater accuracy than before.

Considerable progress has been made in the development
of theoretical structures for representing financial and
organisational problems. The idea that an analytical or model-
building approach to decision-taking problems is now as relevant
to an administrative unit as in natural or applied science is gaining acceptance. Sooner or later the advantages of the application of scientific method become apparent in most fields of human endeavour.

The intrusion of the "systems approach" to government operations requires that there be some new organisational framework of financial management - some framework to provide the additional financial data and subsequent analysis for the purposes of both planning and control. There must be some organised procedure for the obtaining of relevant information on all available courses of financial expenditure. Whether this procedure or system is called program budgeting (PB), planning-programming-budgeting-system (PPBS), output (or performance) budgeting or functional costing is not immediately relevant. What is relevant is the necessity for the existence of some system for the collation, analysis and use of financial and related data.

1.7 Output Orientation

Particularly in the field of civil engineering, it is not difficult to convince the engineer or construction manager of the need for financial control on an output basis; by the very nature of his work, the engineer is forced to cost in accordance with projects or tasks; he would be appalled if there were any other way of costing in his organisation other than on an activity, project or program basis. He is only interested in inputs in terms of labour, materials and equipment as they contribute to the completion of distinct projects and their effect on the efficiency, and hence the profitability, of the project. The engineer is of necessity output-oriented and his interest in input control and costing is a means to an end rather than an end in itself. He has developed simple but comprehensive costing procedures by which he is able to allocate to projects input costs such as cost of labour, hire of equipment, cost of materials and a costed portion of administrative overhead. He has learnt the art of funding projects and balancing project expenditures with periodic
payments for completed work. He has developed elaborate but conceptually simple network analysis or critical path techniques for the timely utilisation of scarce or expensive resources.

If a project is to be financially controlled with any degree of success, in the eyes of the engineer, three factors are of paramount importance. These are budgets, the costs incurred, and the progress achieved in relation to those costs. A knowledge of the budgets and costs by themselves will be of no use at all unless the corresponding progress can be gauged. All three basic factors must therefore be monitored during the active project life (24). Achievement analysis is recognised as an essential link in any attempt at financial control.

1.8 Defence Expenditure - The Army in Perspective

In the financial year 1970/1971 Defence expenditure amounted to some $1,135 million or 14.1 per cent of the total Commonwealth Government spending. This represented 3.44 per cent of Australia's Gross National Product (GNP) measured at market prices (139). The 1971/1972 Defence Vote was $1,252.4 million which is also 3.44 per cent of estimated GNP (112).

The Army's share of the defence expenditure in these two time periods was -

- 1970/1971 $421.0 million or 37.1 per cent
- 1971/1972 $477.2 million or 38.1 per cent

The strength of the Permanent Forces is approximately 81,000, the Army's share being 40,328 as at 29 March 1972 (105). The present forces are supported by some 52,000 civilians, including those in government factories and in naval dockyard facilities, and public servants providing administrative technical and scientific support. The total of 133,000 is about 2.4 per cent of the Australian workforce.

Manpower reserve backing for the forces, comprising Citizen Military Forces (CMF), emergency reserves and other categories (including former national servicemen) currently total 76,500 (112).
Procedures within the Department of Defence and the three Service departments have yet to be refined which will give exact measurements of the expenditure, within the total defence expenditure of $1,250 million, on the various kinds of defence capabilities provided by the Australian force structure. Subject to the reservation that some expenditures contribute to more than one defence capability, the following table provides a preliminary indication of how defence expenditure in the financial year 1971/72, including both capital and maintenance is being allocated.

Table 1.1
Defence Expenditure 1971/72

<table>
<thead>
<tr>
<th>Category</th>
<th>$ million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maritime defence</td>
<td>150</td>
</tr>
<tr>
<td>Ground forces and their related support</td>
<td>215</td>
</tr>
<tr>
<td>Air defence (including ground attach and land based strike/reconnaissance)</td>
<td>115</td>
</tr>
<tr>
<td>Training, logistics and general support</td>
<td>365</td>
</tr>
<tr>
<td>Research, development, testing and evaluation</td>
<td>70</td>
</tr>
<tr>
<td>Industrial capability</td>
<td>55</td>
</tr>
<tr>
<td>Administrative support and miscellaneous defence activities</td>
<td>280</td>
</tr>
<tr>
<td></td>
<td><strong>$1,250</strong></td>
</tr>
</tbody>
</table>


To date Army expenditure in the period has not been costed functionally except on a rudimentary per capita basis (input expenditure apportioned in accordance with the allotment of personnel to defined areas of activity such as the Field Force). The input expenditure categories as expressed in the Budget are shown in Table 1.2:
### Table 1.2

**Army Expenditure Estimates 1971/72**

<table>
<thead>
<tr>
<th>Item</th>
<th>Actual 1970/71</th>
<th>Estimated 1971/72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay and allowances</td>
<td>$187.3</td>
<td>$208.6</td>
</tr>
<tr>
<td>Civil salaries</td>
<td>$42.6</td>
<td>$50.3</td>
</tr>
<tr>
<td>General expenses</td>
<td>$45.0</td>
<td>$47.9</td>
</tr>
<tr>
<td>Forces overseas</td>
<td>$20.9</td>
<td>$20.3</td>
</tr>
<tr>
<td>Maintenance stores</td>
<td>$42.0</td>
<td>$49.8</td>
</tr>
<tr>
<td>Maintenance of equipment</td>
<td>$6.7</td>
<td>$7.6</td>
</tr>
<tr>
<td>Maintenance of buildings and works</td>
<td>$11.9</td>
<td>$13.0</td>
</tr>
<tr>
<td>Capital equipment</td>
<td>$34.0</td>
<td>$47.6</td>
</tr>
<tr>
<td>Buildings, works sites and housing</td>
<td>$18.3</td>
<td>$19.9</td>
</tr>
<tr>
<td>Total from Appropriations</td>
<td>$408.7</td>
<td>$465.1</td>
</tr>
<tr>
<td>Outlay from US Credits</td>
<td>$12.3</td>
<td>$12.1</td>
</tr>
<tr>
<td><strong>Total Army</strong></td>
<td><strong>$421.0</strong></td>
<td><strong>$477.2</strong></td>
</tr>
</tbody>
</table>


Between 1966/67 and 1970/71, total Service strength increased by 6,124 or 8 per cent overall – an annual average increase of 2 per cent. At the same time the total Australian work force increased by nearly 3 per cent.

In the above respect, the claim of the Services for manpower has been decreasing (and has further decreased in 1971/72). But the financial cost per man of maintaining the forces, that is not merely of feeding, clothing and paying him but of training him, and of providing for the repair and maintenance of buildings which he occupies, has increased markedly. The average cost per capita in the items loosely
aggregated under maintenance has risen from $7,465 in 1966/67 to $10,610 in 1970/71 or an annual growth rate of cost per man of 9.1 per cent. (139)

Defence expenditure relative to total Commonwealth expenditure has fallen from 18 per cent approximately in June 1968 to 14 per cent approximately in June 1971. As a percentage of GNP it has dropped from 4.5 per cent in 1967/68 to 3.4 per cent in 1970/71.

A feature (apart from the percentage drop in defence expenditure) is the decrease in the ratio of capital expenditure to maintenance expenditure from 1:1.7 in 1966/67 to 1:4.5 in 1970/71. Thus, maintaining the present force structure attracts a high proportion of the total defence vote, leaving relatively little over for the acquisition of new equipment and hence the updating and introduction of new capabilities. (The capital in defence spending is in the major items of equipment such as ships, aircraft, armoured vehicles, weapons production equipment, and new buildings and installations.)

This falling capital/maintenance ratio can be deduced readily from the relative movements in numbers in the Permanent Forces and the size of the Defence Vote, or the proportion the Defence Vote represents of total Commonwealth expenditure or GNP. Particularly due to the increasing cost of military equipments (resulting from a rising technical sophistication factor), and in the light of relatively static manpower levels within the three Services, there would be a prima facie case for increased expenditures on Defence, that is, if Australia wishes to retain relative technical parity with its likely adversaries in operations.

Whilst decreased manpower levels might be seen as partly the answer there are obviously minimum levels below which the Services cannot sink in total number of men. The Navy and the Air Force must have certain numbers of men to man and maintain their equipment; the numbers required can be explicitly stated. The Army, less explicitly, needs a certain minimum number of men in peacetime which represents a force of a size, say, one Division, which is credible in the eyes of Australia’s neighbours and allies. At the very minimum the Army must be of
such a size that it contains the potential to expand (with the addition of short-service men who are either conscripts like National Servicemen or volunteers like the Korea Special force) to meet likely future commitments.

Levels and direction of expenditure are not the concern of this paper. Sufficient to recognise that in planning our defence capabilities it is necessary to assess clearly and sensibly the objectives we wish to serve, and the limits and possible alternative allocations of our resources. We seek, at any time, an optimum mix of equipment and manpower (side-stepping the issue at present of what "optimum" means), selected with regard also to foreseen complementary allied capacities. It is important, at the same time, not to disregard the fact that certain civil capacities—both industrial and in manpower—provide a very significant supplement to the standing military structures. (139)

1.9 Value for Money

Because of the so-called "uniqueness" of defence, its "publicness" as a good, the difficulty of measuring military worth, the "insurance policy" nature of defence expenditure and its sheer size in relation to other items in the government's budget, particular care must be taken to ensure that value is obtained for the money spent. This is notwithstanding the fact that "the provision of security and administrative services is a fundamental task of government, and most people would agree that the cost of maintaining an adequate defence establishment, police force, and judicial and administrative machinery should be a first charge on the public purse." (25)

It was recognized by a former Secretary Department of Defence, Sir Henry Bland, (127) that there was one constant in a number of moulds of defence administration which could be adopted to suit Australia's defence needs, and that was the search for better and more effective defence administration. He presumed that this had become more evident as defence has grown more and more costly and even more demanding of resources (even in a so-called peace situation). He further reasoned that costs and resources and national economics have by no means been the
sole motivation, that there has been a general growing interest in the betterment of administrative and management techniques as such, and that, particularly in the United States, there has been the very powerful belief that there could be applied to defence administration, with great advantage, techniques of analysis and management already proven in business.

The golden days of liberal defence expenditure which existed in the United States when Robert McNamara was Defense Secretary will probably never dawn in Australia. McNamara said: "Yet my instructions from both President Kennedy and President Johnson were simple: to determine and provide what we needed to safeguard our security without arbitrary budget limits, but to do so as economically as possible." (30). This provides a classic example of seeking a given amount of defence for the least cost. A combination of small population and expanding economy will probably ensure that Australia must take an alternative course, that of trying to obtain the greatest military worth for a given level of expenditure. If such a policy is adopted, however, Australia must be ever mindful of Charles Hitch's advice that "being truly economical does not mean scrimping - rather economics is concerned with allocating resources - choosing doctrines and techniques so as to get the most from the available resources" or, more simply, value for money.

It is proposed in Chapter 2 to look at the system of external financial control or the financial system in Australia of which the Department of Army is a part. This involves a consideration of the role of the Department of Defence, the Treasury, the Public Service Board, the Auditor-General and the Parliamentary Accounts Committee, all of whom play some part in the financial affairs of the Department of Army.
Chapter 2

The System of External Financial Control

2.1 General

This chapter provides a background against which the desirability of improved financial management within the Department of the Army may be judged. It is not sufficient just to describe the existing finance function within the Army; the major constraints in the form of higher financial co-ordinating agencies must also be described. There is in fact, superimposed upon the Army, as on all Government Departments, a hierarchy of controlling and co-ordinating instrumentalities which provide little apparent scope for financial managerial initiative.

On the surface, the Army may be seen to have three distinct limitations on its financial freedom which are not always or necessarily associated with other departments outside the Defence Group of Departments. These limitations will be explored in greater depth later in this chapter but brief mention will be made of them here. They are:

(a) The Army is almost exclusively a spending department. As all its operations involve expenditure of money, all activities are therefore subjected to intense financial scrutiny.

(b) Dual financial control of the Army is exercised by the Departments of Treasury and Defence, Treasury through the normal accounting systems as laid down in the Treasury Manual, and Defence through the Army Programme.

(c) The Army is in the somewhat invidious position of possessing not only a Chief of the General Staff who is responsible for the operational efficiency (the effectiveness of its warlike function) but a Permanent Head of the Department whose primary concern is accountability. Thus all measures to improve the operational efficiency of the Army which have financial implications are subject to the concurrence of the Secretary.
In the light of the above limitations, it is difficult to imagine ways of furthering the interests of better financial management without extensive organisational changes. It would be almost impossible for the Army to develop unilaterally an individual internal "programming-budgeting" system because of the constraints imposed upon the Department by Defence and the Treasury, not to mention other agencies such as the Public Service Board, the Auditor-General, the Parliamentary Public Accounts Committee and even Parliament itself. All these agencies have shown themselves to be extremely conservative when it comes to the management of government finance, conservative in deed if not the spoken word.

The question remains then - why persevere with exploring the scope for improvements in the existing financial function if the constraints appear to be so overwhelming. The answer to this rests in one's attitude to initiative and the level at which the initiative should develop. Failing Parliamentary and Treasury movement in the direction of improved financial management, advances in this field can only be accomplished by active agitation of the various departments. Such agitation must be based on strong evidence or likelihood of improved efficiency resulting from financial management changes. This in turn must be preceded by a thorough analysis of existing procedures and an understanding of the ramifications of the introduction of new procedures.

2.2 Financial Management

The financial functions to be found attaching to the office of the Secretary to the Department of the Army consist mainly of routine responsibilities that are better classified as administrative functions incidental to finance rather than as financial management proper. Even the present Programming and Estimates activity has become so formalised and stereotyped that it contains little scope for financial manoeuvre. The incidental functions of control of public moneys, payment of claims, provision of a field pay service and auditing are important, but they hardly involve decisions in financial management.
The Army's General Staff has little real involvement in financial management, partly because of traditional military abhorrence of finance and partly because of the heavy constraining influence of the Secretary's branch by virtue of the latter's concurring authority.

The expression "financial management" has been used rather loosely. The following view or definition of the scope of the finance function is adopted herein because it appears to represent the most recent academic and professional thinking in the field.

"..... financial management is properly viewed as an integral part of overall management rather than as a staff speciality concerned with fund raising operations. In this broader view the central issue of financial policy is the wise use of funds, and the central process involved is a rational matching of the advantages of potential uses against the cost of alternative potential sources so as to achieve the broad financial goals which an enterprise sets for itself". (49)

The physical objectives and the financial goals in a government department are inseparable entities because the main objectives of the organisation can be achieved only by expenditure of money. The financial goals of the department as indicated in the budget or estimates are meaningful goals only in the sense that the money is planned to be spent in the achievement of the department's objectives.

The greatest evidence of the Army Department's disinterest or inability to indulge in financial management as defined above, occurs at times when arbitrary financial cuts are ordered by the Government. Departmental edicts are subsequently issued calling for economy in the use of stationery; interstate movement is restricted; ceremonial is curtailed. The savings in most areas are trifling and not worth the administrative effort to police, and further, once the saving zeal has died down people revert to their previous "wasteful" ways. Savings in small things can come only from more deeply based economy-consciousness and improved administrative procedures.
Savings should be related to the Army's objectives, and the savings should be accomplished by reducing commitments which do not contribute to the attainment of the main objectives. In a situation of volunteer undermanning, one of the Army's main or important subsidiary objectives is the raising of the re-engagement rate of volunteers in the Army. One of the savings ordered to be effected during an economy campaign was the elimination of travel for inter-Service sports, a saving which would militate (in the view of many people) against the retention of sports-minded volunteers. It is admitted that this is a value judgment, but the point is that the "saving" was made without relating it to its effects on the attainment of the Army's objectives. Responsible savings in a truly financial managerial sense can come from a reduction in commitments and obviously the commitments with the lowest priority in relation to the Army's long term objectives should go first. A sensible reduction in even one small commitment can obviate the necessity for minor savings which are difficult to administer and which cause resentment.

Descriptions of the activities of the Parliamentary Public Accounts Committee, the Auditor-General, the Treasury, the Public Service Board and the Department of Defence are included in this chapter to complete the picture of financial control of the Army. Where possible the description is restricted to the activity which is directly related to the Army's finance function.

Parliamentary Public Accounts Committee

2.3 Background

A Commonwealth Public Accounts Committee was appointed first in 1914. The appointment of that committee followed a general election in 1913 - an election in which one of the issues was the financial methods of the retiring Government which had been criticised by the Opposition (138 p.3). Successive Committees appointed under the 1913 Act sat more or less continuously over the years until 1932 when the operations of the then current Committee were suspended by both Houses of the Parliament as an economy measure.
The Committee was not revived until September 1952. A new Act had been passed in 1951 which, apart from general drafting improvements, differed from the early Act mainly in that it provided for the functioning of sectional committees formed from the main Committee and required evidence to be taken in public except in exceptional circumstances.

The Committee is a Committee of the Parliament itself and exercises the powers of the Parliament. Unlike the Executive, Parliament controls by criticism, not by directive. There are two opportunities at which the Parliament, by criticism, can exercise financial control over public expenditure. One opportunity is when the annual Departmental Estimates are before it (that is before the Houses of Parliament in Committee of the Whole). The other is by its scrutiny of the moneys expended by Departments from funds voted to them.

2.4 "Audit" Approach versus "Efficiency-Audit" Approach

There are generally two opposing views regarding the nature of the work the Committee ought to perform. One view is that the Committee should examine in detail the accounts of Departments, and only those accounts, with a view to establishing accountability.

The other view is that the Committee should try to see whether or not, given the policy being executed, the Government and thus the community are receiving value for the money spent. Although the Committee is an "Accounts" Committee and although discussions of efficiency may verge on questions of policy, the Committee supports the "efficiency audit" view. It endeavours to discover whether Departments are spending the money voted to them as efficiently as possible, as well as to follow through cases of financial irregularity that may have been brought to its notice. (138 p.6)

The acceptance by the Committee of the "efficiency-audit" approach was made clear by the Chairman of the Sixth Committee: "The Public Accounts Committee really operates in the field of an efficiency audit which means that it asks departmental officers appearing before it very much more
difficult questions than it would if it confined itself solely to the accounts and Votes of the Departments. It means it cannot and does not expect a yes-no answer and also expects as a Committee to be informed if its deductions are incorrect."

(120)

By adopting the "efficiency audit" approach, the Committee perennially faces difficult problems involving value judgments. Once the purely legal and mechanical "audit" approach is abandoned, one is necessarily involved in asking about the reasons for actions, in assessing the relative merits of alternatives and in making a judgment on them.

2.5 Achievements of the Committee

The Treasurer's reply to a Report of the Committee takes the form of a Treasury Minute, to be included by the Committee in a later Report to the Parliament. These Treasury Minutes to some extent indicate the Committee's achievements. But what is not known is, first, what changes there have been in Departments simply because the Committee exists: "Certainly, there is evidence that many departments, and particularly those that have good cause to remember an appearance before the Committee, are much more conscious of their responsibilities in the financial field" (138 p.11); and, secondly, how much better are the Treasury, the Public Service Board and the Audit Board now carrying out their functions of control because the Committee is there to ask them what they are doing and why. (If the Committee finds some serious fault in a Department, it generally wants to know whether these controlling agencies were aware of it and, if so, what they have been doing about it.)

Since its reconstitution in September 1952, and as a result of its enquiries into and reports of many and varied subjects, it has been responsible for a great number of changes in the Commonwealth accounting practices and procedures. The duties of the Committee are not restricted to a scrutiny of the Annual Reports of the Auditor-General. It is required to examine generally the financial administration of Departments and the form of government accounts.
Possibly the greatest achievement of the Committee is the indication to Departments of the importance of the concept of financial management.

"We ourselves have observed an inclination on the part of some departments that have appeared before us, to regard accounting purely as a matter of recording transactions rather than in terms of the modern concept of financial management. From those observations we believe that there is ample scope for improved methods in some departments and generally for improvement in the attitude of the Public Service Board to the question of financial management. In our view, effective financial management in the modern sense forms the basis for the efficient operation of departments, irrespective of their functions." (107)

2.6 Departmental Estimating

The Joint Committee has in several Reports stressed the need for accuracy in estimating and the cumulative effect of discrepancies. The Treasury Minute published in the 76th Report sets down the following principles which should be followed by Departments:

1. Each individual estimate is to represent a realistic assessment of the sum that is expected to be spent, having regard to the information available to the department at the time of preparation.

2. Estimates should not include amounts for proposals which are so far from firm that it is not possible to know what payments, if any, will be made.

3. Where an item is for a type of recurring expense (e.g. office services, travelling expenses) it is appropriate to budget on the basis of experience.

In addition to the rules for estimating propounded in the Treasury Minute published in the 76th Report, the Committee added the following two principles:
(a) Estimates for supplies and services are to be based on current costs — in no circumstances is any provision or margin to be included for possible rises in costs and,

(b) All continuing expenditure in particular shall be closely examined in order to eliminate items which are no longer required.

From the 91st Report, it is pointed out that, when formulating proposals for Additional Estimates, Departments should ensure that an increase on an item (e.g. retrospective salary increase) cannot be found from within Budget provision.

From the 84th Report, over provisions of funds are highlighted as "undesirable, misleading and, perhaps unfair to other Departments whose finance needs may not have been fully met".

2.7 Examples of Expenditure Discrepancies in the Department of Army

An awareness of the action necessary to meet the requirements of the Parliamentary Committee of Public Accounts and the need for detailed explanation of under-expenditure is evident in internal departmental submissions.

In 1968/69, expenditures from Advance to the Treasurer in excess of Budget provision (or in excess of Budget provision plus Additional Estimates) were as follows:

(a) 662/1/01 - Civil Personnel, Salaries and Allowances ($210,000)
(b) 662/1/02 - Extra Duty Pay ($55,000)
(c) 664/0/01 - Travelling and Subsistence ($3,685)
(d) 670/0/01 - Communications etc Equipment ($282,000)
(e) 670/0/04 - Weapons and Ammunition ($149,000)

Reasons for the necessity to utilise funds under Advance to the Treasurer would be required of the Director of Civil Personnel in the case of (a) and (b), and the Director of Movements in the case of (c).
The necessity to seek funds on the items (d) and (e) was said to be caused through circumstances beyond the control of the Department of the Army. Late in June 1969, the Treasury directed that certain payments for equipment which had been planned for payment from credits established in the United States ("Outlays for US Credits") be charged instead against Appropriations.

One significant item of under-expenditure in 1968/69 was 660/1/02 Citizens Military Forces (CMF) and Cadets ($638,000). Although it was evident that one of the main reasons for the under-expenditure was the failure to reach the CMF strength target (a reason which would not satisfy the Public Accounts Committee), the responsible branch in the Department was required to prepare the detailed explanation. This would be done in conjunction with the Directorate of Manning and the Chief Finance Officer.

2.8 Public Accounts Committee in Retrospect

It is sufficient to conclude that the Committee has developed into a very powerful instrument exerting a significant influence on the financial administration of the Departments, even to the extent that there is a tendency for its recommendations and observations to be interpreted as policy decisions whereas, in fact, the Committee does not possess any powers of direction. (131)

The Auditor-General

2.9 Background

The Audit Act 1901-1969 provides for the appointment of the Auditor-General. As the holder of a Statutory Office, the Auditor-General is subject neither to the authority of the Treasurer (or any Minister) nor to the provisions of the Public Service Act. Because of his independence from the Executive, and because of the powers conferred upon him by the Audit Act and other statutes, the Auditor-General is enabled effectively to carry out his function of inspecting and auditing the accounts of Commonwealth Departments and authorities. The emphasis of the principal functions of the Auditor-General is naturally on the correctness and propriety of accounts.
In addition to the Central Office in Canberra, there are branches of the Auditor-General's Office located in each of the State capitals. The State branches are divided into sections having responsibility for the audit of a number of Departments or authorities. (All Military Command Headquarters are located in State capital cities.)

2.10 **Reports Transmitted to Parliament**

The Auditor-General's Report (and any supplementary reports) together with the Treasurer's Statement is transmitted to both Houses of Parliament and is presented as a public document. The Report and Statement are examined by the Joint Committee of Public Accounts which may inquire into such matters as it considers necessary or desirable.

2.11 **Auditor-General and Department of the Army**

A section of the Report (1969 paragraphs 41 to 305) deals with Departments and Services and includes comment on various aspects of matters associated with departmental activities. In relation to the Department of the Army, apart from routine observations and explanation of variations in expenditure as between 1967/68 and 1968/69, there were two significant observations, one in regard to the propriety of certificates and certifying receipt vouchers and the other in regard to the inadequacy of stores delivered to the Army.

In the first instance, a contract was arranged by the Department of Supply in December 1968 for the supply of 200 utility trucks to the Department of the Army. An inspection certificate for 200 vehicles and vouchers certifying receipt of the 200 vehicles were dated 13 June 1969 and 18 June 1969 respectively. Payment to the contractor of $629,405, being the full contract price including delivery charges, was authorised by the Department of the Army on 24 June 1969 and payment was effected on 25 June 1969. According to Audit enquiries and examination of records at the Depot, the vehicles did not commence to arrive until early in July 1969. Deliveries continued progressively until all vehicles were eventually received. (If the payment had not been made prior to 30 June,
the funds available under the Appropriation would have lapsed at that date in conformity with section 36(1) of the Audit Act.

It appeared to the Office of the Auditor-General that the payment for the vehicles prior to delivery was contrary to the provisions of the Audit Act, and the Army Department's advice was sought on aspects concerning the propriety of certificates which formed the basis of the transaction. The Army subsequently assembled a Court of Enquiry to investigate and report on what appeared to be a departure from authorised procedures.

In the second instance, orders for the supply of 170 and 200 amplifiers were placed, in May 1962 and January 1968 respectively, with the representatives of the manufacturer in the USA. A total of 370 amplifiers was shipped to Australia. Payments totalling $US405,602 were made to the supplier in April and May 1968.

The Army Department became aware, subsequently, that the amplifiers as supplied were unsuitable for either of the roles for which they were purchased and were not capable of meeting the operational requirements originally specified. The 370 amplifiers, except for a small number undergoing evaluation tests were held in storage at an Army Depot since the latter half of 1968.

At the time of compilation of the Auditor-General's Report, the Army Department had indicated that it was considering a technical report following an investigation as to the feasibility of modifying the amplifiers for use in either role and the probable cost involved.

2.12 Background

The Treasury serves the Treasurer over the whole field of his administration. It works within his powers and performs the duties he gives it. Apart from outlining the general functions of the Treasury, this paper will concern itself only with the relevance of its activities to a normal spending Department such as the Army.
The main functions of the Treasury might be summarised as:

(a) advising on budget policy and priorities;
(b) controlling the public account, including the authorising of expenditure, the collection of revenue and the management of the public debt;
(c) preparing taxation and loan proposals;
(d) administering financial legislation such as that on banking, foreign exchange etc;
(e) prescribing the rules for government accounting.

Some of the functions involve largely routine tasks with minimal decision content, and others involve new policy initiatives in the Treasury's role as adviser to the Government on economic policy. (Function (e) would appear to be the natural prerogative of the Treasury, and as a result one would probably expect the Treasury to show the greatest initiative in promoting changes in the form of government accounting.)

2.13 The Treasury and the Defence Group

The two branches which have the greatest contact with the Defence group of departments are:

(1) Budget and Accounting Branch, with the following relevant functions:

(a) Preparation of the Appropriation Bills and the annual estimates of receipts and expenditure for presentation to Parliament.
(b) Control of the Public Account.
(c) Collection of receipts and authorisation of expenditure.
(d) Accounting for receipts and expenditure.
(e) Preparation of material for the Joint Committee of Public Accounts and follow-up of its reports.
(f) Administration of the Audit Act and its subordinate legislation.
(2) Defence Division, with its functions:

(a) Financial aspects of defence matters including questions of pay and conditions of service of the Defence Forces.

(b) Financial review, budgeting and accounting matters in respect of Departments in the Defence group.

2.14 Commonwealth Sub-Treasuries

Sub-Treasuries are located in all State capitals and it is through them that all receipts and expenditure must be accounted for. Receivers must send to a Sub-Treasury each day a statement of collections paid to the Public Account, and Authorising Officers must send a daily summary of all payments. This information from Departments is processed in the Sub-Treasury and passed to Canberra for the preparation of accounting information. Treasury records are regularly reconciled with Departmental ledgers.

The Sub-Treasury is responsible for the drawing of cheques for payments on behalf of most Departments, for the daily disbursement of all Drawing Accounts, and, when a branch of a Department lacks a full accounting organisation, the Sub-Treasury undertakes certification and/or authorisation of its accounts.

2.15 Preparation of the Budget

By 30th April each year, every Department is required to send to the Treasury estimates of its receipts and expenditure for the forthcoming financial year. These are then discussed between the Department and the Treasury with the objectives of:

(a) ensuring that the purpose for which expenditure proposals have been made either conform to policies approved by Cabinet or that Cabinet approval is to be specifically sought;

(b) ensuring conformity with accepted standards of expenditure on various activities and services; and

(c) ensuring against over-estimating and under-estimating.
"The Treasury does not claim to know as much about the work of individual Departments as they themselves know, but it does have the advantage of a central view of the work of all Departments and of the likely economic consequences of the total budgetary proposals." (108 p.7)

There is a policy on defence and a programme of defence procurement framed basically on strategic and political grounds. When, however, the Government decides that a certain sum is to be included in the Budget for defence, it judges that for the current year a certain amount of the nation's resources ought to be applied to defence as against other competing calls on the nation's resources. In other words, the various other considerations which contribute to the formulation of defence policy are, at this point, measured against financial and economic considerations. Of course the total of all the claims of all the various objects of expenditure have always to be weighed against the claims of the taxpayer to retain the resources which he regards as his own. In relative terms, given the broad aspirations of the society it serves and the level of economic resources that society commands, the Government must make a decision on the most suitable size of the public sector vis-a-vis the private sector. (102)

Despite this portrayal of a benign role on the part of the Treasury, the latter still appears to many people as an all-pervading and interfering agency, but apparently its scope of activities is less than that of its counterpart in the United Kingdom.

2.16 Background

The Commonwealth machinery of government is to a marked degree dependent upon the concept of co-ordination. There are such co-ordinating agencies as the Treasury, the Prime Minister's Department, Department of Defence, the Contracts Board and Department of Works (132). A co-ordinating body of immediate interest is the Public Service Board.
The Board is an agency created by the Parliament to exercise a particular facet of control. Under the provisions of the Public Service Act 1922-1968 the Board shares with each Permanent Head the responsibility for efficiency and economy in his department. As the manager of his Department, the Permanent Head has the primary responsibility for ensuring that its business is carried out "efficiently and economically". At the same time the Board has an overall responsibility to see that high standards of efficiency are observed throughout the Public Service (109). The Board is established as a statutory body, independent of day-to-day ministerial control, and responsible to Parliament for the staffing, pay, conditions, and efficient organisation of the Commonwealth Service.

Having an avowed aim to promote efficiency throughout the Public Service, the Board is a body of considerable interest in the context of this study.

2.17 Public Service Board and the Staffing of the Department of Army

Unlike the civilians working for the United States defence departments, the civilian officers in the Australian defence departments belong to the wider body of the Commonwealth Public Service. Although many Public Service officers spend most if not all of their career within the Defence group of departments, their service can extend across the whole range of Commonwealth departments.

As the controlling body in matters affecting staff such as recruitment and advancement, rates of pay, conditions of service, training and development, the Public Service Board is able to influence standards of staff performance across the whole Public Service. Differences in staff performance between two or more departments should therefore become evident to the Board.

By influencing the civilian element, the Board has indirect influence within many spheres of military activity particularly within headquarters and major formations.
As an illustration, a major Organisation and Methods (O & M) review was completed in 1969/70 by way of an examination of procedures associated with recruitment, reception and movement of enlistees into the Army.

A representative of the Secretary's Branch sits on the Army Establishment Committee whose task it is to recommend to the Military Board changes in the establishment (both military and civilian) of Army units and headquarters.

A Public Service Board representative sat on the tri-service Trade Grouping Sub-Committee, together with representatives of Defence, Navy, Army and Air Force, the previous Department of Labour and National Service and the Treasury, to assist in the determination of pay levels for military employments and trades.

2.18 General Activities

In the interests of "efficiency and effectiveness", the Board has been concerned with the following methods, systems and management techniques:

(a) Introduction of new approaches and concepts aimed at assisting and encouraging departmental managers to achieve accepted objectives in the most "efficient and economical" manner.

(b) The making of individual managers aware of techniques available, training them in their use and encouraging them to apply them when appropriate opportunities arise.

(c) Review of existing work practices in order to detect any inefficiencies and avenues for improvement.

(d) Action to "..... encourage, stimulate and assist departments in the improvement of their own working methods and the application of effective systems and techniques for planning and control of operations, such as network analysis, cost-benefit analysis, and value analysis. In this connection it may be noted that careful consideration is currently being
given to the introduction of program budgeting systems in a number of areas of the Service, and the wider use of management control systems based on the measurement of work performance." (109)

(e) Detailed examination of the organisation, methods and procedures of particular sections of departments, usually in conjunction with departmental staff. Use is made of such techniques as O & M, industrial engineering, operations research, clerical work measurement and other related techniques.

(f) Maintaining a system of information exchange with Departments. Information of techniques is passed on to departmental staff, both managerial and management services, through specialised training courses, through publications such as the Board's Management Services Journal and through the participation of the Board's management services staff in joint exercises within Departments. Liaison is maintained with departmental managerial services staff and periodical reports of their activities are obtained to enable the Board to be aware of work undertaken and results achieved.

Department of Defence

2.19 Background

In November 1957, the Australian Cabinet appointed a sub-committee, with Lieutenant-General Sir Leslie Morshead as its Chairman, to review the organisation of the Defence group of Departments (Department of Navy, Department of Army, Department of Air and the Department of Defence Production), and to advise Cabinet. The Committee submitted a report in December 1957, and a supplementary report in February 1958.

Following its study of this report, Cabinet emphasised the importance of bringing the organisation of all elements in Australian defence more closely together, and referred to the need for promoting a growing integration of
outlook and ideas and for the elimination of wasteful duplication. To this end Cabinet directed that the Minister and the Department of Defence should have clear authority in the whole field of defence, and, in particular, paramount responsibility and final authority to secure the elimination of overlapping, the co-ordination of activities and the development of common services in the Defence group of departments and in the Armed Services. (136)

2.20 The Defence Vote

The Defence Vote is the amount of money provided annually for the operations of the five departments of the Defence Group (plus miscellaneous elements) including the Government contribution to the Defence Forces Retirement Benefit Fund and interest on credit purchases from the United States. Funds for Defence are provided at present by two separate means, that is:

(a) money voted by Parliament (i.e. from appropriations); and

(b) loans from the United States for the purchase of Defence equipment (i.e. through the Loan (Defence) Act 1966).

The overall Defence Vote stems from the Defence Programme, an integral part of which is the Army Programme.

2.21 Defence Administration Committee

Department of Defence has prescribed rules for the control of the Defence Programme such as a strict limitation on variations being made within approved allotments. In most cases proposed transfers within the Programme must be considered by the Defence Administration Committee (comprising the Permanent Heads of Departments in the Defence Group and Deputy Chiefs of Staff of the three Services plus a Treasury representative) and the reports of this Committee are submitted to the Minister for Defence for approval. One of the main objectives of the Committee is to see that such over- or under-provisioning which arises in the Departments' programmes is applied in accordance with priority requirements on a Defence Group basis. Thus where
one Service seeks to make a transfer of allotments to cater for a new requirement, the funds proposed to be used may eventually be allocated to meet a higher priority of one of the other Defence Group Departments.

Treasury has its rules relating to control of the Estimates, and to some extent Treasury requirements are met by the examination of proposals in the Department of Defence machinery; but nevertheless there are specific procedures to be followed in presenting initial and revised estimates to Treasury and in seeking to obtain additional funds under particular vote headings. In almost all cases, these additional funds must be offset by specific savings under vote headings.

The Government financial cuts in 1970/71 provided a good example of the co-ordinating role of the Department of Defence. The Government indicated the order of cuts expected in the Defence Group as a whole. After Departmental decisions of where cuts could best be made were presented to the Department of Defence, the latter decided the extent of each Department's actual reduction, based on the individual needs of the Services and the priority of expenditure, all within the overall Defence Group cut in expenditure.

Further reference to the part played by the Department of Defence in the programming and control of expenditure will be made later, particularly when dealing with the compilation of the Annual Estimates and the Defence Five Year Rolling Program.

2.22 Variation to the Programme

The Programme is reviewed by the Government annually at the time of the Budget, with reference particularly to the money to be provided for each Service in the ensuing financial year, and at other times, when policy changes may be under consideration.

As time goes on, any variations in actual authorisation or expenditure from the planned figures shown in the Programme Statements will indicate that either:
(a) more or less is actually being done than was originally planned; or

(b) the physical plan is being adhered to, but some unforeseeable factor has upset the financial pattern (e.g. cost variations, pay rises, delays in delivery of equipment etc.) or

(c) the physical plan is being adhered to, but the original financial estimates were faulty.

Small variations are to be expected in any planning over a long period. However, it would be normal to expect that the financial allotments in some categories will be deficient, and in others will be excessive, balancing one another off.

The Minister for Defence, and to a limited extent certain officers of the Defence Department, have authority to amend the Programme approved by the Government. The policy is followed of requiring requests for extra money in one category of a Service's Programme to be accompanied by a corresponding reduction in another category. A request for an increase in the total of the funds allotment approved by Cabinet for a Service, is regarded as a major change in the Programme, and requires substantial justification, as it usually would imply introduction of some item or items not originally planned in the Programme.

Extra funds for unforeseeable factors as basic wage or margins increases can usually be obtained with less difficulty, as they are essential to enable the achievement of the physical plans originally approved by the Government.

2.23 Concluding Comments

The Army like the other two Services is subject to a high degree of civilian control. The pre-eminence of the bureaucratic element in our higher defence organisation was pointed out by Beddie. (62). (Although he referred to the Defence Committee as it once existed, his remarks could well apply to the newer Defence Administration Committee. The far reaching powers of this Committee, on which only three of nine members are Service persons, may be judged from its Charter.)
"No one would any longer question the necessity of strong financial controls or of a civilian co-ordinating department within a defence establishment. It is, however, questionable whether the present extent of Treasury control and the dominant position of the Department of Defence have not gone so far in Australia as to prejudice genuine co-ordination and initiative in defence policy. While Treasury, as a Department, cannot be made responsible for the holding of defence expenditure at a fixed figure, it is probably true to say that its presence within defence deliberations has contributed to this policy."

(62 p. 138)

It can be argued, however, that Treasury and other civilian control, whilst possibly damaging to Defence initiative, is an essential element of the "control of the military" in a Western-styled democracy. It is what the Constitution, the elected Government and the people want.

It may be however, that the present state of control - of the manner in which the control is exercised - and the civilian constraints on defence initiative are not necessarily what the electorate wants if it were properly informed. This is probably what a number of political scientists, political economists and journalists are attempting to do - inform the public more adequately.

All the tendencies within Government and the Public Service point towards a more reasonable and realistic interpretation of the control Treasury should exert. The more expert and experienced the officials in the Department of Defence become, the less will be the requirement for stringent oversighting by Treasury and even other agencies such as the Auditor-General and the Parliamentary Accounts Committee. The emergence of ideas associated with planning-programming-budgeting systems (PPBS) must shift the emphasis away from input to output consideration; the systematic analysis of alternative expenditure proposals prior to their reaching the Treasury must engender a greater degree of confidence in any proposal emanating from a PPBS - practising department. The influence of Fulton (116) in public administration.
recognition that individuals should be held responsible for their performance measured as objectively as possible, for example) means that the individuals who are given responsibility must be given control of the means of discharging it.

Unfortunately progress in these respects will probably be slower in the Service departments than in other departments and especially government instrumentalities. The present dual hierarchy in the Services of military administrators and civilian accounting officers coupled with control by committee within the Department of Defence is, in many respects, incompatible with accountable management. This is a deep issue involving Parliamentary control, ministerial responsibility and the very structure of Defence management.
3.1 General

It is not only at the higher policy levels but also at the operational level that the control of public expenditure is important. As in all Commonwealth departments any consideration of the control of expenditure within the Department of the Army appears inseparable from a consideration of the responsibilities of the Permanent Head, namely the Secretary of the Department of Army. Whilst this would be accepted without question in an all-civilian department, the existence of a Service Chief in the Army, namely the Chief of the General Staff, and a Military Board, raises problems and questions of relationships which normally demand clarification.

3.2 The Minister for the Army

The Minister for the Army administers the Defence Act and other enactments in relation to the organisation and control of the Military Forces. The authority to approve of all Departmental expenditure is under the provisions of the Audit Act vested in the Minister. The Minister is authorised to delegate this authority to such extent and to such officers within his Department as he may approve. The exercise of this authority by the Minister or his delegate is an essential pre-requisite to any financial commitment irrespective of approvals given by Cabinet, by a Defence Programme or in the Annual Estimates. Delegations are made as wide and as far down the organisation as is possible, consistent with the detailed public accountability of the Minister for every facet of Department policy.

3.3 The Military Board

Section 28 of the Defence Act states: "The Governor-General may constitute a Board of Administration for the Military Forces to be called the Military Board." The Board is charged with the control and administration of all matters relating to the Military Forces, in accordance with the policy directed by the Minister.
The composition of the Board (at May 1971) was as follows:
The Minister of State for the Army
The Chief of the General Staff (senior Service officer in the Army)
The Adjutant-General (Personnel etc. functions)
The Quartermaster General (Transport, Quartering, Works etc. functions)
The Master-General of the Ordnance (Equipment, Maintenance etc. functions)
The Deputy Chief of the General Staff (Operations etc.)
The Citizen Military Forces Member
The Secretary to the Department of the Army.

3.4 Secretary to the Department of the Army

The responsibilities of Permanent Heads of Australian Commonwealth Departments are set out in the Public Service Act, Section 25(2) which states: "The Permanent Head of the Department shall be responsible for its general working and for all the business thereof, and shall advise the Minister in all matters relating to the Department."

Whilst the provision of the Public Service Act is adequate and appropriate for a normal civil department, there is an inevitable overlap between it, as applied to a Service department, and military regulations.

In an endeavour to clarify the conflicting provisions of the Defence Act and the Public Service Act, the Minister for Defence (Sir Philip McBride), with the approval of the Prime Minister, issued a special directive dated 29th November 1954, outlining the principles which the Government wished to be applied in the administration of Service departments. As a result the Secretary to the Department was made responsible for financial administration and control of expenditure of the Army.

When deciding that the Secretary would become a full member of the Military Board, the Government accepted the British practice that the Permanent Head should additionally be designated as Secretary to the Military Board. As a result the
Military Board with the approval of the Minister created a Military Board Secretariat which is designed to serve the secretarial needs of the Military Board and its committees, and to act as a general co-ordinating office within the headquarters administration. This was modelled on the Army Council Secretariat at the old War Office, and is staffed on an integrated basis by civilian and service officers.

3.5 Extent of Financial Powers of the Secretary

An analysis of the existing army finance administration reveals the basis for the extent to which the Secretary, Department of the Army, or his representative is consulted on all proposals, activities, and policies from the financial viewpoint, including the aspects of economy and merit as well as regularity. Although the Secretary has responsibilities as a member of the Military Board under Australian Regulation 30(e), and has statutory obligations under Section 25(2) of the Commonwealth Public Service Act, the importance to be attached to his (or his representative's) concurrence in an expenditure proposal flows from a directive issued by the Minister for the Army to the Military Board in April 1957.

3.6 Financial System in the Department of the Army

The financial system is basically the same as in all Commonwealth Departments. The important difference is that, along with other Departments of the Defence Group, dual control is exercised by the Departments of Treasury and Defence, Treasury through the normal accounting systems as laid down in the Treasury Manual, and Defence through the Army Programme.

3.7 Existing Army Finance Administration Function

The main activities within this function are as follows:

(1) Programming and Estimating. This involves:
   (a) the preparation of programmes; and
   (b) the provision of estimates for the financial operation of the service.
(2) **Accounting.** This involves the recording of:
(a) warrant authorities and monetary receipts;
(b) allocation of funds;
(c) authorisation for expenditure; and
(d) payments and costing for Treasury and management purposes.

(3) **Control.** Using the programme and estimates with the accounting data given above, this operation:
(a) effects authorisation of funds for control purposes;
(b) influences the course of expenditure to ensure optimum use of funds;
(c) reallocates funds to meet changes of plans; and
(d) examines and certifies accounts.

(4) **Audit.** As approved by the Audit Act and Treasury Regulations, this operation deals with the verification of the receipt, care, custody, and management of moneys and stores.

Pay accounting for service and civilian personnel is not included in the concept of the Finance function. These activities are incorporated in the Services and Civil Personnel functions.

3.9 **Secretary's Branch (Finance Section)**

As a Member of the Military Board, the Secretary to the Department of the Army has vested in him, by Australian Military Regulation 30(e), responsibility for the financial functioning of the Department. Thus the Finance function is the responsibility of the Secretary and in accordance with Regulation 31 he may, as a member of the Military Board allot his duties to subordinates.

The finance organisation at Army Headquarters is briefly set out in Figure 3.1.
Figure 3.1
Finance Organisation at Army Headquarters (as at May 1971)

The Assistant Secretary (Finance and Logistics), through the Finance Section which he controls, is responsible to the Secretary for matters of a financial matter concerning the Department. These include:

(a) Army Estimates and financial elements of the Army Programme.
(b) Financial control.
(c) Financial relations with other Governments and Departments.
(d) Costing.
(e) Cash accounting.
(f) Pay service.
(g) Financial policy.

3.8 Finance Organisation in Commands

"Commands" are the main geographical areas of concentration of Army personnel. There is in each Command, excepting Northern Territory Command, a Command Secretary and a Command Paymaster, and at the Royal Military College, a Finance and Civil Secretary.
A Command Secretary in his Command carries out the responsibilities of the Secretary. He acts as a consultant and adviser to the Commander on matters of financial policy and administration, stores and supplies and administrative procedures within the Command. He may communicate direct with the Secretary on matters of departmental procedure, interpretation of regulations and instructions, and on financial matters, but copies of such communications will be forwarded to the local Commander if he is involved.

A Command Paymaster is responsible for providing a service in respect of military and civilian pay, payment of claims, and collection of moneys due to the Department. The Command Pay Office is designed to provide these services through the following divisions:

(a) Treasury Division,
(b) Australian Military Forces Division, and
(c) Headquarters Division (mainly internal checking).

Briefly the Treasury Division is designed to:
(a) examine and certify claims for payment,
(b) authorise and record the payment of civilian wages and salaries,
(c) control payment and receipt of public moneys, and
(d) record and control the funds appropriated by Parliament for the activities of the Department.

3.9 Cash Office and Unit Level

In each area where there is a large concentration of military units, a Depot Paymaster is appointed to each Cash Office and is responsible for the issue of cash advances to units for the payment of members, payment of claims in accordance with instructions, receipt of public moneys, and general supervision of the observance of technical instructions in units under his technical control.

At the unit level, a Unit Pay Representative (UPR) is appointed by either the Command Paymaster or the Commanding Officer. The UPR is instructed by the Depot Paymaster (or
"Formation" Paymaster as the case may be) in his pay duties and is provided with relevant instructions. A UPR may not assume responsibility for unit Sub-Imprest moneys; this responsibility rests with the military Commanding Officer or an officer appointed by him.

The financial administration and accounting in a unit are the responsibilities of the Commanding Officer, who will ensure, by supervision and check, that any accounting work performed on his behalf is correctly done, and that all financial instructions are strictly followed.

3.10 Information Responsibilities to other Sections of the Army

The Secretary's Branch (Finance Section) is the departmental co-ordinator on all financial matters; it is also the point of contact with other Departments and administrations on matters involving finance. It follows, therefore, that since finance has an impact, direct or indirect, on most day-to-day Army activities, the Finance Section has a responsibility to inform Army Branches and Commands on financial matters affecting their respective activities.

These information responsibilities are:
(a) The extent to which authorisation may be placed, and expenditure incurred, within the limits imposed by the Defence Programme and Parliamentary Appropriations.
(b) Progress statements of authorisations placed and expenditure incurred.
(c) Statement of outstanding liabilities.
(d) Policy decisions and interpretations on matters affecting pay and allowance entitlements.
(e) Financial instructions implementing a new procedure or amending an existing one.
(f) Use and availability of accountable forms.
(g) Cash advances for pay and petty cash.
(h) Banking arrangements.
(i) General advice upon unit accounting and stores procedures, including aspects of security.
3.11 "Branch" and Directorate Inter-Relations and Duties with Regard to Finance

Army Branches, which are the major administrative divisions of Army Headquarters headed by Military Board members, have financial responsibilities. In accordance with Treasury Regulation 48(2), proposals involving expenditure of Public Funds require the prior approval of the Minister, or an officer appointed by the Minister with authority to approve expenditure. Accordingly, Military Board members other than the Citizen Military Force Member and the Secretary, have been delegated to approve financial proposals up to the limit of the funds available, an exception being a limitation imposed on the Quartermaster-General in respect of capital and maintenance works projects. Deputy Board Members, and sub-ordinate Directors and their staffs, have varying but limited delegations to approve expenditure.

The delegations are subject to the financial concurrence of the Secretary, or his representative, the availability of funds, and where necessary, Department of Treasury concurrence. At the Army Headquarters (AHQ) level, the Secretary's Branch concurrence is normally given by a Branch Secretary located in each Branch.

Apart from financial proposals which have been approved at AHQ, and passed to Commands for implementation, Commands themselves hold certain delegations. Command delegations are exercisable subject to the relevant regulations and instructions and the general conditions that the delegate must satisfy himself that funds are available, that there is nothing irregular in the character of the expenditure, and that it is not an allowance or payment to any member of the Australian Military Forces except in accordance with regulations, and does not require Ministerial approval. Before approving of any expenditure, the delegate must also obtain the advice of the Command Secretary, where practicable, on aspects of financial policy involved, and in relation to the regularity of the transaction from the financial viewpoint.
Flowing from their delegations to approve expenditure, Branches have responsibilities to prepare financial Estimates and Army Programme financial requirements, in respect of Votes and Items under their control.

3.12 Office of the Chief Finance Officer

Because of the decentralisation in the expenditure field and the responsibilities vested in spending Directorates and Branches, one of the principal activities of the Finance Section of the Secretary's Branch relates to the reporting of progress of authorisation and expenditure to Departmental committees, e.g. the Estimates Review Committee, and also to other departments e.g. Defence and Treasury. The focal point in this activity is the office of the Chief Finance Officer.

3.13 Accounting Generally

The significant characteristics of government accounting (and therefore Department of the Army accounting in the main) should be noted:

(a) it is a cash accounting system;

(b) each department is allotted a fund in the nature of a temporary, self-liquidating fund which is required to be disbursed by the department within a set period;

(c) there is a discontinuity in transactions by virtue of (b);

(d) a departmental fund assumes the role of the accounting identity;

(e) there is no profit motive in government accounting;

(f) accumulated funds do not take into account assets other than cash or near-cash; and

(g) since there are no asset accounts, depreciation is not recorded in the accounts.

By virtue of the Public Service Act and Treasury Regulations, the responsibility for proper financial management rests with the Department, even though the basic procedures for the receipt and payment of public moneys laid down in the Audit Act and sub-ordinate legislation must be followed.
implicitly, and even though certain departmental officers (such as Certifying and Authorising Officers) have personal statutory responsibilities. There are many areas of financial administration where wide initiative is left with Departments, for example in the planning and operation of procedures for stores accounting, cost accounts and other financial activities subsidiary to the main Treasury accounts. (The Army "pay system" is a unique accounting device. Financial activities peculiar to the Army Department are of course the subject of detailed accounting instructions. In the main however our interest lies in financial activities which are related to the main Treasury accounts.)

Armed Forces Activities

3.14 General

The main finance activities are described in this section to provide further background to any consideration of existing expenditure efficiency and to indicate areas in which greater efficiency might be obtained through improved financial accounting and budgeting.

The Five Year Rolling Programme as introduced into the defence group of Departments in 1971 displaced an earlier Three Year Programme. Whatever the length of the programming period, however, the basic principles of programming remain the same.

3.15 The Defence Programme

The Defence Programme is co-ordinated and controlled by the Minister for, and the Department of, Defence. The Programme represents the collective programmes for a specified period, of the Departments in the Defence group namely Defence, Navy, Army, Air and Supply.

3.16 The Army Programme

The Army Programme is the document which sets out the physical objectives approved by the Government for achievement by the Army. Besides setting out the objectives, it also shows the annual allotments which are expected to be approved and are necessary to carry out the objectives of the Programme. Before
a Programme can be prepared, two necessary considerations must have been decided - first, the "Strategic Basis of Australian Defence Policy", and secondly, the "Composition of the Australian Defence Forces". These must have been approved by the Government. When they are approved, the Services may proceed with the preparation of their Programmes.

3.17 Objectives of the Programme

The objectives of the Army Programme are related to the Forces to be raised and maintained. The organisation and manpower aspect is, therefore, dealt with first. When the type and number of units has been decided, provision is made for equipment and buildings requirements.

The organisation provides for the Regular Field Force, CMF formations, National Service Training (when implemented) and the Regular Army required for the management, maintenance and support of these forces, the latter comprising the Australian Support Area (ASA).

The equipment requirement is related to the field forces and other essential requirements for support and training. The building requirement is directed towards providing barrack accommodation, schools, depots, married quarters, and essential installations for the approved organisation.

3.18 Preparation of the Programme*

When the objectives nominated by the Government are known, the detailed manpower requirements for each element for each year are determined. Against this requirement an allocation of available manpower (soldier or civilian) is made. The soldier strength is based on forecasts given by the Adjutant-General's Branch and more specifically the Directorate of Manning. Priority of manpower allocation is decided in principle at this stage.

* The procedure described was that in force in May 1971.
The General Staff** then issues a directive to all Branches at Army Headquarters (AHQ). This details the organisation which the Programme is to cover and gives the detailed strength forecasts by years for regular soldiers, CMF, National Servicemen, if any, Cadets and Civilians. Branches are required to forward their estimates of expenditure for each year. The Items of Army Estimates, for which each Branch is responsible, are nominated by the General Staff Branch. Branch forecasts are submitted to the Chief Finance Officer whose staff collates all statements. From this point, General Staff and Secretary's Branches are jointly responsible. Forecasts are examined to ensure that bids are reasonable, and sometimes they are arbitrarily reduced after consultation with the Branch to ensure that expenditure will fit within the financial allotment.

3.19 Equipment Requirements

Equipment requirements are of two types:

(a) Maintenance.
(b) Capital.

As the name suggests, maintenance equipment requirements are for day-by-day usage, e.g. Army ammunition, or replacement vehicles. Branches responsible for provision prepare bids based on the organisation to be maintained, stocks already on hand, effect of repair programmes, and whether or not new capital equipment will come to hand during the period.

Capital equipment requirements are the equipment deficiencies for the forces to be raised under the Programme. In May 1971 the Director of Staff Duties was responsible for producing the detailed capital equipment programme. Branches at AHQ responsible for equipment provision advised the Director of Staff Duties of equipment deficiencies, that is the difference between the total of an item on all unit equipment

** The term "General Staff" has in 1972 become dated, but it is a useful term when representing, inter alia, the uniformed or military side of the Army as distinct from the civilian side or Secretary's Branch.
tables less stocks already held or due in from suppliers. These lists were examined to ensure that the equipments were in accord with current equipment policy and adjustments made where necessary. After the adjusted statements were referred to the Directorate responsible for procurement, the deficiencies were costed and an estimate of the spread of expenditure over years was given for each item.

When this information was available to the General Staff, a reasonably exact cost of the deficiencies was known. When the amount of money available was also known, a detailed Capital Items Programme of selected items for the first year was prepared by the Director of Staff Duties. Outline Programmes were prepared for subsequent years. The detailed Capital Items Programme was submitted to the Military Board by the Deputy Chief of the General Staff and the Outline Lists for subsequent years were included as appendices to the Army Programme.

3.20 Programme and Annual Estimates

The Army Programme and Estimates are respectively the authorities for Army development, and the source of moneys to pay the expense necessary to keep the Army in existence. Although very closely related to each other, the Army Programme and Estimates are nevertheless separate entities.

The Army Programme is primarily a list of physical aims for fulfilment over a period of years. As such it is the direct responsibility of the General Staff. On the other hand, the Army Estimates are the listed amounts stated to be required in a particular financial year to implement the physical aims of the Army Programme in that year. As such, the Estimates are the direct responsibility of the Secretary.

It naturally follows that the closest co-operation must exist between the General Staff and Secretary's Branches, for at the stage where Branch forecasts are submitted, General Staff and Secretary's Branches become jointly responsible. At that stage Branch forecasts are jointly examined to ensure that bids are reasonable having regard to the Programme.
The Programme may be designed to cover any period—usually not less than three years. A one-year Programme differs from Annual Estimates in that it takes account not only of expenditure in the year but of the commitments arising during that year which will have to be met in a subsequent year, e.g. a shipbuilding project. Planned Authorisation Allotment is the term given to the commitments side of the financial statements prepared for such a Programme, and Planned Expenditure Allotments are used to describe the expenditure estimated to arise in each year as a result of the planned Authorisations. When a Programme is approved, the Authorisation Allotment is the upper limit to which the Army may incur commitments (i.e. place orders) provided always that the expenditure resulting from these commitments can be met within the approved expenditure allotments for the years concerned. Additionally, expenditure arising in any financial year cannot be met unless provision for it is included in Treasury Estimates (i.e. the Annual Estimates) or in Additional Estimates (usually passed in the second half of each financial year) or provision is made from the Advance to the Treasurer i.e. a lump sum appropriated to the Treasurer to cover unforeseen expenditure not provided for in Departmental estimates.

Changes are inevitably necessary and the Department of Defence has prescribed rules for the control of the Programme, including the normal strict limitation on variations being made within approved allotments.

3.21 Works Requirements

Works requirements consist of building projects. The programmes for these are the responsibility of the Quartermaster-General Branch (specifically the Directorate of Army Works). There are special procedures to be followed for Army Works Programmes. All Commonwealth Departments with building requirements prepare Works Programmes and Army conforms with the common procedures. The Works Programme is finally approved by a Cabinet Sub-Committee known as the Cabinet Committee on Works.
To prepare an Army Works Programme, Commands and Branches are required by Quartermaster-General's Branch early in the year to advise requirements. These are examined and incorporated into a Design List which is in three Parts:

(a) those for which the design work can be completed before the new financial year opens;
(b) those for which the design work cannot be completed before the commencement of the new financial year; and
(c) major projects requiring up to two years for design and which are very expensive. If the estimated cost is over $400,000, separate Cabinet approval is necessary before any work on the project can be commenced.

The Design List is approved by the Military Board, the Minister, and finally the Cabinet Committee on Works. Subsequently, before the beginning of the new financial year, the next year's Works Programme (essentially Part (a) above) is submitted to the Military Board, the Minister, and Cabinet Committee on Works. After approval by these authorities, it becomes the firm Works Programme for the Army and is incorporated into the Army Programme. Work then commences on the Design List for the following year.

3.22 The Army Programme Statements

These set out in broad terms the Army's plans to meet the objectives laid down by the Government. The Programme does this be setting targets/limits:

(a) in physical terms - such as new units to be raised, planned Regular Army and CNF strengths, major equipment purchases etc; and
(b) in financial terms - liabilities to be entered into, and money to be spent.

The complete Army Programme consists of a Narrative describing the Objectives to be achieved, and a series of Annexures concerning financial requirements, strength allocations, equipment proposals, and Works programmes. (The Army Programme
is supported by a Works Programme, a Capital Equipment Programme, a Replacement Programme, and a Repair and Maintenance Programme.) The draft Programme is submitted to the Military Board and the Minister, and is then forwarded to the Department of Defence for submission to the Defence Committee and subsequent presentation to Cabinet for approval, along with the Programmes of other Services and Departments in the Defence group.

Once the Programme has been approved by the Government, its elements become both:

(a) targets to be achieved (strengths to be recruited, equipment to be procured etc); and
(b) limits to be observed (strength ceilings, financial allotments etc).

Any variations in the actual performance, either above or below the targets, will result in a different pattern of development from the one which has been decided upon by the Government.

3.23 The Army Estimates

The Army Estimates are the amounts of money required in one financial year to implement the Army Programme in that year.

Estimates are compiled from "bids" made by Branches at AHQ and in Commands. These are examined by General Staff and Secretary's Branches for conformity with the approved Programme, reasonableness, and priority.

The state of balance between expenditure proposed on "capital" and "maintenance" is examined, as too great a proportion allowed for maintenance could retard progress of capital objectives.

The Draft Estimates are submitted to the Estimates Committee for examination. This is a Military Board Committee and its report is submitted to the Military Board with the Draft Estimates. The Draft Estimates are then submitted to the Minister. If he approves, they are forwarded to the Treasury for examination and incorporation into the Budget papers. A copy is also sent to the Defence Department, showing the proposed Estimates as they concern the Army Programme.
The Estimates are an attachment to the Treasurer's Budget. They are debated in Parliament under the title of the Appropriation Bill, which is of no effect until the Governor-General has issued a Warrant. When this has been given, the Treasury issues Warrant Authority to individual Departments for periods of three, six, nine and finally twelve months. The Warrant Authority controls the rate of expenditure during the year.

3.24 Estimates Cycle

The annual estimates cycle commences with a request to Commands, in March, for Estimates for the forthcoming year. Consolidated bids are considered by the Military Board and submitted to the Treasury in May. In July, Cabinet decides on the amount of the Defence Vote apportioned by the Minister for Defence amongst the Service Departments. Final Estimates are submitted to the Treasury in July. They are considered by Parliament in August under the Appropriation Bill. Additional Appropriations if necessary are sought in the form of Additional Estimates in March of each year.

The part played by the Finance function in the preparation of Army Programme financial statements and Draft Estimates is principally one of co-ordination in collaboration with General Staff Branch. Briefly, Army Branches and Directorates formulate financial proposals under Votes and Items previously designated as their respective responsibilities by the Military Board. In this sense, the Military Board invests the Secretary's Branch with the responsibility of also preparing Draft Estimates for a number of Votes and Items, the principal one affecting the Finance function being "Australian Military Forces (AMF) Pay and Allowances in the Nature of Pay".

3.25 Estimates Items

Estimates are commonly grouped into three sections: Personnel maintenance; general maintenance; and capital.

These are in part self-explanatory. The grouping of the items under Maintenance and Capital is to show how much money is going into real expansion as distinct from what is spent to maintain the existing Army at its current level of equipment etc.
Personnel maintenance covers Army pay and allowances, civilian salaries and wages, and general services items of expenditure on Army personnel, civilians and school cadets, including payments to the United States for maintenance of the Australian Force Vietnam (AFV) (Army Component). Generally, expenditure on these items is taken up in the books of account in the same year as the commitment is incurred. For this reason, it is possible to make direct comparisons in requirements between one year and another taking into account such factors as strengths, cost variations and changes in levels of activities.

General maintenance covers replacement and repair of equipment (including purchase of equipment in Australia for the Army component of the AFV), repair and maintenance of buildings, and rent. General maintenance items have been segregated from personnel maintenance, not because they are of secondary importance, but because fluctuations in expenditure on these items are not so readily attributable to variations in strengths of the Forces. Taking equipment maintenance as an example, expenditure is dependent upon the rate of delivery of the equipment and the bulk of the expenditure in any one financial year is produced from orders placed in previous years. Increased training activities necessary to prepare units and individuals for service in Vietnam between say 1965 and 1972 created conditions which have resulted in a greatly accelerated usage of equipment.

As a further example, variations in strengths have little effect on expenditure on maintenance of buildings and works. The estimate for this item is based on surveys by the Department of Works and an assessment by that Department of the amount of work which should be undertaken in a financial year.

Capital covers arms, armament and equipment, acquisitions, buildings and works, and advances for State Housing.

Expenditure on capital items of equipment is related primarily to commitments entered into in previous years and the scope for variations is limited accordingly. Items are
essentially of a long lead time nature and it is this factor which dictates that the pattern of early ordering must be maintained if the needs of the expanding Army are to be met.

Expenditure on acquisitions, new works and housing falls in accordance with the approved pattern of authorisation and there is no way of justifying an estimate by simple comparison with the previous year's expenditure.

3.26 Review of Expenditure within the Department of the Army

The progress of expenditure during the financial year is reviewed by the Army Headquarters Estimates Committee every month from November to June of each financial year. This Committee reports to the Military Board, drawing attention to variations in expenditure from expected trends. These usually indicate a variation in the physical progress towards the approved objectives of the Programme and/or a possible change in costs of an item.

3.27 Financial Control

"Expenditure" means a cash payment from public funds. Most payments are made by cheque from Command Pay Officers, and the drawing of cheques is strictly controlled by procedures laid down by the Audit Act and Treasury Regulations. In particular, a payment of cash may be made only where money is available from funds "appropriated" by Parliament for that category of expenditure in the financial year concerned. There has to be, therefore, strict control on the progressive total of payments made in each category of expenditure.

"Authorisations" means commitments entered into which will ultimately involve payments of money. The simple example of this is the letting of a contract for the provision of equipment to the Army. At this time, the Government is legally committed to making payment for the equipment, provided of course the contractor performs his part of the contract. The payment may fall due on a financial year following that in which the contract is let.
The significance of these two definitions is that they indicate the two points at which financial control is exercised:

(a) at the point at which a legal liability to pay out public money is being entered into; and
(b) at the point at which a cash payment is to be made.

The first control is the reason for a funds certificate being required on a procurement demand before a contract is let. Commitments cleared for "authorisation" in this way are recorded and their progressive total checked continuously against the allotment for "authorisation".

3.28 Army Estimates Committees

It is important to note that Estimates Committees within the Army, Department of Defence and, of course, the Treasury are concerned only with expenditure. The means of creating the expenditure, namely by authorisation (including outstandings which are merely consolidated authorisations at a point in time) are not normally considered. Authorisations must, however, be adjusted to conform to the overall expenditure allotments and Defence approval is required to do this. An excessive build-up of outstandings, thereby committing the Commonwealth to increased expenditure in the future, is not normally permitted.

3.29 Audit

The internal audit organisation is responsible for providing an assurance to the Permanent Head (and through him the Minister) that the Department's accounting and internal controls are effective. Internal audit is aimed at inducing accuracy and "efficiency" in the financial field by means of systematically planned checks and examinations. It does not exist for the sole purpose of detecting errors, omissions and fraud. Internal audit has the ability to give assistance to lower levels of management by pointing out defects on the spot,
and by mutual agreement, ensuring prompt rectification. Only where serious matters of principle are involved and where mutual agreement cannot be reached as to the means of rectification is it necessary to report to higher management.

More generally, the Audit activity is concerned with watching for, and bringing to the notice of the Chief Finance Officer, avenues for improving financial control with the "object of increasing efficiency and attaining maximum economy".

The Audit activity embraces the direction from Army Headquarters of Army Audit Staff in Commands plus internal checking functions in Command Pay Offices performed by personnel within that organisation.

Commonwealth Audit staff have a higher responsibility of reporting the state of accounts to the Auditor-General, who in turn reports direct to Parliament.

3.30 Costing

Some cost information is collected in the Budget section at Army Headquarters for forecasting costs of plans and proposals, for determining charges to be made for such things as attendance of overseas students at Army Schools, and for control and management purposes.

The present system of Treasury accounting answers the question of upon which type of expenditure the Department has spent its money. But apart from ad hoc costing arrangements the Department has not instituted any costing procedures which could answer for which purpose (projects etc.) the money has been spent or in respect of what units the expenditure has been increased.

The Army (since September 1970) has availed itself of the Treasury Automatic Data Process (ADP) Appropriation/Revenue and Commitment Control System, and this system is capable of providing data, when fully exploited, for future development in the fields of costing and forecasting.

The transfer of the Appropriation Ledger and Liabilities Register to the Treasury system commenced in the General Accounts Office of Army Headquarters on the 1st September 1970. Command Pay Offices were absorbed at monthly intervals from that date.
Chapter 4

Efficiency in a Military Environment

4.1 General

The financial environment both beyond and within the Department of the Army has been described, at least in its essentials, in the preceding two chapters. In order to attempt to isolate economic efficiency criteria which are suitable and relevant in the military financial sphere, it is necessary to explore the meaning of "efficiency" and to distinguish between the various interpretations placed upon the word.

This chapter will look first at the distinction between "efficiency" and "effectiveness"; secondly, at economic versus engineering and technical efficiency; thirdly, at efficiency in relation to the concept of optimality in the allocation of resources; and fourthly, at a number of general approaches to the application of efficiency criteria in the military environment and in the broader field of government expenditure.

The exercise of defining and explaining the meaning of "efficiency" has been undertaken by a large number of writers in many disciplines - economics, engineering, sociology. It is therefore a formidable task to contribute something original by way of finer definition or better explanation; the most that one can do is remove the ambiguity associated with the work and leave no doubt as to what is meant by the use of the term "efficiency" in the context of the particular study.

Such clarification paves the way for the isolation of possible efficiency criteria against which new administrative measures or financial planning devices can be judged.

4.2 Effectiveness versus Efficiency

In a United States Air Force official publication (121), the distinction between the two items is very simply stated. In relation to resource management and budgeting it stresses that to budget for and know the cost of resources may improve both the effectiveness (doing the right thing) and the efficiency (doing the thing right) of resource use.
Such a simple statement is not meant to ignore the fact that the effectiveness versus efficiency question is a very important conceptual theme throughout the whole study of organisational theory and management (20 p.23). Any treatment of organisation and management is concerned with criteria for both effectiveness - the accomplishment of or the approach to the goals established - and efficiency - the most efficient use of human and material resources. However, this is little different from defining an effective organisation as one which "does the thing right".

Effectiveness depends on the capacity of the organisation to cover the performance of all necessary activities, while efficiency depends on proper co-ordination and control to ensure that the level of operations is at a requisite optimum: "that targets are achieved within reasonable approximations". (77 p.197)

The obvious difficulties which emerge are those of measurement of effectiveness and efficiency, both within business organisations and government institutions. Even if systems are judged to be effective by some superficial external criteria, the question of efficiency looms large in the minds of managers and administrators. For business organisations an absolute measure of long run efficiency in a competitive environment is actual survival. But in the short run there may be considerable variation in efficiency among surviving firms. For government institutions there is generally no question of survival, but with the assumption of some degree of official dedication there is constant internal pressure to improve the efficiency of the use of resources in the face of budgetary constraints and the consequent need to make decisions concerning competing expenditure proposals. In this respect the military administrator who attempts to keep the military machine as operationally viable as he can, even when starved for funds, is little different from the forestry administrator who endeavours to save his forests from the disaster of fire even when denied the funds to maintain adequate fire-fighting equipment.
Following Etzioni (12), effectiveness is broadly defined to refer to the degree of success an organisation enjoys in doing whatever it is trying to do, in short, its degree of success in goal achievement. The efficiency of an organisation may be defined in terms of its capacity to achieve results with a given expenditure of resources, in short, the ratio between organisational inputs and outputs. The two terms are related but need not always coincide, and an organisation's attempts to husband its resources in the interests of efficiency may seriously limit its effectiveness. The striking example of this in the military sphere is the zeal of which both civilian and uniformed administrators strive for functional efficiency in the discharge of peacetime day-to-day workloads whilst ignoring the impact of efficiency measures on the operational effectiveness of the Army in a war or minor operational commitment. The taxpayer or public administrator who wants value for money in peace (in terms of narrow efficiency criteria) can but rail at his shortsightedness when an ill-equipped and under-manned Army fails on the battlefield. It is not proposed to elaborate on this theme at this stage, and two small illustrations may suffice. Training all senior officers of the Army to be good financial administrators, skilled in the art of negotiation with officials of other departments, treading cautious paths through financial regulations and policies is undoubtedly poor preparation for the commanders who must be prepared to make instant decisions in the heat of the battlefield where the quality of decisiveness is more important than the quality of financial acumen. Initiative training of soldiers such as is involved in desert expeditions, mountain climbing, may be financially unattractive, particularly when public resources are used, but it is considered to be an excellent method of preparing soldiers (of the right age, medical standard and military skill) for operational situations in which there is a high demand for the exercise of initiative and bravery.
4.3 Economic versus Engineering and Technical Efficiency

The production of a given product (thus indicating a degree of effectiveness in the sense that an organisation goal had been achieved) may be accomplished in various ways.

The best process from a technical efficiency viewpoint is the one that uses the fewest physical inputs to achieve the given product.

The best process from an economic efficiency viewpoint is the one in which the inputs, to achieve the same given product, are the least costly.

Technical efficiency is a broader concept than engineering efficiency. In the classical example, an engineer may judge the efficiency of a steam engine according to the percentage of the potential energy in the fuel that is actually converted into work done by the machine. The particular engineer might not be so concerned with the amount of lubricant used, the trouble taken to purify the water prior to use, the maintenance effort involved in keeping the machine going - he is concerned with how much fuel is required to produce a given amount of work. A dramatic change in the price of fuel, thus rendering the particular method of energy production quite uneconomic in comparison with other methods, might pass this engineer completely by unless the accountant draws the fact to his attention. Thus technical efficiency concerns the quantities of all factors of production used; engineering efficiency concentrates on just one factor, and economic efficiency concerns the costs of all factors.

Economic efficiency makes the choice of method of production depend upon the relative prices of factors. For a number of technical possibilities, the economically efficient possibility will be obtained by substituting cheaper factors of production for more expensive ones until no further substitutions are possible.

Relative factor prices, as a generalisation, reflect the relative scarcities, in relation to demand, of different factors of production. This generalisation ignores the facts that private cost is not always the same as social or public cost and current scarcity may bear no relation to future scarcity.
This general theory of factor pricing and factor combinations by firms (striving for economic efficiency) helps to explain the widely differing productive processes to be found in countries which are differently endowed with factors of production. It explains the different methods of construction of, say, earth dams in India with its abundant labour, or in the United States with its relative scarcity of manual labour. Carrying the analogy into warfare, it explains why the means of waging war adopted by North Vietnam is labour intensive.

4.4 Military Production Function

Temporarily leaving aside the question of costs, efficiency in the most accepted sense is concerned with ratios of inputs and outputs in the production process. In the military sphere it is conceptually useful to treat certain objectives as desired outputs, and the resources required to attain these objectives as the desired inputs, thereby obtaining as it were a "military production function", or series of production functions which may then be used to obtain the desired choice of technique (78). Defence outputs are typically of an intermediate product kind such as ships, tanks and aircraft - the visible evidence of military worth - and a final, generally intangible, kind such as the achievement of particular national security objectives in terms of surveillance, deterrence, or the capture of enemy territory. Typical defence inputs are men, materials and services.

If costs are re-introduced it may be seen that the costing of inputs is relatively simple, particularly in the aggregate and not when required in some itemised form by activity or function. Values are ascertainable in terms of market prices or opportunity cost.

It is on the output side that the difficulties in analysis are presented, most stemming from the uniqueness of defence as a public good. Additional difficulties are as follows: (78 p.6)
(a) First, indivisibilities present in both the intermediate output and the final output create difficulties for economic calculus. Presumably the indivisibility referred to is both of a physical kind - a $100 million aircraft carrier or cruiser - or of the intangible kind such as the defence of a country, state of island where the defence cannot be measured by the acre or by person. Marginalist analysis, for example, becomes unworkable with such discrete outputs. Marginal increases in threat cannot be matched by marginal increases in intermediate product or output.

(b) Second, intermediate products having alternate uses or joint final products. A Mirage aircraft can contribute to both an air defence capability, destroying other aircraft in the air, and a ground attack capability, that is, assisting friendly ground forces by attacking enemy ground forces.

(c) Third, there is a high degree of uncertainty in the output components. The output or intermediate product is difficult to evaluate because of uncertainties arising from technological progress which is very rapid in the military field and the everchanging nature of the enemy threat. The importance of this uncertainty in evaluation is heightened by the lengthy time period between the application of primary inputs and the resulting outputs. Whilst this is especially the case in the construction of intermediate products for naval and air purposes - the lead time for the construction of the Navy's light destroyers (DDLs) and for the purchase of the Air Force's F111s are cases in point - the time it takes to produce a highly trained senior non-commissioned officer (NCO) in the Army should
not be over-looked. The Warrant Officer artificers who will be required to maintain the sophisticated equipment in the Army twelve to fifteen years from now must be recruited into the Army's Apprentices School or Adult Trade Training Scheme this year.

4.5 Optimality in the Allocation of Resources

Normative economists are always trying to think of ways for the economy as a whole to achieve an "optimal" economic state, that is, a state which would enable society to attain the maximum possible social welfare. It would be quite natural then for a defence analyst to ponder upon the question of the attainment of an "optimal" state of defence in which the community would attain the maximum possible defence for a given resource allocation. The economy as a whole would have the entire resources of the economy at its disposal; the defence sector would have merely that segment of the resources devoted by the nation to defence.

In further explanation, it is generally recognised that there are two approaches to the problem of allocating resources within the defence sphere:

(a) getting the most defence from a given level of resources, the practice most commonly found in Western democracies in peace-time following the arbitrary allocation to defence of a fixed percentage of Gross National Product;

(b) achieving a given level of defence for the least cost - the approach preferred by Robert McNamara, but seldom able to be pursued.

These two approaches have been variously expressed. S.J. Deitchman (10) puts it in this way - if you want your proposals to be considered, submit either a constant-budget unequal performance case that substantiates your proposal in detail, or a constant effectiveness, unequal-budget case. Attributed to the former US Assistant-Secretary of Defence Charles J. Hitch is the definition of economy in defence as getting the most capability out of any given level of resources,
or conversely providing a given level of defence for the least amount of resources. Either way, economy in defence is concerned with the efficient use of resources.

Continuing the analogy between social welfare and defence, any definition of an optimal state of defence would incorporate two premises:

(a) Competing defence objectives have a continuing and legitimate claim on defence resources; insofar as the major defence objectives are made the principle concerns of the three Armed Services the Services must express preference for the allocation of resources in a changing threat environment. An assumption must be made that in a democracy the Service specialists express the defence preferences of the people, at least in a qualitative sense.

(b) Any change in the allocation of resources that increases the nation's ability to satisfy some defence objectives without simultaneously decreasing the ability to satisfy other defence objectives increases the totality of defence.

Whenever resources are allocated so that no feasible reallocation would increase the ability to satisfy at least one defence objective without simultaneously decreasing the ability to satisfy some other objective, the defence administration could be said to be allocating resources "efficiently". This is what is known as a "Pareto-optimal" solution in recognition of Pareto's contribution to welfare economics. "Efficiency" in relation to the concept of optimality in the allocation of resources can be attained by reaching any one of a number of points at which it is impossible to increase one (defence) output without increasing input or decreasing another (defence) output. The military planners' choice of one of a number of optimal or "efficient" points depends upon their expressing a preference for the allocation of resources.
An administration operating at an "inefficient" or non-Pareto-optimal point can always reallocate its resources in a fashion that will increase certain aspects of defence preparedness without simultaneously decreasing other aspects. Any such reallocation, according to the second premise, increases the totality of defence.

The major difficulty arises when one has to measure the ability to satisfy defence objectives; defence preparedness is plagued with emotive considerations both on the civilian and military sides. Value judgements have to be made and this means that in a competitive defence atmosphere, where different factions place different emphasis on certain defence objectives and therefore allow their judgements to be less than objective, there are numerous points depending on the views of the competitors.

Whenever the defence administration moves from one "efficient" point to another, the ability to satisfy some defence objectives will be increased, while the ability to satisfy others will be decreased. The two premises are not an adequate basis for choosing among "efficient" points since they do not tell us how we can compare the gains of the former with the losses of the latter.

This is a rather unsatisfactory conclusion in that there is no firm basis provided for practical decision-making. Decisions on resource allocation between competing defence ends are quite often made arbitrarily, or in response to majority rule of the intensity of expression of preference. Since democratic societies operate on the basis of majority rule, one way to select a single point that corresponds to an optimal state of defence would be to say that such a state corresponds to the "efficient" state that the defence "society" operating under majority rule would select. In other words the defence group collectively orders all the "efficient" points open to it by the rule that any point A is preferred to some other point B whenever A is preferred to B by a majority of the group.
It can be easily shown that majority rule does not always identify a unique optimal choice (50). Even if preferences of individuals in a group are consistent (so that, for example, by preferring X to Y and Y to Z they prefer X to Z) a number of preferred points can be obtained. Inconsistency of preferences makes collective ordering of alternatives even more difficult and unpredictable as to outcome.

Too much concentration on the difficulties surrounding the measurement of output may hide the large scope which exists for ensuring efficient resource use in the public sector. In the last decade or so modern welfare economics has been concerned with developing criteria for more efficient resource use in non-market situations. In addition there have been developed modern tools of analysis which are now freely applicable in the public sector. Techniques such as those encompassed within systems analysis, operations research, cost-benefit analysis and program budgeting enhance the analyst’s ability to quantify output or to adopt a more dynamic approach to output.

Existing allocation of resources and methods of production, when subjected to analysis, may be found wanting from considerations of efficiency. The importance of such inefficiencies depends, however, on their quantitative significance. Sensitivity analysis particularly can assist in the assessment of quantitative significance by revealing how sensitive the allocation is to the movement of major physical or cost parameters. It would not be worthwhile, however, spending time and effort to remove the inefficiencies unless the cost of doing so was more than made up by the gains resulting from their removal.

This is an analogous situation to the one confronting an executive who must make decisions quickly and who may wish for the best but may settle for only satisfactory solutions; often the theoretically best solution may be only slightly better than a number of satisfactory ones. He may deliberately be indifferent to a number of solutions to obviate the need to
spend additional time to find the "best". In fact the cost of refining the decision-making process so that the "best" can be determined is itself a factor in determining the best.

4.6 Efficiency in the Large versus Efficiency in the Small

The two major levels of efficiency consideration - efficiency in the large or macro, and efficiency in the small or micro - have been mentioned previously. It is very convenient in analysing national security or defence problems to distinguish between these two levels. Efficiency in the large, or at relatively high levels involves finding the correct allocations in reference to major objectives - in the case of national security, the allocation of resources between military and non-military uses, and allocations to the separate Services in conformity with national objectives. Efficiency in the small, or at relatively low levels, involves making good use of the resources allocated to each Service activity or element. (89)

The division of the problem into these two levels should not be taken as implying that there are two completely independent types of choices (78). The choices at both levels are highly inter-dependent and act as constraints on one another. The choice of a particular weapons system to meet a designed threat may have very large implications for the whole spending programme and thereby influence the broad budgetary objectives. On the other hand, the amount of resources allocated to the defence sector as a whole through the Budget will act as a serious constraint on the choices open among the various alternatives. Large expenditures on the F111 with possible flow on consequences into jet tankers, the Navy's destroyer programme and a decision to acquire nuclear weapons would be examples of the former, while an arbitrary decision to limit defence expenditure as a certain percentage of Gross National Product is an example of the latter. The decision to limit defence expenditure may not be arbitrary, of course, but may reflect changing priorities in national expenditure.
Analysis confined to lower level contexts which assume decisions given at higher and collateral levels are often called "sub-optimisations". They occur when we simplify the problems of selecting an alternative by completely fixing certain characteristics which might in fact vary. In the language of systems analysis, analysts or decision makers compare alternative courses of action that pertain to a part of the military problem, and the resulting analyses attempt to find optimal solutions to sub-problems. Sub-optimisation at intermediate levels will be carried out on the assumption of given macro-efficiency at higher levels and given technical efficiency at lower levels.

4.7 Military Efficiency

The use of the expression "military efficiency" usually conjures up in people's minds mental pictures of smart uniforms, sparkling parades, spotless barracks, punctuality and good soldierly conduct. Rarely does it automatically switch people's thinking to matters of resource allocation and input-output relationships. Certainly they might think of economy in the use of resources (such as conserving stationery) but rarely of economics. It will probably take a long time to dispel these traditional notions of military efficiency; in fact ideas of what constitute military efficiency are in many instances serious obstructions to the attainment of economic efficiency in a military environment.

Still, there is a discernible shift in military attitudes to what constitutes efficiency and this shift is partially illustrated by the following quotation (141). Jargon aside, it contains a useful expression of ideas:

"...... the advancement of a progressive and imaginative approach toward the management of Army resources. Always sensitive to the public trust involved in the use of public resources, the Army must continue its leadership in the efficient management of the resources entrusted to it. Rapidly expanding management technology and methodology in the field of
resource management offer greatly increased opportunities to enhance the Army's ability to achieve maximum benefit from resources made available. The Army cannot afford waste and inefficiency if it is to justify successfully its requirements to an administration and a Congress faced with an ever increasing number of competitors for available resources."

4.8 **Approach to Efficiency**

In considerations of efficiency, sooner or later the question which is likely to be asked is, does the end justify the means? Is the attainment of objectives regardless of intermediate inefficiencies a desirable goal of military activity? In a business firm, it may be questioned whether short-run maximisation of profits is more acceptable than long-run optimisation of profits. At least two approaches to the attainment of efficiency can be described. One is an outcome-oriented approach in which a model of the organisation is established to simulate its behaviour. The effects of different strategies are studied over time, and comparisons are made at a point in time. The other is a process-oriented approach, in which a model (explicit or implicit) is established which compares salient characteristics of the respective strategies. The strength of the characteristics is determined by the degree of fulfilment of the objectives.

The distinction between the two approaches has been highlighted in politics and budgeting (95). The essence of the first approach is the outcome, not the activity itself but what results from it. Allocations of resources are formally related to preferred outcomes or objectives. Its assumption is exactly contrary to that which underlies the "process" approach, which asserts that if the process is working properly, the outcome will be favourable. Hence there is no need for an explicit examination of outcomes, one can evaluate the process itself to determine its performance and desirability.
The process approach offers a convenient escape from difficult value questions. A decisional system that focuses on the outcomes and objectives of public policy cannot avoid controversy over the ends of government and the definition of the public interest. The advocates of the process approach, after exhaustive bargaining, tend to take the actual distribution of values (and money) as Pareto optimal, that is, as the best that can be achieved without disadvantaging at least one objective. The preferred solution generally becomes the "second best" because the best requires an uncomfortable reappraisal of policy and purpose, with the possibility of upsetting delicate group relationships.

The opposing philosophies of "outcome" and "systems" versus "process" are manifested and easily identified in the Australian political scene, the bureaucracy at work and in the Armed Services. A recognition of the two approaches, and their interplay, are very helpful in a consideration of efficiency in a government department. Of necessity there will be conflict in any major striving towards greater efficiency, because, whilst efficiency may be the goal of the advocates of the two approaches the methods adopted will be different.

4.9 Efficiency Criteria

From what has been written, it is difficult to isolate specific criteria against which departmental activities may be judged. Notions of efficiency in the defence sphere are obviously very much related to the level at which efficiency is to be considered. A very high level and far-ranging condition for efficiency is that the objectives selected by the national leadership be transmitted effectively to the lower levels of decision-making in such a way that lower level decisions will be consistent with the larger objectives (4 p.176). A low level but important condition may concern the delivery of an artillery round on to an enemy target.

Just as macro-economics and micro-economics are conceptually different and yet can never be clearly distinguished, so "efficiency in the large" and "efficiency in the small"
cannot be so isolated as to enable separate criteria to be evolved. Macro-efficiency at one level may be micro-efficiency in a different order of things or in a different context.

What is important is the difference between efficiency (doing a thing right) and effectiveness (doing the right thing), and a recognition that any looseness in the use of the word efficiency, when effectiveness is obviously implied, can lead to difficulties.

The distinction between the three "efficiencies" - economic, technical and engineering is a valuable one if for no other reason than it highlights the fact that there is no necessary connection between them. High engineering efficiency may be attained when considering the use of one physical resource in a particular activity. Low technical efficiency may operate within the same activity when the efficiency consideration is broadened to include all resources. High or low economic efficiency will prevail depending on costs.

In all subsequent deliberations, when "efficiency" is used it will be taken that "economic efficiency" is implied, that is that costs are highly relevant. Any preoccupation with technical or engineering efficiency to the neglect of economic efficiency is therefore generally to be avoided.

Inculcation of an economic efficiency attitude makes one conscious of the dynamic nature of costing and efficiency considerations. Decisions and policies are "right" only at a point in time, because changes in factor prices alter the basis upon which such decisions and policies are deemed to be economically efficient. A statement like "this method of instruction is, and always will be the most efficient" will almost certainly be wrong except in the exceptional circumstance of relative factor prices remaining constant.

4.10 Efficiency in Government Budgeting (Introducing Program Budgeting)

This paper is concerned almost entirely with micro-economic phenomena and with techniques for appraising efficiency in government operations. To this end it touches upon two of the following three principal intellectual derivatives of classical micro-economics (55) as follows:
(a) static efficiency analysis - giving rise to
cost-minimisation via operations research, systems
analysis, cost-benefit analysis etc;
(b) classical public finance - giving rise to
theories of public finance, output budgeting etc;
(c) profit maximising behaviour.
Profit maximising behaviour does not concern us here
(except insofar as some of the concepts of such behaviour are
relevant) but the other two do.

Because static efficiency analysis cannot be conducted
in the absence of an orderly and relevant assembly of statistical
costing information (which implies a prior definition of goals
and objectives), the subject which particularly interests us is
concerned with the form in which budgetary information is
presented to administrators for decision-making and to parliament
for accountability and appraisal. The constitutional side of
public finance has been much concerned with the development of
procedures, offices (such as the Auditor-General) and
parliamentary bodies (like the Public Accounts Committee) which
have been designed primarily to ensure that moneys are spent
legally. They have been much less concerned with whether or
not they are spent efficiently in a broader sense, and Estimates
Committees have been hamstrung in this respect by having to work
with information generated by an accounting framework tailored
to the needs of legal accountability rather than to the needs
of management and the appraisal of economic efficiency.

To fill this need a technique of management accounting
has been developed which is known variously as performance
budgeting, output budgeting, functional costing or program
budgeting. In essence this involves recasting governmental
accounts in such a way that the costs ("inputs") are allocated
as far as possible to specific objectives of policy, and an
attempt is then made to measure the success or failure of the
various activities ("programs") in attaining the objectives, so
that it is possible to appraise cost or allocative effectiveness.
The next two chapters will be concerned with the historical development of output or program budgeting and its application within the Australian defence environment, in particular the Department of the Army. As the most difficult part of output budgeting is not in the costing of the inputs and their attribution to activities but in the measurement of success or failure, a separate chapter will be devoted to the measurement of performance and the selection of performance criteria.
Development of Functional Costing and Allied Techniques

5.1 General

Technical progress moves, and material culture grows, at an exponential rate; it is for this reason that many new developments are seen as discoveries whereas they are simply inventions or innovations which are, for the most part, combinations of old elements and therefore dependent upon principles already known. It is the pace of the growth of knowledge which gives the new development the air of being a discovery.

Functional costing or program budgeting falls into this category. Thus whilst it is easy to look at the historical record of the development of certain accounting techniques within a number of countries, to see when a particular technique was "discovered", it is more meaningful to trace the administrative and conceptual background of the technique. This is an acknowledgement that functional costing and its modern application are derived from managerial accounting principles already expounded and probably already in practice.

It is proposed therefore not only to trace the development of functional costing in two major countries - the United States and the United Kingdom - but also to deal with it on a more generalised basis.

5.2 Modern Management

As long as both business and government were relatively small operations, there was little attention given to formulation of rationale for execution of administration. There is little evidence for example, aside from Roman law and military organisation, of the existence of a formalised theory for administration, management and control of the Roman Empire (80 p.37).

It was not until the Industrial Revolution that such theories began to appear. When private industry for the first time employed large numbers of people assembled in one location
to perform varied tasks in producing commodities, a great deal of thought was concentrated upon systems of administration, organisation and management. There was the great task of co-ordinating and regulating individual and group activity.

The 20th century witnessed two world wars which combined the largest military undertakings ever to take place. The organisation of these military efforts required highly trained manpower to operate the technical equipment. Not only did combat forces have to be well-trained and equipped; the same could be said for the personnel (a large percentage of which was civilian) necessary to supply and care for all related services required by the military. This assemblage of human effort required innovative organising ability and leadership. The pressure for both philosophy and techniques of administration, direction and control of large-scale military and civil operations was the greatest in history. This pressure was met by a new impetus approximating a social movement for improved management.

Since all expended effort, at least in government and large business, must ultimately be related to financial expenditure it might have been expected that some of the most important approaches toward modern theory should have occurred in the fields of accounting and budgeting.

Whilst accounting as an instrument of control and management did appear in very early times its emphasis was, however, to provide advice to insure honest stewardship. It was also thought to encourage thrift if not always efficiency in operations. With this objective to check up on the legality of expenditures and hold down costs, the budget historically was a collection of figures which really constituted a subsidiary of the accounting system. The purpose of having a budget was to establish various appropriation accounts for controlling expenditure and, under that narrow view, accountants (as opposed to financial managers) were eminently qualified to be in charge
of the budgeting. Estimated expenditures were often put together hurriedly without any critical effort to analyse the work results achieved in the past, weigh the spending alternatives and develop improved programs for the future (90 p.68).

Accountants appeared not to take up the challenge presented by the need for improved management. Modern cost accounting was first developed by engineers, who placed emphasis on accuracy of cost and effort expended and the apportionment to work functions. Budgeting techniques were developed by governments striving for improvement in the management of public finances. Until recently, accountants lagged in their recognition of cost accounting as a possible device for administrative planning and control and its ability to add a new dimension to budgeting.

Under modern systems of financial administration, controls against dishonesty are not dispensed with, but responsibility is fixed in the chief executive and other directors, and they are expected to be both efficient and honest. This is reflected very well in the relative emphasis given to accounting and to budgeting. The budget is conceived as a work plan which translates into financial terms carefully made decisions of which public services to provide and at what levels. The purpose of accounting accordingly becomes production of cost and other data which will help measure the results accomplished during the current fiscal year, as well as aid in making work plans and estimates of costs for future periods. Thus accounting is essentially an information system which can make an important contribution to good budgeting.

5.3 Scientific Methodology and the Model Building Approach

Scientific methodology can be applied to problems of financial management in a number of ways which differ in their points of emphasis. However, all share the following general sequence of steps and all imply a quantitative approach in that numerical measurements of one kind or another are given primary emphasis: (94)
(a) Form some explicit view of the objectives of the firm concerned, and translate into specific criteria.

(b) Draw up a list of various activities which are available to the firm and which the management is prepared to consider. This sets the range of the required decisions.

(c) Formulate the model which relates the objective of the undertaking to the variables that influence it (exogenous and endogenous).

(d) Describe any conditions which restrict the values that may be given to the variables. One type of restriction will stem from shortages of resources, others from the relationship between different variables.

(e) Final step in the sequence is to consider possible combinations of values for the variables in the model, subject to the restrictions specified in (d) and choose the set which gives the best result, judged by the selected objective and its criteria.

One difficulty is that there are normally many possible combinations of actions to be considered under step (e), many more than could be evaluated by a trial-and-error process. Several mathematical techniques can be used to deal with this problem. However, the model may be so complex that optimal solutions cannot be derived by methods of calculation presently available.

A greater difficulty is that of formulating a model which adequately describes the relationships involved. An important implication of the process described above is that all the decisions faced by an organisation over a reasonably long period should, ideally, be considered at the same time; in this way, the inter-actions of various activities, for example in their competition for scarce resources, can be considered. To assume the possibility of doing this, however, would be to assume an ideal situation in terms of an organisation's ability
to predict the characteristics of activities available to it, now and in the future. Although important progress has been made towards the use of the model-building approach in solving business-decision problems, there are many difficulties to be overcome before the method can be applied fully in practice. At present many individual activities are necessarily appraised and accepted or rejected, either independently or at least in the context of only a particular section of an organisation's activities. This implies also the use of simple models, in which many of the inter-actions between different variables are ignored.

Despite the difficulties, the proper and restrained use of the model-building approach can do much to improve the quality of decision-making. It forces the explicit consideration of assumptions that have to be made about the values of the various parameters in the model and the relationships between different variables. It may help to identify critical assumptions — those that, if wrong, will affect significantly the outcome of the action — and it may throw light on unsuspected results of particular decisions. It also provides a link with and demonstrates the relevance in business of some of the fundamental concepts of economics which, though simple, are not always appreciated in their application to real problems.

The use of systematic model-building can illuminate the decision process, however uncertain may be the actual values of the relevant parameters, and however shaky the assumptions of a particular model. The essential role of the model is that it imposes a discipline on those who are forming the plan. The model provides a conceptual framework for the exercising of managerial judgment, not a means of replacing it (there is no question of reducing the entire process of decision-making in business to the level of a mechanical process). Rather it replaces a vague, perhaps even unsuspected intuitive model by a clearer more explicit one.
Functional costing and program budgeting systems are derivatives of scientific financial management and more specifically of the model building approach. Seen in this light, they become neither more nor less than more rational methods of accounting for and planning expenditure.

5.4 Functional Organisation

Whilst functional organisation is not a prerequisite for functional costing, the philosophy underlying the former gives a good lead to the derivation of divisions or programs in the latter. The philosophy expounded here is Service-oriented in keeping with the final purpose of this paper.

According to Moulton (33), it is all too easy to reject the idea that institutions must be functionally justified. Institutions direct men's thoughts and efforts and assemble and arrange both human and material resources. To do this objectively, and efficiently, organisation must follow the line of function. It must be clear what each institution is intended to do, and why it is required to do it. For example, the functions of United Kingdom defence might be:

(a) nuclear deterrence;
(b) contribution to defence of the land frontier of Europe;
(c) defence and attack of strategic and trade communications; and
(d) defence of Territories, interests and obligations outside Europe.

It is clear at once that none of these functions is a one-Service responsibility. Each of the Services has a series of functions which overlap with those of other Services, and, if at any time one of the Services focuses itself too intently on any one of its functions to the exclusion of others, the imbalance is immediately reflected in weaknesses and possible failures.
Moulton outlines the functional principle in a series of simple steps:

(a) decide what is to be done;
(b) divide personnel and machinery between the necessary tasks;
(c) tell those in charge what their share is of the available national resources;
(d) give them a free hand, each to perform his task by the most effective and economic means.

The advantages of simple functional organisation are as follows:

(a) it allows simple comparison of costs between functions and between means of performing functions;
(b) parliamentary and other public discussions become more meaningful;
(c) it is easier to know where to lay the blame if things go wrong, or if there is a failure to provide resources and to use them properly.

Some of the known weaknesses of functional organisation are mentioned below:

(a) there is a considerable degree of interchangability between resources employed in different functions, but this flexibility cannot be fully exploited in a pure functional organisation;
(b) techniques and skills are also largely interchangeable between functions;
(c) long established customs, tradition and organisation cannot be simply ignored (as embodied in well-established non-functional organisations).

The aim is therefore to obtain the best of two worlds - organisation by function and traditional organisation. The Moulton formula for a modified functional system is derived as follows. Organisation should be purposeful, and it is known that organisation by traditional elements - land, sea and air -
limits that choice artificially and makes it non-purposeful. The logical substitute is organisation by the main functions of defence - deterrence, land frontier, etc. Traditional organisation has its "function" too, that of providing and caring for the vital human element in defence.

Therefore, a new organisation should provide for traditional as well as operational functions, although the operational functions, being the final instrument of the whole, should have the major voice in control. If traditional organisation is valid, it at least needs a thorough overhaul with some regard to the consistent application of principles and criteria of practical usefulness.

Amalgamation of administrative services, so often advocated, cannot under the traditional system achieve major results. Administrative resources fit properly only the Service for which they are designed, and tend to give that Service their true loyalty and understanding. What individuals learn from experience about other services is dispersed as they are posted elsewhere in their own Service, and the business of progressive development in personnel and technique is neglected.

Under Moulton's modified functional system, the following would apply:

(a) Traditional Services should remain the suppliers of men and material, and advisers on the more limited and technical aspects of their employment.

(b) Separate functional organisations - call them functional services - would be responsible for meeting the functions of defence, and would be empowered to call on the traditional (or parent) Services for what they required for their function.

(c) Demand on the parent Services by the functional Services would be limited by the financial allotment to each functional service.
(d) Subsidiary tasks (subsidiary to main functions) for equipment, weapons etc. would be planned, and switches would take place as accountable acts. A ship or aircraft would be sponsored for its primary purpose, and subsidiary purposes would be taken into account quite possible as a financial transaction between the functional services concerned.

(e) A parent Service for administration would be formed, a step analogous to the gradual development of modern partly-centralised military administration from the ancient system of regimental administration.

(f) Civil defence would be placed under the main function of deterrence.

5.5 Conceptualisation of Main Functions or Objectives

Whether the emphasis be on ex-post analysis of costs as in functional costing or on ex-ante analysis of forward expenditure as in a programming-budgeting system it is necessary to develop a program structure based on the organisation’s main objectives. A methodology for the identification of objectives will be outlined in the next chapter when it is necessary to devise a suitable functional costing system for the Department of the Army, and a separate chapter (Chapter 7) is devoted to the principles or approaches underlying the derivation of programs.

An easy understanding of the concept of a major program can be ascertained however from a study of the approach to program budgeting or functional costing in those countries which have embraced new accounting and budgeting ideas. The identification of major programs or objectives is seen by these countries as an essential step in the application of the theory of functional costing to governmental and business practice.

Functional Costing in the United Kingdom

5.6 The 1919 Experiment
It is apparent that functional costing when introduced in the 1960's was not an entirely new or revolutionary idea in the United Kingdom; rather it was the outgrowth of a number of ideas that were developed over a long period of time to meet the needs of administrations and governments in the more complex issues which were progressively confronting them (130).

As long ago as 1918 the Select Committee on National Expenditure recommended that the Estimates and Accounts should be presented in objective form rather than subjectively (68 p.298). (The "objective" form relates to object of expenditure or output whereas the "subjective" form relates to inputs of resources.) In 1919, the United Kingdom Army Estimates were presented in a form aimed at showing the true cost of each unit and establishment of the Army. The experiment in functional costing lasted from 1919 until 1926 and covered the full range of expenditure administered by the War Office. The experiment was inspired by criticisms of the hitherto-employed subjective system from professional accountants inducted into the War Office during the 1914-18 War. It might be inferred that these accountants had much to do with or at least strongly influenced the methods adopted.

Consequently the Estimates and Accounts of the period convey the impression of intricate and detailed control involving innumerable complicated ledger and voucher transactions. Apart from full details of all ranks and grades serving at the many units administered by the Army, precise assessments were made and actual costs recorded for a host of minor establishments including, for example, the Army School of Pharmacy (annual cost about £1,900) and the Veterinary School (£4,500). Statistical production costs of such items as bread produced in Army bakeries (14s 8.2d per 100lb) and self-generated electricity (3.77d per BTU) were carefully worked out and then meticulously charged up to consumer units in order to provide the fuel costs of the latter.
The system provided, in compliance with normal commercial practice, for the full evaluation of Army assets and stocks. Apparently, however, after six years of the cost accounting trial only 5 per cent of the estimated 100 million pounds of stock had been costed. In addition, the system involved arbitrary allocation of overheads so the results obtained were meaningless for the purposes of control or decision-making.

The Army experiment, which cost 400,000 pounds in its first year and about 250,000 pounds per year thereafter (68) was abandoned in 1926 and the War Office resumed subjective or input accounting.

5.7 "Stickiness" of Input Budgeting

Approximately thirty years after the Army experiment, the Select Committee on Estimates in 1948 (Fourth Report) and again in 1953 (Seventh Report), despite strong Treasury objections mainly on the score of shortage of accounting staff, were still pressing the view that the Estimates and Accounts should be presented to show more clearly the purposes of expenditure. Nor did independent enquiry accept the arguments for objective accounting — in 1947 the question was examined by the Crick Committee which fully endorsed the continuance of the existing system (115). More recently this opinion was confirmed by the Plowden Committee (117), by implication at least, since the Plowden group accepted and approved the revised, but still subjective form of Estimates introduced by the Treasury in 1962.

5.8 The Plowden Report and "Forward Looks"

The Plowden Committee Report emphasised the need for:

(1) the Government to develop and use long-term surveys of expenditure and resources;

(2) major simplification of the form of Estimates;

(3) modernisation and clarification of Exchequer Accounts;

(4) more widespread use of quantitative methods in dealing with public expenditure problems throughout the Public Service;
(5) wider application of mathematical techniques, statistics and accountancy to problems of expenditure.

The Plowden Report added that purposeful "forward looks" depended upon whether it is possible to measure the services provided by different units and to express both services and the cost of providing them in quantitative terms.

The Committee was pressing for reform in forward planning and the use of analysis and quantitative measurement for more effective decision-making in government.

5.9 Functional Costing and the Armed Services

The pioneering of United States-styled program budgeting was done in the Ministry of Defence but under the name of "functional costing". In May 1964, the Minister of Defence, after referring to the difficulties experienced by the Estimates Committee in obtaining certain cost information about overseas military expenditures, stated: "This is really basically due to what I regard as an outdated system of forward estimating. What is wanted is to be able to estimate not simply what a base costs, but what a role costs, what a weapon costs and in the future to be able to take a forward look at what these things will really cost. This is what we are trying to do now in the Ministry of Defence....

..... It is no secret that the far-reaching decisions of 1965 on the RAF aircraft programmes were related to the information provided by the new functional costings." (68 p.303)

The development of functional costing was associated with the integration of the defence supply, administration and planning functions, and it was used extensively in the formulation and review of defence policies. The Ministry's application has been developed and used only for planning defence expenditure. (Estimated input costs have been translated into functional costs under fourteen major headings or programs which follow the United States pattern, being related to "missions" rather than to final objectives.) The application is open-ended in
that there is no costing or control of actual expenditure in terms of these programs for internal management purposes.

5.10 **The Civilian Sector**

In the UK White Paper on "Public Expenditure in 1963–64 and 1967–68", issued in December 1963, the Chancellor of the Exchequer presented forward estimates for the whole of the public sector under major functional headings (the two years 1963/64 and 1967/68 not the intermediate years). The Chancellor reported that surveys of prospective public expenditure in relation to resources were made annually and had become an established part of the Government's machinery for the appraisal and control of public expenditure.

A later White Paper "Public Expenditure: Planning and Control" (February 1966) in presenting the out-turn for 1964/65 and estimates for 1965/66 and 1969/70, stated that the classification of public sector expenditure under "functional blocks" enabled the Government "to consider the development of the various services as a whole, and to decide the priorities between them". The Government used "functional blocks" when it reviewed, late 1967/early January 1968, public expenditure following devaluation of the pound.

In a later report (116) dealing with the structure of departments and the promotion of efficiency, the Fulton Committee recommended that the principles of accountable management should be applied to the work of departments; that wherever possible, measure of achievement should be established in quantitative or financial terms; that individuals should be held responsible for output and costs (this cost accounting to be supplemental to the formal appropriation accounting); and that greater attention be given to planning.

The presentation of public expenditure has been brought into line with modern practices in its planning and discussion by the proposals made in an important Green Paper in 1969 (118). The government proposed to publish towards the end of each calendar year a White Paper which would present to Parliament
systematically and in standard form the results of the government's considerations of the prospect for public expenditure. It would show figures for the financial year preceding publication (for the 1969 White Paper, 1968/69), for the following three years for which the government would have taken decisions (1969/70, 1970/71, 1971/72), and for the following two years (1972/73, 1973/74) which would represent projections of present policies, not decisions. The survey procedure has continued to operate with the annual forward estimates rolled forward one year. It provides the major overall control of public expenditure, with the Annual Parliamentary Estimates being in the nature of a translation of the general survey guidelines into detailed cash appropriations.

"It will be for Parliament to make good use of this new information, in its debates and committee proceedings. The Annual Estimates will of course continue as the final endorsement by Parliament of those parts of public expenditure which the Estimates cover. These proposed changes were accepted and welcomed by the House of Commons Select Committee on Procedure (1969) which also called for the further development of 'output budgeting' relating the results sought to the expenditure incurred." (6 p.127)

5.11 Attitude of the United Kingdom Treasury

The interest of the UK Treasury was aroused in 1966, and it chose the strategy of mounting a series of feasibility studies before attempting to commit Departments to the introduction of program budgeting. This is not to say that the Treasury had not considered the use of an "across-the-board" strategy. It decided that, because of the scarcity of resources and the feeling that there was not much enthusiasm on the part of Departments, the limited feasibility study approach offered the best opportunities.

Studies were made by joint Departmental and Treasury teams in the Home Office (for the Police Force) and in the Department of Education and Science under the name of "output
budgeting". A third study, which went on for some eighteen months, concerned the feasibility of applying program budgeting concepts to overseas representation.

5.12 Summary of the UK Position

The UK like the USA has not made any change in the form of appropriations (from inputs to outputs) and does not contemplate doing so in the near future.

There are no known plans for a change in the Ministry of Defence appropriations to program format. Thinking in the UK is that a program structure is best used as a forecasting and planning tool. There is a decided preference for congruity between appropriation structures and management operations rather than between appropriations and programs. Some costs arbitrarily apportioned to programs may be satisfactory for planning purposes, but program costs cannot always be verified to accounting degrees of accuracy.

The UK approach has departed a great deal from the American model, partly because the UK was building on the foundation of a system which had already considerable merit (proven over time), partly because of the great difference in the organisational structure in the two countries (in legislature and the executive) and partly because of the more pressing need in the UK for staff economy. The UK system does not lend itself to a formal change procedure, which is one of the foundation stones of the American system, nor does the UK have the concept of obligational authority whereby money can be voted in one year for use over the years ahead; the UK adheres strictly to annual budgeting in terms of authority to expend.

A warning has been served (69 p. 92) that, although output budgeting in the UK owes its existence to a small group of "Fulton's amateurs" in the Ministry of Defence who introduced and operated it with a manpower bill of only twenty people, the professionals are belatedly appearing on the scene. It has also been suggested that the commercial accounting approach which doomed the War Office functional experiment of 1919 from the outset is beginning to intrude, with all its implications of massive multi-dimensional cost recording.
The United States of America

5.13 Early History

As was the case with functional costing in the UK, planning-programming-budgeting (PPB) was not an entirely new or revolutionary idea in the USA, but was rather the outgrowth of a number of ideas that were developed over a long period of time to meet the needs of administrators and governments in the more complex issues which were progressively confronting them.

One can go back as far as 1912 to the seeds of discontent with the traditional form of budgeting, when the Taft Commission on Economy and Efficiency stressed the importance of budgeting according to the objects of work to be performed. There was not much done on this recommendation (130).

Experiments with long-range projections of budget expenditures first appeared in the 1946 Budget papers. Arranging accounts so that they revealed the true cost of accomplishing missions had been the goal of early budget reformers, and this was the recommendation of the First Hoover Commission (1947-49). In its recommendations on budgeting and accounting, the Commission said: "The structure we propose is intended to tell the Congress and the public two things: ... what is the money wanted for? ... what do the taxpayers get for it?" (147 p.28). Apparently that relatively simple goal has proven particularly illusive. The Commission also said: "We recommend that the whole budgetary concept of the Federal Government should be re-fashioned by the adoption of a budget based on functions, activities and projects; this we designate a "performance budget"." (79 p.119)

The Second Hoover Commission (1953-55) continued the campaign, but with the gradual substitution of the term "program" (in "program budget", "program classification" and "program costs") in place of "performance". The idea behind this movement was very simple; namely, that any government agency should know what it has done, is doing, or wants to do with the inputs it uses. If such knowledge is obtained, it may then be possible to estimate the costs of doing these functions, activities, or projects, or even to know when — with no increase in costs — there may be an increase in output.
The 1949 National Security Act (possibly the first concrete result of the Hoover Report) directed the segregation of capital and operating costs in the defence budget (42).

5.14 The Development of "Program" Budgeting

Chronologically there was a gap of several years between the bloom of performance budgeting and the first articulated conceptions of program budgeting.

In the aftermath of the first Hoover Report, especially during the early 1950s, there were many writings on the administrative advantages of the performance budget. Substantial interest in program budgeting did not emerge until the mid-1950s when a number of economists began to urge reform of the Federal budget system.

Earlier, however, in 1954 Dr F.C. Mosher proposed "programs" for the Department of the Army. Also in 1954 David Novick advanced the concept of program budgeting in his work at the Rand Corporation (38). (The Rand Corporation followed up the World War II methods studies leading to what was later called Weapons Systems Analysis and to a proposal in 1953 that a program budget be applied to the US Air Force. It also suggested that the methodology could be extended to all military activities.) In 1955, the concept was investigated by Arthur Smithies in one of his publications "The Budgetary Process in the United States" (48). In 1956 David Novick further advanced the idea in another Rand publication "A New Approach to the Military Budget" (35). But what the economists had in mind was not the same as the Hoover Commission's intent. The central idea of the performance budget was that the budget process be focused upon accomplishments to be achieved, work to be done. But from the planning perspective, the all-important thing was not the work or service to be accomplished but the objectives or purposes to be fulfilled by the investment of public funds. "Whereas in performance budgeting, work and activities are treated virtually as ends in themselves, in program budgeting works and services are regarded as intermediate aspects, the process of converting resources into outputs." (42)
The word "program" started to assume a meaning and significance far removed from its origin or previous uses. The use of the word in Washington had originated in World War II, when it was used to describe a combination of activities to meet an end objective. With the War's end, "program" was taken over by the US Bureau of the Budget, but here it dealt with components such as personnel or the training of personnel rather than major objectives. In the same way, "program" was used to lump together related administrative activities, such as procurements of equipment items. In none of these cases was the term "program" used to mean the output or ultimate goal of many inter-dependent activities (e.g. the combination of equipment, people, real estate, and related activities necessary for a military mission such as strategic bombing or continental defence) (37 p.50).

5.15 Early Development in the Department of Defense

Planning-programming-budgeting was initiated in the US Department of Defense in 1961. Program budgeting ideas were brought to the Department in 1961 when Charles Hitch left the Rand Corporation to become Assistant Secretary of Defence and Comptroller. Traditional Budgets were seen to be unable to translate resources into objectives, to project the future resource implications of proposed actions, and to distinguish between one-time investment outlays and recurring, or annual, operating expenses.

Novick himself, whilst working at Rand, had suggested a method for considering resources requirements in military planning, a method called "program budgeting". He proposed the identification of four major mission areas for the Air Force - strategic, defence, tactical, and transportation. He also proposed allocating to each of these mission areas not just equipments but the complete weapon system packages and support system packages necessary for their implementation. Finally, he proposed and demonstrated a new method for developing resource requirements in terms of weapon and support systems packages, so that they could in turn be related to the appropriate major
mission areas and these into a total Air Force posture. Perhaps more important, his resource proposal was a part of a series of Rand developments in the field of weapon system analysis in which a major feature was the concept of evaluating alternatives and tradeoffs with a view to illuminating possible preferred solutions.

It appears that the Rand analysts, motivated by a desire to use cost information in seeking out preferred ways for applying resources to objectives, reinforced the more orthodox economists and politicians, who were seeking a more meaningful budget presentation, in their search for a "functional" or "output" budget.

Dr Mosher early in 1954 (31) had spoken of tailoring budgeting systems and classifications to the requirements of the different purposes they were intended to serve. This meant in effect two different budget systems - one designed for the development, appraisal and authorisation of future policies and programs at top levels, and the other to facilitate external programming, management and control. He proposed as a primary classification for the Army:

- Combat Operations.
- Overseas Non-Combat Operations.
- Active Defence of the USA.
- Operation and Support of Active Forces in the USA.
- Training.
- Mobilisation Reserve.
- Research and Development.
- Construction.
- Services (not directly allocable).

Novick said that this was an improvement but did not go far enough. It did not define those activities into meaningful or complete units, e.g. armoured divisions. It also separated such highly dependent activities as "the operation and support of active forces in the United States" and "training"
from the units which in the end consume either the support or the training. In other words, to be effective the program should be a device for tying together all of the activities which enter into the armoured division as a single unit of performance.

By 1954, Novick envisaged the following form of presenting information as illustrated in Table 5.1 (highly simplified from the original).

Table 5.1
End Program Resource Requirement

<table>
<thead>
<tr>
<th>Resource Elements</th>
<th>One-time Outlays</th>
<th>Recurring Annual Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installations</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Equipment Facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personnel Facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance Facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Mission Equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisation Equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialised Equipment</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Stocks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Stock Level</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Readiness Reserve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Spares</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Elements</td>
<td>One-time Outlays</td>
<td>Recurring Annual Expenditures</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td></td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

Personnel
Training
Pay and Allowances
Travel

Maintenance
Mission Equipment
Support Equipment

Petrol, Oil and Lubricants (POL)
Mission Equipment
Support Equipment

Service and Miscellaneous
Tactical Administration
Superior Administration

<table>
<thead>
<tr>
<th>Total</th>
<th>xxxxxxx</th>
<th>xxxxxxxx</th>
</tr>
</thead>
</table>

Source: Novick, David A New Approach to the Military Budget, Rand Publication No. 1759, June 1956

The important advance in this form of presentation was that it enabled those responsible for budgeting to identify the elements of cost involved in changes in organisation, shifts in equipment, expansion or contraction of the number of, say, squadrons or any variety or combination of changes. This budget structure would identify all the costs in the proposed program, the extent to which past investment would represent operational assets or scrap in the new proposal and perhaps, most importantly, the costs throughout the anticipated life of the program under consideration.
The next two advances in budget presentation were contained in Novick's 1959 Rand publication "The Federal Budget as an Indicator of Government Intentions and the Implications of Intention" (36).

The first was a cross-classification in terms of budget codes or resource elements (or inputs) and the main programs (or missions), activities or elements, as shown in the following table:

Table 5.2
United States Air Force Budget Codes

<table>
<thead>
<tr>
<th></th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>....etc</th>
<th>800</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Mission</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B - 52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B - 47 etc</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Strategic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defence Mission</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F 102</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F 106 etc</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Defence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tactical Mission etc</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td>xxxxxx</td>
</tr>
</tbody>
</table>

The codes were:
- 100 Aircraft Procurement.
- 200 Missile Procurement.
- 300 Construction Procurement.
- 400 Maintenance and Operation.
- 500 Military Personnel.
- 600 Research and Development (R & D).
- 700 Miscellaneous.
- 800 Other Procurement.

It was the second advance in presentation format in 1959 which introduced the important concept of the "Life Cycle Funding Pattern" which is typically shown in the following figure:

**Figure 5.1**
Life Cycle Funding Pattern

An alternative or complementary form of presentation then becomes:

**Table 5.3**
Expenditure by Fiscal Year ($ million)

<table>
<thead>
<tr>
<th>Mission or System</th>
<th>R and D 1960...1968</th>
<th>Investment 1960...1968</th>
<th>Annual Operating 1960...1968</th>
<th>Total 1960...1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B 52</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B 47</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F 102</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F 106</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tactical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Novick insisted (36 p.8) that very often the longer run implications of program intentions - in terms of the "recurring" or "annual operating costs" of the program year after year - are not adequately considered, if considered at all. Yet in many cases the operating cost of the program represents sizeable yearly outlays, and if these recurring costs are summed over the time period the program is to be "in operation" the resulting figure will often dwarf the initial investment cost of the program (and the R & D costs). In fact, when the long run implications of a given program intention are taken into account the result may on occasion lead to a revision of the original intention.

5.16 Program Budgeting and the Civilian Sector

On the 25th August 1965 a Presidential Directive from President Johnson called for the introduction of a new planning-programming-budgeting system (PPBS) into the Federal Government. This Directive followed the apparent success of PPBS within the Department of Defense, and a recognition that "crash programs" were inherently ineffectual for dealing with basic goals in comparison with the planning techniques of PPBS. The President directed that it be adopted by twenty-two agencies. He encouraged its adoption in seventeen others, and in 1967 a further nine agencies were directed to follow suit.

The management job in the Department of Defense resembles the management job in large private business organisations or large civil agencies. It was not surprising therefore that the deficiencies in the budget system as seen by the military were the same as those seen by the civilian sector. All recognised that the major deficiencies of the existing budgets were:
(a) lack of an "end product" or "activity" oriented budget structure or format;
(b) too much of an administrative and/or organisational orientation in the budget structure (an "input" orientation);
(c) too short a span covered by the budget;
(d) insufficient distinction between capital and operating outlays;
(e) budget concepts and language being too complicated.

The typical budget structure did not provide a very meaningful basis for top-level resource allocation decisions or for conveying organisational intentions and their implications.

The PPBS structure which was derived from the defense field and then applied to the civilian sector, has been variously described, but the essential elements are seen to be: (37 p.53)

(a) a program structure in terms of missions, forces and weapon and support systems (or in the civilian sphere, the definition of objectives and related programs expressed in output terms);
(b) the analytical comparison of alternatives;
(c) a continually up-dated five-year force structure and financial program (the costs of programs assessed for several years ahead);
(d) progress reporting to test the validity and administration of the plan (measurement of the effectiveness of program performance).

If it is possible to sum up some of the United States experience of the application of program budgeting in civilian agencies, the following might apply:

(a) Program budgeting has to be tailored to meet the specific needs of individual agencies.
(b) There tends to be a centralising bias, caused by program budgeting being a more highly integrated process of policy making and costing than that form of budgeting which depends entirely on the cost of resource elements.
(c) Program budgeting has a "bonus" benefit in that when the new procedures are being studied in relation to a particular organisation, existing deficiencies in the organisation and decision-making procedures are disclosed (others have described program budgeting as the "back door to re-organisation").

(d) Program budgeting has a co-ordinating effect. The co-ordination of program costs provides useful aggregates devoted to particular purposes.

(e) The US Office of Management and the Budget (formerly the Bureau of the Budget), realising that component analysis is both resource and time-consuming has backed away from "zero-based" (as opposed to incremental) analysis of all programs. It has found that zero-based analyses of major areas of government expenditure are rarely possible on a continuing basis.

(f) The US Office of Management and the Budget has found it necessary to establish a Management Information Systems Staff to examine data needs for budget and management purposes.

(g) In regard to the form of appropriations, the US Congress has resisted any change in budget format and the present "line-items" are expected to continue.

5.17 More Recent Experience in the Department of Defense

When Charles Hitch first took office in 1961, he envisaged the introduction of the program budgeting process over a period of several years. This span was, however, compressed by Robert McNamara, the Secretary Department of Defense who set as an initial objective formulation of the fiscal year 1963 defense budget in terms of major programs and weapon systems.
The "McNamara phenomenon" is well documented and it is not proposed to launch into a detailed account of the McNamara management philosophies and his contribution to the implementation of PPBS in the Department of Defense. Whatever his failings, whatever the influence of the war in Vietnam on his departure from the executive of the US Government, there is no doubt that he has had a very large impact on both defense and civilian financial management. Whilst not necessarily the initiator of new ideas, it was his drive and enthusiasm which promoted them and turned them into reality.

"Left over" from the McNamara period is:

(a) more lucid articulation of objectives (right or wrong);

(b) output-oriented ordering of expenditure, representing an enormous structural improvement;

(c) general principles of cost-effectiveness analysis, unlikely to be swept away;

(d) systematic analysis, the most powerful technique yet devised for improving government decision-making;

(e) radical means for questioning prevailing ideas and methods of procedure (therefore meeting bureaucratic resistance);

(f) psychological contribution - "stirring up the stale mill pond";

(g) doubt whether the same attention will continue to be paid to the long-range program and the accompanying documentation requirements.

As early as July 1969, however, McNamara was being openly criticised even in Service journals (88):

"It is the tragedy of Mr McNamara and of the country that the impeccable management expert failed to manage his most important assignment. The trappings of efficiency were mistaken for its substance. It is analogous to a hospital being administered with a high degree of competence, except for the fact that patients were dying needlessly. So put the blame on the doctors."
Further, from an unknown source (probably a Defense Digest) comes the statement that from the moment in August 1967 when McNamara appeared before the Senate Preparedness Investigating Sub-Committee and, as Secretary of Defense, presented statistical data on the "effectiveness" of US bombing in North Vietnam, Washington observers began to predict that President Johnson would soon find another position for "the exercise of McNamara's talents". McNamara, it had become evident, had broken the tacit covenant between him and the Armed Services - namely, that his well-staffed analytical capabilities be exercised under the constraint that, while providing a new kind of civilian control of procurement and supply activities for the Armed Services, they be not applied fully to the more important decisions on the use of military equipment in combat operations.

After the new Secretary of Defense Melvin Laird assumed control, there emerged from a meeting arranged by him (Airlie House Session of 3 May 1969) the conclusion that PPBS had to be made more workable in the Department of Defense. Officials felt that the Services must have additional flexibility in such things as the choice of weapon system to accomplish a particular mission, and an increased voice, but not the final say, in such things as the assignment of force levels and funding for the accomplishment of a particular mission.

As part of a new defense budget formulation, as from the 4th March 1970 the Services were to receive their fiscal guidance from the Secretary of Defense. This guidance was by major force and support category (by Service) for each of the five fiscal years of the defense plan. It included totals for such mission areas as tactical air, anti-submarine warfare and division forces. (The Secretary used the controversial Office of Systems Analysis in formulating the fiscal guidance totals.) The fiscal guidance reflected the budget constraints imposed by the national economic situation.
The changes in the Department of Defense's PPBS were introduced for Fiscal 1972 budget (Financial Year 1971/72) and the Five Year Defense Program for 1972/77.

While the new system was a far cry from giving the military department a "blank cheque", it did promise to give them a greater voice in decision-making. The military were certainly happy that the Office of the Assistant Secretary of Defence (Systems Analysis) was to revert back to its authorised function of "devil's advocating" rather than "playing God" (81 p.43). One of the main sources of discontent with that office was the constant changing of the PPBS.

5.18 Conclusion

Americans have pioneered many management techniques. The systems they have developed are successful partly because they suit the American business temperament, which is amenable to fairly high discipline. They are not directly transferable to other nations which have different forms of discipline.

Nor should it be taken for granted that because the UK financial structure is suitable for UK conditions, it is suitable for administrations in other countries where quite different conditions might apply.

In tracing the development of program budgeting and financial costing in these two countries it is possible, however, to extract concepts and ideas which are applicable, when modified, to Australian conditions. Certainly Australia can learn from their mistakes, and capitalise on the experience which those countries now possess in the application of financial management techniques.

It appears that US planning-programming-budgeting and the British style of functional costing are both predicated on the primacy of the planning function. Both styles emphasise the usefulness of the new budgeting technique in the role of planning, and both are concerned secondarily with financial control and management. What starts off as frustration with existing line appropriation budget techniques and the emphasis on inputs
instead of outputs, ends up with a system of categorisation of inputs which is highly useful for planning ways of meeting physical and financial objectives.

However, a human tendency towards stinginess of effort invariably tries to create a system which is multi-purpose, and which performs not only one function, that of planning, but several others - accounting control, programming of resources and measurement of performance to test the efficacy of the original allocation. The danger is that the various functions are treated co-equally and that, in devising a system suitable for application in a particular country or department, the relative importance of the functions is not recognised.

The lesson which emerges is a very clear one - the first task in establishing any system is to think out beforehand what the system is meant to accomplish. It must be made quite clear at the outset that a system is not necessarily all-embracing and that there are possible variations in the balance of importance of the various functions of planning, programming and budgeting. Because the word "system" is used and it is a much recognised part of the US expression "PPBS" this does not mean that any Australian attempt to introduce a planning-programming-budgeting system need be along the same lines as the US system.

Of course the balance of functions can alter over time and the functions will assume different relative importance as the system is tried and developed. Measurement of effectiveness of program performance has proved particularly elusive and, although mentioned by the early program budgeting theorists as an essential adjunct to an efficient PPBS, fails to receive the attention devoted to the other functions.

The British functional costing, which in its simplest is a post-analysis of cost of inputs by function or output category, pays very quick dividends in guiding decisions for future allocation of resources. The trappings of the US PPBS -
namely the cost-effectiveness studies, the systematic analysis of alternatives, a more definitive display of activities and elements, cross-walk grids for the conversion of data from a planning to a management and control framework - can be utilised depending on the resources in terms of manpower and money which can be devoted to their exploitation.
Towards Greater Efficiency in the Department of Army

6.1 General

The chapter on efficiency in a military environment (Chapter 4) points to procedures or devices which can be introduced into the Department to attain higher levels of administrative efficiency. The chapter on the development of functional costing and allied techniques (Chapter 5) implies that what we know generally as "program budgeting" provides a financial management system which provides scope for the implementation of new tools and procedures. Whilst this chapter is concerned principally with approaches towards the introduction of program budgeting into the Army, it is mindful of other measures to promote efficiency.

Given the state of the "art" in other countries, it is surprising to the outside observer that the techniques of program budgeting have not already been introduced into Australia to any significant extent. The Department of Defence has embarked on a modest Australian version of a PPBS and Five Year Rolling Programme with the emphasis on the needs of the higher Defence planners, but there has been no attempt to exploit fully the potential of a comprehensive PPBS, a system which extends down to operating units and comprehends a connection between planning and accounting information.

In addition to the Department of Defence, the Post Master General's Department (PMG) and the Council for Scientific and Industrial Research Organisation (CSIRO) have launched program budgeting systems of varying degrees of sophistication without the active participation of the Treasury. Although the Treasury has been aware of and studied program budgeting trends overseas, it has not come out actively for or against its wider immediate application.

The general public, the Government and the Services are normally conscious of the need, when it comes to considerations of military hardware, to keep abreast of
technological development. Technical obsolescence of equipment, whilst necessary sometimes in poorer less-developed countries on grounds of financial capacity, is not readily accepted in the modern armed state. Whilst not aspiring to ownership of nuclear weapons and the various highly sophisticated weapons systems of the United States and the USSR, Australia still manages to equip its armed services with the most modern small arms, radio equipment, helicopters, planes and destroyers. The purchase of such equipment is not necessarily justified on a capacity-to-pay basis, but on the basis or need to keep up-to-date with technical trends. The small peacetime professional force is the custodian of the military skills which might have to be expanded and utilised by a much larger wartime force. The need to keep abreast of managerial developments, however, is not recognised to the same degree. The unfortunate thing is that resisting technical obsolescence in hardware is such an expensive and risky business (e.g. sophisticated aircraft) whilst innovation and utilisation of modern management techniques is relatively inexpensive. It is surprising therefore that the technique of program budgeting is only now being tentatively exploited in the Defence Department when it has been used in one form or another in the United States since 1961, in the United Kingdom since 1964 and in one South-East Asian country (the Philippines) in recent years.

Whilst lack of progress in the program budgeting field in Australia can be put down to inertia or extreme caution, it can also be attributed to the lingering concepts of subject-of-expenditure budgeting (through resource control), incrementalism and cash basis of accounting. These concepts are now expanded upon.

6.2 Resource Control

The "stickiness" of input budgeting ("resource", "input", "subjective") has been previously alluded to. Despite the demonstrated advantages of output budgeting ("functional", "objective"), there is a tendency for all legislatures to adhere to appropriation presentations cast in input or subjects-of-expenditure form.
By subjects-of-expenditure are meant what the money would be spent upon such as personnel, equipment, supplies, telephone service, office rent, travel and other expenses. In the military sphere the traditional inputs are pay and allowances, travelling, equipment and building maintenance, personnel maintenance and supplies generally.

The United Nations Manual for PPB outlines a number of reasons why classification by subject-of-expenditure is still retained as a secondary classification (119). Such classification:

(a) provides a standard basis for classification of items being purchased by all agencies;
(b) furnishes a base for developing estimates of requirements (total);
(c) permits a review of actual and planned purchases;
(d) is useful for developing estimates of requirement under programs and activities (average overheads, personal services etc);
(e) acknowledges that data by subject class is required at the appropriation level to permit development of analysis of the economic impact of government operations (and of course normal legislative review);
(f) provides operating managers with a subsidiary basis of control.

6.3 Incrementalism

The traditional approach is that each individual estimate of public expenditure is drawn up on the basis of those of previous years. These past statements represent so many experiments made, and officials do not deviate from them without special reason. Thus the order or necessity of the various forms of expenditure is not established anew each year, but is gradually revised by the modification of small details and slowly transformed in the light of new requirements which arise in the course of time and to which the available funds must be adapted (97 p.351).
In the military sphere, as in most spheres, creeping incrementalism is encouraged by budget restraint. With the budget pegged in size, with the dollars purchasing an ever-decreasing quantity of military resources, and with the costs of operation, maintenance and personnel rising continuously, there is less opportunity to consider the purchase of entire new systems. The pressing problems are rather to make incremental improvements to systems already in existence so as to continue to exploit those parts of the system already paid for and still able to produce useful service. Much depends on the extent to which past budget appropriations have included large capital sums for new systems.

"Even if technology had not changed between the initial and subsequent incremental allocation of resources, the problem of allocating an increment $T_2$ to a system originally allocated $X_1+Y_1 = T_1$ is not the same as that of allocating $(T_1+T_2)$ ab initio." (42)

Planning-programming-budgeting tries to create a different environment for choice. "The environment of choice under traditional circumstances is incremental, in PPB it is teletic." (42)

A budgeting process which accepts the base and examines only the increment will produce decisions which transfer the present into the future and will provide some small variations. A budget-making process which begins with objectives will require the base to compete on an equal footing with new proposals. The decisions will be more radical than those made under incremental conditions. Now this does not mean that each year's budget will lack continuity with the past. Past events determine, in part, the spectrum of opportunities available now and in the future. (Nevertheless the cost of a resource, purchased in the past and subsequently held in stock, is not a relevant measure of the cost of using it on a current activity. This is the underlying theme of the concept of 'sunk costs' which maintains that the important costs are those which have yet to
be incurred, and money already expended or sunk costs should be ignored when evaluating future alternative courses of action.) However, the effectiveness in measuring relative use of resources should always influence the choice of cost concept.

There is probably a simpler reason for the prevalence of incrementalism. There is often a severe penalty for originating mistakes yet little or no penalty for perpetuating past decisions; subsequently there are strong forces against making "new" decisions except when palpable crises occur. This explains the traditional conservatism in government decision-making.

6.4 Cash Basis of Accounting

A constant criticism of government accounting procedures from a managerial point of view has been the reliance on a cash basis of accounting instead of the accrual basis of the commercial world. The cash basis has been defended in works on the New South Wales accounts by public officials, and in the British Crick (115) and Plowden (117) reports. The accrual basis of accounting is not based on cash transactions but reflects the actual availability and use of resources in relation to the actual services performed. It is clearly needed in any attempt to assess organisational efficiency over the period of time. One United Nations publication claims that performance budgeting is consistent with either cash or accrual accounting (119). However, this seems to be based primarily on the fact that the difference between a cash basis and an accrual basis depends on the type of program under consideration. The difference can be ignored when a particular operation has a high wage and salary content, no inventories and few fixed assets. It is quite possible for accounts to be prepared on a modified accrual basis, with cash accounting maintained in those areas where it makes little difference. The acid test is probably whether control needs to be exercised through spreading appropriations or by use of controls over the use of assets.
6.5 Reasons for Budgets

A government budget is (should be) seen to perform three separate functions:

(a) **Planning**: to facilitate program formulation and rational assessment of priorities.

(b) **Management (or Control)**: to contribute to efficient budget execution.

(c) **Accountability**: to serve the purpose of maintaining financial responsibility especially of the government to the legislature.

Another source sees a budget system serving three main administrative processes. These are attributed by Schick to Robert Anthony (42) as:

(a) **Strategic Planning** - the process of deciding on the objectives of the organisation, on changes in these objectives, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use, and disposition of these resources.

(b) **Management Control** - the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organisation's objectives.

(c) **Operational Control** - the process of assuring that specific tasks are carried out effectively and efficiently.

It appears therefore that every budget system, however rudimentary, comprises planning, management, and control processes.

Budgeting is normally looked at more simply as being either (a) a projection or forecasting of financial results for a future period, or (b) primarily the work of presenting financial proposals to successive reviewing authorities in a manner that will satisfy their technical requirements and their enquiries. These views are inadequate.
It is better to look at budgeting as having to perform certain tasks. A liberal translation from a US Armed Forces source (99) describes these tasks as follows:

(a) **Development of a program plan.** Because budgets are financial expressions of plans for carrying out program missions, budget preparations must usually begin with an assessment of missions, objectives, and programs for achieving them.

(b) **An analysis of required inputs.** Budget tasks encompass consideration of the resources required in order to accomplish a given program.

(c) **Translation into money needed.** In its simplest form this may consist of applying assumptions with regard to price and wage levels to the input quantities determined to be necessary.

(d) **Taking account of fiscal policy constraints.** Priorities must be developed as an aid to reaching intelligent choices in the light of such constraints.

(e) **Budget presentation that is honest and convincing.** There is a need to establish the confidence of subsequent reviewers of the budget - this presentation should reflect the qualities of integrity, fairness and honesty.

(f) **Distribution of available funds among responsible subordinates.** Reliance is usually placed upon the financial management system to enforce, as controls, the amount thus distributed. Revised schedules of input requirements and money needed may be necessitated by changes in original budget proposals.

(g) **Interpretation of interim reports.** The general management of an activity needs to know how effectively the programs are being carried out and how well the available resources are being utilised.
(h) **Initiation of, and leadership in, specialised economising efforts.** The average man's concept of budgeting is closely linked to the saving of money. While "budgeteers" would not concede this to be the most significant purpose of budgeting, it is a purpose. The systematic review of programs and requirements in the regular budget cycle may usefully be supplemented at times by special analyses or campaigns, usually centering around certain elements of cost, such as overtime pay, printing and reproduction, travel etc.

6.6 **Devising a Planning-Programming-Budgeting System (PPBS)**

Three possible approaches to the furtherance of efficiency are considered by Hitch and McKean (17):

(a) The improvement of institutional arrangements within the government to promote efficiency. Extreme proposals have been made which would simulate price and market mechanisms within the government. Less ambitious proposals would improve budgeting and accounting methods, attempt to provide more appropriate incentives, and re-organise the apparatus of decision-making.

(b) Increased reliance on systematic quantitative analysis to determine the most efficient alternative allocations and methods.

(c) Increased recognition and awareness that military decisions, whether they specifically involve budgetary allocations or not, are in one of their important aspects economic decisions; and that unless appropriate alternatives are selected for comparison, and unless an economic criterion is used for choosing the most efficient alternative, military power and national security will suffer.

A well developed PPBS for the Army is seen as such an improvement in institutional arrangement, as well as providing systematic quantitative analysis and stressing the importance of economic criteria in military decision-making.
The development of any new costing or programming system should recognise the peculiarities of the Australian defence environment. We should recognise the difference between Australia's forces, commitments, capabilities and civilian constraints and those of other countries before adopting programming and analytic techniques from abroad.

Significant differences are as follows:

(a) **Size of Australia's Forces**

Australia's forces are not only small in an absolute sense, but require a financial outlay which, as a proportion of central government spending, is small in comparison with that of her two major allies, the United Kingdom and the United States. With smaller forces it is possible to gauge more quickly and more easily the efficiency with which the force is working. There is a much smaller flow of information to sift and the ramifications of intuitive judgments may be seen more readily. The problems of co-ordination and control of a small organisation are fewer, and therefore the program budgeting system, if justified at all, may not need to be as comprehensive.

(b) **Weapon Systems**

In comparison with the USA and the UK, Australia's Services are labour intensive. Australia has not the spectacular weapons system of the two countries mentioned, e.g. Polaris submarines, each of which make its own significant impact in the Defence Budget and even on the economy as a whole. The US "M48" program for development of a new guided torpedo has to date (1971) cost more than three times Australia's annual defence budget. Within a normally constituted and motivated Army, the efficiency of its manpower is relatively stable and predictable, and there are not the wide efficiency discrepancies which can occur in
say, the research and development of a major weapons system. There may not therefore be justification, in the current labour intensive defence force, for elaborate program budgeting techniques.

(c) International Commitments
The USA and the UK have defence commitments which are world-wide, and the commitments must be reflected in the national security objectives and therefore the major defence programs of the countries concerned. Australia's treaty obligations and defence commitments are simpler, being restricted to the South East Asian region. Its defence program is subsequently simpler and although able to be expressed in program budget form, may not require the analysis and information benefits which program budgeting can bestow.

(d) Legislative and Executive System
In the US the chief executive is also the Head of State and Commander-in-Chief. There are powers which are vested in the President which are shared in the UK, Canada and Australia by the Prime Minister and the Sovereign or Sovereign's representative, and even Parliament. It is possible that if the executive systems differ then there is a requirement for different information systems.

(e) Budgetary Systems
Although changes are foreshadowed by the Treasurer, government expenditure in Australia is financed annually by a system of annual estimates. The US obligational financing system allows a situation where 30-40 per cent of this year's expenditure could be financed through unspent authorisation of previous years. For example, of total outlay in 1969 of $186 billion, $131 billion came from
new authority recommended for 1969 (of a total of $201 billion), whilst $55 billion came from authorisations enacted in prior years. This means that Congress is voting not only for expenditure in the next fiscal year but for expenditure for a number of years ahead. In a setting of forward estimates and authorisation, program budgeting becomes more meaningful. If Australia were to adopt widespread program budgeting it might be able to soften the inhibiting restrictions of the annual estimates cycle (whilst hopefully avoiding the loss of control which seems to plague the US system).

After studying the environment in which the new system is to operate and if it is decided that a system may be justified, it is necessary to proceed to a more detailed examination of the form of the system. The United Nations Manual for Programme and Performance Budgeting 1965 is very helpful in laying the basis for such a detailed examination. The Manual advocates a simultaneous development of new budgeting, accounting and performance measurement techniques.

In a recent paper by the author (140) the important activities from the Manual narrative were isolated, and also the apparent dependent relationships of the activities. A network analysis and "critical path" were drawn up.

The network is most useful in indicating, by means of the critical path, the minimum time to introduce a PPBS into a department that is, from the "decision to investigate" to the stage of "system ready for implementation". Time units in weeks were allotted to each activity, based on a limited experience of how long similar activities would take in a government department. The analysis revealed that it would take a minimum period of 41 weeks for the successful introduction of a PPBS into a department.

In retrospect, this time period appears to be too short and would require a degree of dedication to new ideas not usually found in government departments. (The Department of
Defence has already chosen to introduce an evolving system. In other words they have decided that the simplest way to test the new PPB idea is to involve the Services and let the final system emerge on a trial and error basis.)

The following list of important activities indentified in the United Nations Manual contains a number of activities which would be significant in any detailed feasibility study:

(a) appointment of a pilot study group;
(b) recommending the accounting system to be adopted;
(c) appointment of a central installation staff;
(d) appointment of agency representatives;
(e) investigation of changes in structure of financial activities;
(f) issuing of program and activity structure;
(g) approval of a financial management system;
(h) development of accounting data in terms of programs;
(i) selection of meaningful units of performance measurement for measurable activities;
(j) identification of the basis of review of non-measurable operations;
(k) development of a unified reporting system;
(l) preparation of manuals of instruction.

6.7 Objectives and Programs

PPBS in the defence budgeting sphere is a decision-making system that focuses on the outcomes and objectives of defence expenditure. It is a unified long range financial and non-financial plan for the country's defence establishment which requires that planning is in terms of programs, forces and weapon systems rather than in terms of the standard appropriation categories.

As we have seen, planning requires the continual review of objectives and their means of attainment and is assisted in this task by use of cost-effectiveness studies and systems analysis. Programming is the more specific determination of the manpower, material and facilities necessary for accomplishing a program.
Currently there is a difficulty in transposing the conventional budget categories into a meaningful identification of resources required for the major Army objectives. What is proposed is the systematic relation of the expenditure funds to the discharge of these objectives. In other words the budget should be organised around the main functions of the Army, and, as with objectives, projected forward into the future. Budget headings such as Field Force, Training and Reserve Forces will be used rather than such administrative headings as Personnel, Maintenance, etc.

The Army budget can be expressed in terms of the Army's main objectives which are then expressed as programs and sub­programs. Further, techniques of systems analysis and cost­effectiveness can be used to decide priorities within programs. Such a proposal does not exclude the retention of the normal administrative (input) budget for statutory accounting purposes. There would be economies in not operating two classification systems but much depends on whether statutory accounting purpose can be satisfied using program budgeting categories for appropriations. There is at least a case for certain rationalisation of the existing appropriation categories.

PPBS can be viewed as an information system designed particularly to improve the quality and organisation of information for executive decisions. The chief executive authority in the Army, the Military Board, can benefit because of the range and quality of information provided by the budget system, and the early identification of activities which do not contribute to overall objectives of the Army. PPBS forces the asking and answering of hard specific questions about the direction in which the Army is heading and the effectiveness of many of the Army activities.

The introduction of program budgeting and a mechanism to introduce progressive changes into a long­term program structure can partly free program decisions from the annual
budget cycle. Important weapons systems procurement decisions can to a certain extent be taken out of the political arena. Annual budget decisions will make incremental changes to "total obligational authority", rather than major program changes quite often based on issues divorced entirely from national security considerations. An advantage to the Services is the provision of greater stability and confidence in the future. (There is already a means of obtaining additional estimates outside the Annual Estimates, but this is normally for occasions when approved funds are found to be insufficient to meet approved commitments in any financial year.)

Notwithstanding the ideal circumstances of the previous paragraph, to motivate Services in the production of program change proposals, it may be necessary for the Department of Defence to call for annual Services' "shopping lists" approximately halfway through the financial year. This is so that adequate attention can be given to the Services' requests before the annual budget presentation. It is desirable however to strive for progressive and unsolicited program change proposals.

6.8 Implementation

It is inconceivable that the Department of Army could introduce program budgeting in formalised detailed form not in conjunction with the other two Services and the Department of Defence. Without speculating on the form program budgeting should take in the defence group as a whole, it is an interesting theoretical study to apply the budgeting system to the Army in the first instance.

PPBS at the national level relates national security objectives, strategy, forces, resources and costs all projected several years into the future. An individual service enters this decision-making process at the program objective and force level stage as indicated in the following figure:
The decision-making process is cyclical because the budget estimates can influence the formulation of national security objectives which in turn affect strategy, plans and so forth.

The Services are given their objectives (actually there must be certain interplay between the Services and the Department of Defence in formulating these objectives) and it is their responsibility to state what forces and hence what resources are required to meet the objectives, using the agencies of costs and budget estimates. It is the responsibility of the Department of Defence to make recommendations to the Government on the balance of forces and resources to meet objectives at the national, rather than Service, level.

To meet its objectives the Army outlines certain major programs and sub-programs to be followed. The forces required to support these programs are known as program elements. A program element may be defined as any integrated activity—a combination of men, equipment and facilities which constitute an identifiable military capability, e.g. an infantry battalion or ordnance depot.
The resources for each program element are projected over, say, a five year period. Program costs (i.e., the costs of the resources necessary to meet the requirements of the program elements) are generally subdivided into three categories:

(a) **Research and Development (R & D).** R & D represents the cost of bringing a new weapon or capability to the point where it is ready for operational use.

(b) **Initial Investment.** The investment category represents the costs beyond the development phase required to introduce a new capability into operational use.

(c) **Operating Costs.** The operating costs are the annual recurring costs required to man, operate and maintain the capability. (Operating costs can be crucial to the initial decision to produce and deploy one weapon system compared with another.)

This subdivision of costs is more applicable to the large and expensive weapon systems of the US Defense group, but its necessity is becoming more apparent in Australia with the introduction of such weapon systems as the F111 and the guided missile destroyers.

Whether there should be a dynamic and current costing capability throughout the whole Army, or simply an analysis cell which converts the traditional appropriation budget into a program budget, will have to be decided. Possibly there would be a gradual introduction of costing capability as expertise in the area developed.

6.9 **Major Programs**

Having regard for the program structure used by the United States and Canadian forces and the functional costing adopted by the UK, the following major programs for the Australian Military Forces (AMF) would appear to be appropriate.
(a) Field Force (General Purpose Force).
(b) Australian Support Area (ASA).
(c) ASA Training.
(d) Reserve Forces.
(e) Research and Development (R & D).

Because of increasing emphasis on overseas representation and military aid (civil and military) it may be desirable to identify another major program as follows:

(f) Overseas Staff and Aid.

It is timely to introduce the major program of R & D in order to focus attention on this important field and to identify many aspects of R & D which are at present hidden in other programs or sub-programs.

6.10 Sub-Programs and Elements

It is not suggested that the AMF adopt sub-programs and elements identical with the US or the UK or the Canadian system. Regard should be had for the nature, responsibilities and mode of likely employment of Australian forces.

Because of the lack of active formations in the Australian Regular Army, division into sub-programs could be based more on Corps and functional lines rather than on formations or units.

So that costing may at some future date be extended down to the lower costing levels, program elements will eventually have to be identified. The elements suggested are "units" because these are the lowest elements which possess costing capability:

- e.g. battalions of infantry
- batteries of artillery
- squadrons of armour and engineers
- service companies etc.

Consideration could be given to "Task Forces" being costing elements, but the existing Task Forces are flexible in composition and there is too little likelihood of their operating as fixed costing entities in time of peace or counter-insurgency.
6.11 Suggested Programs and Sub-Programs

The following programs and sub-programs are suggested. They are illustrative and meant to demonstrate one of many possible program structures.

(a) FIELD FORCE
   (1) Australia
      (i) Divisional Troops (Forward combat)
      (ii) Army Troops (Reserve or back up)
      (iii) Communications Zone Troops
            (supporting the combat zone)
   (2) Vietnam (illustrative)
      (i) Divisional
      (ii) Army Troops
      (iii) Communications Zone
   (3) Malaysia/Singapore
   (4) Papua/New Guinea

(b) ASA COMMAND AND ADMINISTRATION
   (1) Army Headquarters
   (2) Headquarters of Commands and Military Areas
   (3) Engineers and Survey
   (4) Signals
   (5) Transport
   (6) Medical and Dental
   (7) Supply
   (8) Electrical and Mechanical Engineers
   (9) Miscellaneous
   (10) Personnel on Exchange

(c) AUSTRALIAN SUPPORT AREA (ASA) TRAINING
   (1) Training Installations
      (i) Royal Military College, Duntroon
      (ii) Officer Cadet School, Portsea
      (iii) Army Schools
   (2) Major Exercises
   (3) General
(d) RESERVE FORCES
(1) Citizen Military Forces
(2) Emergency Reserve
(3) School Cadets

(e) RESEARCH AND DEVELOPMENT
(1) Army Design Establishment (ADE)
(2) Design and Inspection Staffs
(3) Units with other Government Departments
(4) Office of the Scientific Advisor
(5) Combat Development

(f) OVERSEAS STAFF AND AID
(1) Australian Army Staff, London
(2) Australian Army Staff, Washington
(3) Military Attaches in Foreign Countries
(4) Army Training Team (Vietnam)

6.12 Classes of Costing

Present appropriation categories for Australian Military Forces could be rationalised and simplified in order to extend cost accounting to lower levels (by functional analysis or some direct costing method). The US cost classes are appropriate and readily absorb the existing AMF appropriation categories, as shown in Figure 6.2:

Figure 6.2
Comparison of Cost Categories

<table>
<thead>
<tr>
<th>Proposed Cost Categories</th>
<th>Present Cost Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Military Personnel</td>
<td>660 Australian Military Forces</td>
</tr>
<tr>
<td></td>
<td>662 Civil Personnel</td>
</tr>
<tr>
<td>Operation and Maintenance</td>
<td>664 Administrative Expenses and General Services</td>
</tr>
<tr>
<td></td>
<td>666 Forces Overseas (other than pay)</td>
</tr>
<tr>
<td></td>
<td>668 Arms and Equipment, Repairs and Maintenance</td>
</tr>
</tbody>
</table>
### Proposed Cost Categories

<table>
<thead>
<tr>
<th>Procurement and Production</th>
<th>Present Cost Categories (By Appropriation Divisional Category)</th>
</tr>
</thead>
<tbody>
<tr>
<td>682 ) Rent</td>
<td>670 Arms, Armament and Equipment</td>
</tr>
<tr>
<td>685 ) Rent</td>
<td></td>
</tr>
</tbody>
</table>

| R & D and Testing and Evaluation | 673 ) Building, Works, |
|                                 | 687 ) Fittings and Furniture                                 |
|                                 | 675 ) Repairs and Maintenance                                |
|                                 | 688 ) Repairs and Maintenance                                |
|                                 | 681 ) Acquisition of Sites                                   |
|                                 | 684 ) Acquisition of Sites                                   |
|                                 | and Buildings                                                |

#### 6.13 The Special Problem of Assets Consideration

The Service Departments, as with most government departments and agencies, operate on a cash basis of accounting. There is usually no attempt to distinguish between current and capital transactions, expenditure on fixed capital assets does not result in the creation of asset accounts, and depreciation is not recorded in the accounts. There is no continuity from one accounting period to the next through the medium of assets, as the accumulated funds of governments do not take account of assets other than cash or near cash.

How then can managers in the Services attain technical or economic efficiency in the use of assets without knowing the value of the assets at their disposal? In asking this question it is not denied that very experienced managers, be they Servicemen or civilians, with a good knowledge of the physical and other assets at their disposal, can by a combination of wisdom, skill and intuition arrive at an optimal productive situation. They have shown that a knowledge of value of assets is not necessary for effective use and control of resources.
For the less experienced managers, especially in an increasingly sophisticated environment, it would however be most desirable to develop a means of measuring quickly the value of assets in use.

Before adopting any comprehensive performance measurement system, it would be necessary to solve this "assets" problem. Without pursuing it much further, the simplest solution would appear to involve making the manager the custodian of the Government's assets and charging him by way of book entry rent for fixed assets like buildings (based on realistic market values) and hire rates for movable assets such as vehicles and earth-moving equipment.

Thus, in judging the efficient performance of the Service element or activity, the assets need to be taken into account. It is not absolutely necessary that there be one accounting system for performance measurement using assets as well as cash expenditure, and a separate system for the formulation of budget estimates and the control of expenditure of appropriations. The assets accounting identities could be subtracted from the overall accounts to arrive at the cash expenditures. The difficulties in accomplishing this are not denied and obviously a methodology needs to be developed.

6.14 The Special Problem of Performance Measurement

Developing a means of measurement of performance appears to be the most difficult step in establishing a true PPBS. Where there is clearly defined production of some commodity or service, particularly in a form that can readily be reduced to statistics, there is obviously not much problem. But in a government department like a Service department which is not revenue-collecting and which produces a collective or public good as classic as defence, difficulty is experienced in expressing the service or work produced in meaningful performance terminology.

Whilst it is impracticable to measure and develop performance ratios of many categories of work effort by servicemen, it is still recommended that the costs involved should be identified within the overall reporting system. Such
data can then be related to the total cost and employment of the unit/branch/directorate etc. for general analysis and budgeting purposes. It is rare that some measure of performance, however indirect, cannot be isolated for a particular agency which is expending funds, e.g. projects completed in Research and Development, students trained in Service schools under Training, and stores processed in logistic units.

6.15 The Special Problem of the Army Itself

Whilst the other two Services with their large ships, aircraft and weapons systems may rail against the new Defence proposal on PB because they question the effort involved and the advantages derived therefrom, the Army has a more difficult problem. The Army has no equivalent of the RAAF Air Defence capability or the RAN Submarine capability. The Army is not easily divisible into functions which make separate definable contributions to national defence. There are hundreds of units, both small and large, which make organisational and operational sense only in the context of a larger grouping of units. This larger grouping may not exist in peacetime but may be called together as required to meet commitments as they arise. The costing of all these elements is a very large administrative task (given the present degree of computerisation) if it is to be done meaningfully and not merely on a capitation basis.

6.16 Institutional Arrangements to Promote Efficiency

Without elaboration the following institutional arrangements were suggested as possibilities in the now famous Hitch and McKean book on defence economics: (17)

(a) Simulate "Markets" within the Government

Hitch and McKean referred to a proposal by Lerner that the whole military establishment be organised in a network of markets and that it operate, by means of decentralised decision-making. Lerner's proposal implied that "sums of money" or budgets be placed at the disposal of various theatre commanders.
(b) **Stock and industrial funds**
It was suggested that funds should be established as working capital to finance certain defined activities, which are conducted much as though they were private businesses, e.g. in military clothing.

(c) **Increased reliance on the private market economy**
The increased use of private contractors was advocated.

(d) **Proposal to increase the efficiency of contractors**
Different contractual arrangements could be made to provide more incentive for contractors to complete projects within time and cost schedules.

(e) **Proposals to facilitate an economic calculus within the Services**
The scope for greater employment of economic analysis in solving problems of military choice could be increased by use of better budgeting and accounting techniques and specialised operations research groups.

(f) **Decentralisation and incentives**
Apart from the general benefits which might be derived from greater decentralisation it was suggested that cost savings might be retained at the unit level at which the savings were achieved.

Program budgeting is again seen as only one of many possible institutional arrangements for promoting administrative efficiency.

6.17 **Economics**
A paper on the attainment of greater efficiency in the Department of the Army, and in this context including the Regular Army, would be deficient if it did not remark on the prevalent attitude which equates economising with parsimony. When calls for reduced expenditure are made, immediately thoughts fly to "one-off" measures designed to cut down on inputs, on subjects-of-expenditure instead of longer term measures which
call for the elimination of activities. Of course the elimination of activities has consequential reductions in inputs, but there is a wealth of difference between making a conscious decision to do away with an activity of low priority, with its input consequences, and asking people to economise across-the-board. The latter is referred to as "one-off" because of the very human tendency to revert back to normal input expenditures - use of stationery, transport requisitions, allowances etc., most of which were designed with operative efficiency in mind.

When real economies are called for, the object should be to reduce activities and capabilities (those of lower priority and those which do not affect the nation's essential preparedness for contingencies and Treaty commitments) not to reduce the efficient discharge of all activities across-the-board. Economies imposed by decree are, in addition, resisted and are quickly eroded even by the well-meaning.

In fact much greater economies might be achieved by eliminating or scaling down entire projects than by reducing the individual "subjects" of expenditure.

It is quite a normal situation that the departmental objectives may imply budgets that are higher than the governments involved are willing to provide. Across-the-board budgetary restrictions by subject-of-expenditure are administratively the simplest means (but not necessarily the most effective or efficient) of reducing proposed military capabilities to total budget levels. But, given non-uniform military returns to scale in different places, at different times, uniform budgetary cuts will be non-optimal; more strongly, "given increasing returns to scale for such defences in several places, uniform cuts would be decidedly disadvantageous relative to selective cuts that sacrificed such defenses in one or more places in order to exploit such returns well in other places" (18).

6.18 Responsibility Accounting and Decentralisation of Authority

The Fulton Committee recommended that the principles of accountable management should be applied to the work of departments; that wherever possible, measures of achievement should be established in quantitative or financial terms; that
individuals should be held responsible for output and costs (this cost accounting should be supplemental to the formal appropriation accounting), and that greater attention should be given to planning (116).

Although the Fulton Report suggests that individuals should be held responsible for their performance measured as objectively as possible, it is reasonable that the individual who is given this responsibility should be given control of the means of discharging it. The present dual hierarchy in the Services of military administrator and civilian accounting officers, coupled with control by Committee in the Department of Defence is, however, incompatible with accountable management. This is of course a very large issue involving Parliamentary control and the very structure of Defence management.

As a small illustration, the commanding officer is held personally responsible for his equipment and unit accounts though he has no direct influence on the manpower and equipment allocated to his unit; this is determined centrally and must be done in this manner under our present system of material, manpower and financial control. Since the resources are fixed the only other variable is quality which is difficult to quantify. The Service administrator, whose career prospects to a significant extent depend upon his ability as a sound administrator, finds himself in this invidious position. Beddie(62) referred to this situation in stronger terms. He maintained that the military are subject to a high degree of civilian control, but it is civilian control by public servants rather than by Cabinet.

There is no immediate solution to a problem created by the financial system which exists and by the uniqueness of defence as a public good. The Services could not, for example, go the way of the Australian Post Office. To provide a greater degree of commercial flexibility, the method by which the Post Master General's (PMG) funds were provided by the Treasury was altered to a single line appropriation at the time the PMG's new method of operating came into force in July 1968. At the same time the PMG introduced a system of responsibility accounting
which ostensibly enabled a manager to plan and budget his expenditure (in line with the requirements of the total system) and therefore stimulated the creation of a commercial awareness throughout the management structure (75 p.4).

Hints of areas of relaxation of financial control to attain more responsible accounting in a Service department are contained in the recommendations of the Glassco Commission in Canada (98 p.83). This Commission advocated greater delegation of authority to departments, and suggested the following areas in which retrenchment of authority of Treasury control should occur:

(a) The level of allotment control should be raised from the subjects-of-expenditure level to the activity level, giving departments a freer run in the disbursement of appropriated funds.

(b) Greater use should be made of revolving funds (one of the 'institutional arrangements to promote efficiency' advocated by Hitch and McKean). However, it is noted that in the major revolving fund enterprises of the United States, e.g. the US Military Air Transport Service, there are certain costs which are not included in their operation. They are depreciation, pay and allowances of military personnel and major equipment and facilities on capital account. This lack of cost comprehensiveness does not negate the overall usefulness of revolving funds.

(c) The value level of contracts requiring Treasury Board approval should be increased.

(d) There should be more active departmental participation in personnel matters such as classification of positions and collective bargaining.

(e) Pre-audit functions should be transferred to departments under the control of Ministers to ensure that expenditures are made in accordance with allotments and parliamentary appropriations.
The United States Forces have enlarged the scope for more responsible accounting at the unit level. This may be illustrated by the US Air Force's Resource Management System (121) in which an attempt is made to bring unit and base level commanders more directly into the total planning and management cycle in the Air Force. The system is designed to make financial management of resources for operating activities consistent with the program structure of the US Department of Defense. It is noted however that the largest expenditure item - that of Service pay - is beyond the unit commander's control, and the end result of quite extensive decentralisation of expenditure authority is still only to give the unit commander and his staff control of approximately 30 per cent of his annual expenditures.

At the higher level the call in the US is for greater decentralisation in regard to line-item appropriations.

Regardless of what degree of decentralisation of financial control or management accounting is indulged in, and of how financially restraining are the rules and regulations imposed by the Department of Defence or the Treasury, it is evident that a Serving Officer is a better manager if he has a semblance of financial expertise. Even if the Commanding Officer cannot control the allotment of resources to his unit, he can still derive benefit from a knowledge (or feel) for the cost of those resources and thereby try to obtain the maximum defence benefit from the resources given to him. He will not be in a position to maximise overall efficiency (because of his inability to control input over time and in various situations) but he can maximise output given resource constraint.

6.19 Acceptance and Support of Top Management

It is almost axiomatic that, in any large organisation, a new idea is not accepted and is certainly not implemented unless it receives the support of top management. One of the conclusions of a study completed in 1969 (130 p. 22) on the implementation and use of planning-programming-budgeting in sixteen US Federal agencies was that the most important factor determining the relative effectiveness of an agency's program budgeting efforts was the active support and use of program
budgeting by the agency head. (Support was perceived when the
agency head asked for analysis of issues or reviewed periodically
the results of policy analysis.) Program budgeting uses highly
qualified people to perform analysis and if these people are to
be placed in lower echelons of the organisation, there is no
guarantee that the studies they undertake will come to the
attention of top management. A solution is, of course, to have
the program budgeting analysts report directly to top management
so that they undertake studies of immediate interest to the latter.
This at least gives the assurance that the reports will reach
them.

It is noted in another study (122 p.10) that the
responsibility for the development and use of a planning-
programming-budgeting system (PPBS) should rest with the head
of each agency, who should in turn ensure that line managers
participate in the operation of the PPB system and have available
sufficient resources to ensure its active implementation.
Maximum use should be made of internal orientation and training
courses to ensure that a general understanding of the methods
and purposes of program budgeting is generated throughout the
agency.

6.20 Direction of Budget Decisions

The "stickiness" of input budgeting and the role of
"incrementalism" has been previously referred to. Such a
preoccupation with inputs in traditional budgeting leads to what
Allen Schick (42) refers to as "an upward and aggregative flow
of budgetary decisions". The first step in such budgeting, in
anticipation of the call for estimates, is for each department
to issue its own call to prepare and to submit a set of estimates.
This call reaches down to the lowest level that is capable of
assembling its own estimates. At this lowest level, the
estimates form the building blocks for the next level where they
are aggregated and reviewed and transmitted upward until the
highest level is reached and the totality of building blocks is
aggregated into a department-wide budget. Since budgeting is
tied to a base, the building-up-from-below approach is sensible;
each building block estimates the cost of what it is already doing plus the cost of the increments it wants. (The building blocks then are decisional elements, not simply informational elements as is often assumed.)

Program budgeting reverses the informational and decisional flow. Before the call for estimates is issued, top policy has to be made, and this policy constrains the estimates prepared below. For each lower level, the relevant policy instructions are issued by the superior level prior to the preparation of estimates. "Accordingly, the critical decision process - that of deciding on purposes and plans - has a downward and disaggregative flow." (42)

The upward and aggregative approach is easier for the higher authority because responsibility for the formulation of estimates (and hence the making of many decisions) falls to the lower echelons. A downward and disaggregative approach makes both parties work and ensures that vital decisions are made where and when they should be, that is, at the top. Under the traditional system, decisions can still be made at the top but quite often they are across-the-board or arbitrary, based on percentage cuts in expenditure, and worse still they involve much wasteful estimating and consideration of alternatives at the lower levels. It leads to common abuses such as inflation of estimates in anticipation of inevitable cuts.

6.21 Budgeting as an Aid to Communication

Budgeting is the process of expressing in units and dollars the plans of a business for a specific period of time, usually a year. It is the means by which conflicting goals of various departments may be modified so that the best interests of the enterprise as a whole may be achieved.

It is recognised that one of the pitfalls in the planning process - financial or otherwise - is inadequate communication. Budgeting can help management avoid this pitfall because it makes middle-ranking managers justify their estimates. Because of the necessity to quantify estimates of feelings about
the future, with attendant numerical summaries and factual evidence, there is more chance that a true meeting of minds will be obtained as to what the organisation expects to happen. The budgeting process leads to the creation of formal communication channels for designing, revising and transmitting plans. In their budgeting work, members of an organisation make certain "paths" (13) back and forth between themselves: habits of asking and answering questions, mutual understandings concerning what must be done and so forth. These "paths" serve the whole planning process.

The potential value of budgeting as a communication tool can be increased by:
(a) more employee participation in budgeting, more involvement;
(b) defining clearly and explicitly the cardinal assumptions and expectation on which a budget, and hence at least part of a program, are based (84 p.104).

In the same context of the usefulness of budgeting in the planning process it was F.C. Mosher who said that "budgeting is the ingredient of planning which disciplines the entire process" (32).

With improved communication, budgeting is then seen as a means of centralising control but at the same time decentralising administration.

6.18 Need for Data Base

A good data base is essential for PPB because it has to meet the needs of input recording, the program budget itself and economic or other analysis. The data to be produced must cover also a longer period than the budget year. Because the variety of analytical studies is great, it is unrealistic to expect the information system to provide all the data needed. Special surveys have much to offer for this purpose.

It is noted that the US Office of Management and the Budget has established a Management Information Systems (MIS) Staff to examine data needs for budget and management purposes. Such is the potential of the Services Electronic Data Processing
System, and such is the diversity of the data demand in the military sphere - personnel, operational, intelligence, logistics, material, financial - that a MIS staff would appear to be essential.

6.22 General Acceptance of a PPBS

To gain early acceptance, a PPB system should be related as closely as possible to the administrative framework (either as it is now or as it might fairly easily become). However, to make sense of a series of activities one may have to use functional categories which bear little resemblance to the existing administrative arrangements.

As a management accounting tool, PPBS should also be related to existing accounting concepts and practices (though not dominated by them). However, the kind of information (and the degree of accuracy) required for the traditional control and audit functions of accounting may be quite inappropriate in the context of output budgeting. Some of the concepts (e.g. conventional depreciation allowances) may also be totally irrelevant in a planning context concerned with actual resource use, while other inputs which give rise to no financial transactions (and which are therefore not reflected in existing accounts) may need to have values imputed to them which reflect opportunity costs (e.g. the rental value of Crown properties).

Finally, as an aid to decision-making, PPB systems must generate information which is of more than historical interest, and in a form which bears on the realities of the context within which choices have to be made. Since most decision-making is of a kind in which one is appraising the advantages and disadvantages of alternative courses of action, it is necessary to have estimates of marginal costs and benefits, and not just averages. This may be difficult because decisions as to which items can be regarded as variable and which as fixed costs clearly depend upon the size of the variation envisaged.
Chapter 7

Derivation of Programs

7.1 General

The derivation of programs or the development of a program structure can be made a relatively easy exercise in the Australian defence sphere if nothing more is done than compare the program structures of allied nations and adopt a structure which would be suitable in the Australian environment. This course has been explored in Chapter 6.

It is also relatively easy to select criteria from the more important texts in the program budgeting field and design a program structure which accords generally with the criteria, adapted as necessary to suit the country's particular defence requirements. Typical criteria are those used by Mosher (32), who suggests that a program structure must categorise programs according to:

(a) the size of programs in financial terms;
(b) whether there are reasonable politically viable options now or in the near future;
(c) whether an executive who is receptive to the techniques has substantial influence on decisions;
(d) whether information is available or can be inexpensively developed;
(e) whether there is a fairly demonstrable relationship between inputs and outputs.

The United Nations Manual for Programme and Performance Budgeting 1965 suggested that the program classification needs to exhibit the following characteristics:

(a) It must distinguish broad categories within functions (functions being broad groupings of operations that are directed toward accomplishing a major purpose of the organisation) that identify the end products of the organisation;
(b) It should be tailored to the situation in the individual organisation;
(c) It should reflect the purposes to be served by the budget plan;
(d) It should not carry any implication that departmental responsibilities should be changed to conform to functional categories, but should emphasise the need to provide a classification of departmental expenditure according to the purposes served;

(e) It is desirable that a program should produce an end product - one that is identifiable and measurable (although lack of a measurable end product should not militate against the establishment of a program that otherwise meets the criteria of providing a suitable basis for planning, reviewing budget proposals, and evaluating performance against plans).

Program criteria, by themselves, are still an unsatisfactory guide to the formulation of a program structure in that, whilst they may be able to show whether a particular program structure is suitable, they reveal very little about how to derive the program structure in the first instance. They are more like a specification for a designer who must then set about designing the machine or article or system. It is proposed to delve a little more deeply into the interconnection between programs and organisational objectives and levels of program structure.

7.2 Conceptualisation of Objectives

The development of a program structure requires:

"the identification and articulation at an operational level of organizational objectives. Based upon these, the organization's activities which contribute toward the same objective are grouped into categories which are designated as programs in a PPBS context. These programs may then be subdivided into sub-programs, which in turn are divided into program elements, the output from which are defined to serve as quantifiable measures of objective attainment .... The specification of these objectives may be considered to depend to a large extent on how the institution conceives of itself, and/or on how the institution is conceived by those who in one form or another, finance its activities." (71)
In simpler terms, the aim is to define as sharply as possible why an agency or institution exists, and it is immaterial whether an objective is referred to as an "aim", "purpose", "mission", or "goal".

Each program category should therefore focus on a basic objective of an agency in fulfilling its mission. For each specific category a measurable objective is formulated. An objective may therefore be defined as a statement of program purpose expressed in terms of the impact on society of the final product or service which the program provides (not the means of providing the product or service) (114).

A sub-category becomes self-explanatory under this definition and an "activity" becomes the means of achieving the objective of the program sub-category. Activities should relate to the program size indicators.

An example in a non-defence field is a program category of "reduction of highway accidents" (an objective focused on the final product of highway accident prevention) which may have program sub-categories such as:
(a) improving driver capability;
(b) improving vehicle safety.

or based on such characteristics as:
(a) demographic type - age, sex, income level etc;
(b) geographical breakdowns;
(c) clientele groups served (i.e. target groups).

An activity within the sub-category of "improving vehicle safety" could relate to improving the vehicle body, the steering, the wheel grip, the upholstery, visual aids and so forth.

A program category, in another field, of "reduction in the loss of life and property from fires" is focused on the final product or service of "fire protection"; it can be broken into spatial or client group sub-categories; and activities such as "acquiring and maintaining efficient fire fighting force" and "informing the public" emerge.
A UK study (130 p.24) noted that relating objectives to policy choices or breaking down functions into smaller fields does not mean that objectives should correspond with the work of organisational units of the department. (The programs suggested by the UK study group involved different branches of the Department of Education and Science.)

It is further recommended (91 p.352) that statements of objectives should avoid inclusion of specific numerical magnitudes. For example, a statement of objective "to reduce crime rates ten per cent" should be avoided. The specific amount of improvement that should be sought should generally not be determined until after the alternatives have been evaluated, as to the costs and benefits of each, and their trade-offs are understood.

Statements of objectives should be worded to avoid specifying particular "means" as definite targets before evaluation takes place. For example, an objective worded 'to provide a central public recreational facility' assumes that it is necessary to have a central facility in order to meet the objective of providing adequate recreational facilities. However, there are such alternatives as the use of smaller decentralised facilities that should also be considered. These alternatives are different means of reaching the real objective.

7.3 Program Structure Levels

Reference to program categories, sub-categories and activities is in fact assuming that there is something valid about three levels within the program structure. The following generalisations are pertinent to the question of levels:

(a) It is impossible to specify the exact number of levels that should be provided. There should be at least three, and probably more will be desirable.

(b) Different parts of the program structure may have different numbers of levels.

(c) Before a separate level for a group of programs is established, each program involved should pass one of two tests:
(i) the individual program should entail a substantial commitment of resources over the planning period; or
(ii) the program should be of substantial importance.

The following levels have been suggested:
Level 1. Broad categories directed towards the fundamental objectives of the agency.
Level 2 and Lower. Progressively narrower groupings serving more limited objectives. As the categories become narrower in scope at the lower levels, they should be viewed as complementary and/or alternative approaches to the fundamental objectives at the highest level in the structure.
Lowest Level. Comprised of the programs that have been implemented as the specific means for moving toward the end objectives.

The lowest level categories, the individual programs, represent the basic program "building blocks" which can be accumulated in various combinations to yield the higher level categorisations.

The question of levels is closely tied to the definition of objectives and the distinction made by many writers, including more recently J. Cutt (71), between "primary" and "secondary" objectives.

Primary objectives (or "final" or "output" objectives) are defined as those objectives which are reflected in some product, service, skill or orientation which will affect society.

Secondary objectives (or "intermediate" or "support" objectives) are defined as those objectives which must be pursued to make possible the pursuit of the primary objectives.

Within a university setting, the primary objectives are:

(a) instructional i.e. student-oriented objectives;
(b) research i.e. objectives of pure and applied science;
(c) public services, i.e. provision of services, such as extension or correspondence courses, which the university as an institution is uniquely equipped to provide to the population outside the university.

The secondary objectives are seen to be:

(a) adaptation objectives, e.g. attract students and staff, acquire financial resources;

(b) management objectives, e.g. allocation of resources between objectives;

(c) motivation objectives, e.g. maintain a sufficiently high level of satisfaction on the part of staff and students;

(d) position objectives, e.g. maintain "prestige" and "character" of university.

According to Cutt, objectives for program budgeting in higher education can accordingly be stated at levels of abstraction which lie between the philosophical objectives of the institution, on the one hand, and detailed behavioural objectives, on the other. At the program element level operations must be able to be translated into defined measures of performance or effectiveness, such as achievement test scores, attitudinal indicators and measures of post-university achievement (first offered salary, cumulative income over a defined period, numbers of papers published etc). Objectives at the sub-program and program levels represent aggregations of the program element objectives, the objectives being arranged in a hierarchy, each group of program element objectives contributing to the attainment of the objectives of the corresponding sub-program one stage higher in the hierarchy, and each group of sub-program objectives contributing to the corresponding program objectives.

The program objectives must be operational in a sense quite different from that relevant to program elements. They must be operational in a form amenable to resource allocation decisions within the university (71 p.12).
Two approaches to the categorisation of program objectives are offered by Cutt. They correspond closely to two approaches to financial estimating, one of which flows from decisions made at the top and which is then disaggregative, and one of which is "incremental" or aggregative, stemming from a large number of decisions made at low levels. Cutt feels that the two approaches can be used simultaneously.

"The process of categorisation of program objectives may be approached from two directions simultaneously. On the one hand, the process may begin with the formulation of a set of objectives which are derived from a broad philosophical conception of what universities ought to be doing. These normative, philosophical objectives are then disaggregated into more operational sub-objectives and so on down to the specification of detailed behavioural performance objectives at the lowest instructional (or research or service level, broadening the discussion to include the three basic output objectives of the university). This disaggregative, normative and prescriptive approach may, however, be accompanied by a more descriptive and aggregative approach which begins with the existing basic elements or activities in the university, synthesizes these into larger categories, and so on until the larger objectives of the institution are obtained. This second approach, which determines the nature of programs inductively from relationships between existing activities, is a useful complement to what is perhaps the commoner approach. The use of the two approaches simultaneously offers insight and guidance in the formal structuring of program, sub-program and element categories. The final definition of this structure will, of course, reflect the level of the institution (i.e. the university as a whole, or some constituent part or group of parts) for which the program budget is being designed."

(71 p.13)

7.4 Formulation of Army Objectives

It is a little artificial to deal with Army in isolation, that is, away from the rest of the Defence Group, particularly when it comes to a statement of philosophical objectives. For brevity, and because this formulation is by way of illustration only, this situation is accepted.
It was stated in the previous section that objectives for program budgeting can be formulated at levels of abstraction which lie between the organisation's philosophical objectives, on the one hand, and detailed behavioural objectives on the other. Without any attempt at comprehensiveness or accuracy the objectives which might emerge from such an approach are:

**Philosophical objectives**
- Defend the mainland of Australia
- Defend dependent territories
- Contribute to collective security
- Maintain preparedness
- Support the Government
- Serve the people
- Support foreign policy initiatives

**Detailed behavioural objectives**
- Recruit an adequate number of soldiers
- Maintain school cadet corps of certain size
- Maintain Citizen Military Forces at given level
- Operate an officer training institution to maintain adequate officer levels
- Engage in a number of civil affairs projects
- Train a number of men for counter-insurgency
- Foster an army of given size in Papua New Guinea
- Indulge in a number of exchange programs with other armies.

Or, should one look more immediately at the concept of primary objectives (or "final" or "output" products which affect society) and secondary objectives (or "intermediate" or "support" objectives), the following types of objectives might emerge:
<table>
<thead>
<tr>
<th>Primary objectives</th>
<th>Defence of Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Defence of overseas territories</td>
</tr>
<tr>
<td></td>
<td>Contribute to collective security within the defence region</td>
</tr>
<tr>
<td>Secondary objectives</td>
<td>Train numbers of men for desert and jungle warfare</td>
</tr>
<tr>
<td></td>
<td>Station forces overseas at a given level</td>
</tr>
<tr>
<td></td>
<td>Foster military forces of given size and composition in Papua New Guinea</td>
</tr>
</tbody>
</table>

An exhaustive itemisation of objectives within each of the two approaches will probably end up with the same number and type of objectives. It is a matter of the degree to which one can philosophise about military activities and the number of levels of objectives one feels appropriate.

7.5 Multi-purpose Programs (and Multi-application Support Activities)

Many programs will have simultaneous applicability to more than one program grouping; they serve several philosophical or primary objectives at the same time. The programs or activities which fall into this category are typically of the support type; in the Army sphere any logistic or administrative support program would support a number of objectives; a Training Command, if established, could serve the Field Force, logistic formations in the support area and Reserve forces.

Probably the most frequent solution is to place the multi-purpose program with that grouping to which it seems to contribute most. Another and possibly better solution is to place it also with other groupings to which it makes a significant contribution. When this is done, it will be necessary to identify the program as a "non-add" entry in these other groupings so that when grand totals are calculated, such programs are not double-counted. However, the too frequent use of these multiple, non-add entries will add too much length to the program structure and thereby adversely affect the ease with
which the information can be comprehended. Therefore, multiple entries should be used selectively. (A non-military example of a multi-purpose program is street lighting, serving both traffic safety, reduction of crime, beautification – separate objective-oriented categories.)

Regardless of the placement of a program in the formal program structure, if a program is relevant to an individual program analysis, it should be considered in the analysis (91 p.361). The problem is to provide for shared activities in the program structure in such a way as to give the reader of the multi-year program and financial plan, or the program analyst, a reasonable perspective as to the costs and other resources involved in the various programs. A program structure serves little purpose if it does not group the organisational activities in a way that facilitates comparisons of the cost and effectiveness of alternative approaches to the organisation's objectives.

Apart from the approaches already mentioned, three other approaches can be identified: (91 p.362)

(a) Assign all the costs of the activity to the individual programs supported and remove the activity from the program structure. (This is almost a 'non-approach' as it suggests doing away with the activity for presentational purposes, distributing all the costs associated with the activity.)

(b) Establish a separate program category for the activity, placing it in the program structure at a level that suggests which programs it supports.

(c) Attempt to identify (perhaps statistically) the portion or activity that "varies" with the size of the programs it supports, and assign this portion of the activity to each supported program, as in (a) above. The remaining portion of the activity, that which is fixed, would be allotted a separate program category as in (b) above.
Both the second and third approaches require establishing separate categories in the program structure for the support activities; the first approach does not.

It is suggested, however, that arbitrary allocations which are made solely for the purpose of distributing all costs should be avoided. Allocation should be made only where they contribute to better decisions.

Where there is no reasonable basis for allocating such activities, or where allocation would not contribute to more effective decision-making in budget review, these activities should be reflected in appropriate separate classifications within the program structure (122 p.4). The consensus appears to be that a separate classification is more desirable than an arbitrary allocation.

Further to multiple entries, Spigelman (97 p.354) suggests that for purposes of planning it is by no means silly to attribute expenditures to more than one category, especially as the program budget is supplementary to a budget in the traditional form which actually allocates the funds and balances receipts and expenditure. To take his example of "airlift and sealift" in the US defense program, these can be given separate programs, and the same expenditures can be included in end programs such as "general purpose forces" or "continental defence" etc.

The accountant's fear of "double-counting" in a budget is largely a reflection of preoccupation with accountability rather than with efficient allocation of resources. Double-counting is only a sin if one is interested more in allocating funds or calculating aggregates than in facilitating allocation decisions. The latter is the function of the program budget. The allocation decisions in a PPBS result from program analysis which in turn depends upon the estimation of relevant costs for alternatives; the estimation of how the costs are likely to vary with changes in significant program characteristics are major parts of the analysis.
Accordingly, whatever the difficulties associated with apportioning costs of shared activities the program grouping must not be permitted to revert to:

(a) accounting by subject classes;
(b) cost elements such as "operations, activity Y" versus "maintenance, activity Y" versus "capital costs, activity Y" (p.361).

Whilst such a classification is not harmful in itself and indeed presents (if the cost of collecting the information is accepted) a more meaningful display of the allocation of resources, it would help to defeat the whole purpose of a PPBS, which essentially should focus upon comparison of alternative courses of action, that is, upon whole programs not cost components.

The concept of "program" as used in a PPBS will generally not be directly compatible with current accounting systems. Identification of all costs generated by an output oriented program, regardless of source of funding, organisation, or object class is necessary in a PPBS. These costs should be included, as far as is practicable, in the program generating them. Current accounting categories should not be allowed to affect significantly the choice of PPBS program categories. There will be many ways in which program costs can be at least roughly estimated from existing accounting systems. In the long run, however, some changes in the financial information systems will probably be desirable.

7.6 Provision for Future Program Changes

Because of the many options open for program structure classification, it would be unwise to expend too much time and effort in perfecting the design of the initial program structure. After trial, the design can be revised as best suits the requirements of the particular jurisdiction and the needs of its policy decision-makers. The program structure is only one of the several parts of the PPBS. If the fundamental objectives have been sufficiently identified, even a rough-cut program
structure should be sufficient for forming the framework for the subsequent analytical efforts that are the essence of a PPBS. The test of a satisfactory program structure will be its usefulness for the on-going processes of choice and decision (91 p. 352).

The formal program structure should not be allowed to become rigid or inflexible. New developments and changes in emphasis are bound to occur in future years, and they will suggest the need for revisions of the formal program structure. Nevertheless, too frequent changes in the structure, for insufficient reasons, are also undesirable since changes are likely to cause problems with existing data information systems.

The indication to high management of proposed changes in program structure, reflecting an on-going look at the department's activities, is formalised in various program budgeting systems under such a title as "Program Change Proposal". Such a formal procedure requires an effectiveness study not only on a new proposal but also on existing authorised programs which it might displace or supplement. This involves a continuous evaluation of departmental activities in terms of determining the most effective approaches for achieving objectives.

Program change proposals fall into one of the following three categories:

(a) significant changes in scope and direction of authorised programs;
(b) alternatives to authorised programs;
(c) new program proposals.

It is not inappropriate to include a category in the program structure even though the current multi-year financial plans do not make an allocation of resources to it. New programs may have been recommended but their date of implementation within the current planning period is, for a variety of reasons, uncertain. The adoption of certain programs depends upon the phasing out of other programs. (The phasing out of National Service thus required a revision of the program structure of the Department of Labour and National Service and the Army. This could allow the reactivation of other programs with little or no current allocation.)
7.7 Program Elements or Activities

A military element was defined in the previous chapter as any integrated activity, such as a combination of men, equipment and facilities which constitute an identifiable military capability, e.g. an infantry battalion or ordnance depot. This is not incompatible with other definitions of the lowest levels of a program structure such as:

(a) program elements - the outputs from which are defined to serve as quantifiable measures of objective attainment (Section 7.2) (in this context the very creation of the infantry battalion, a collection of trained soldiers with defensive and offensive capability, is its own output measure or end result);

(b) elements or activities - the means of achieving the objective of the program sub-category (Section 7.2);

(c) lowest level of program structure - specific means for moving toward the end objectives (Section 7.3);

(d) "building blocks" which can subsequently be accumulated in various combinations to yield the higher level categorisations (Section 7.3).

The definition is also seen to be compatible with a set of essential characteristics of a program element from another source (122);

1. they should produce clearly-definable outputs which are quantified whenever possible;

2. wherever feasible, the output of a program element should be an agency end-product - not an intermediate product that supports another element;

3. the input of a program element should vary with changes in the level of output, but not necessarily proportionally.
7.8 Conclusion

Obviously there is no "perfect" program structure. The structure which emerges from a consideration of acceptable or workable criteria, or from a compromise between the prescriptive, disaggregative approach and the descriptive aggregative approach, or from a fresh uninhibited philosophical and behavioural approach will undoubtedly be imperfect in the first instance. No one category scheme will fulfill all needs or satisfy all users. In addition, individual program analyses may frequently call for special groupings or other modifications to reflect the needed emphasis of the problem at hand. This imperfection is easy to accept if one is conscious of:

(a) the dynamic nature of program structuring, recognising that an organisation's roles and missions and sometimes even basic objectives, are continually changing;

(b) the ready availability of formal systems of program change;

(c) the inherent purpose of a PPBS as originally conceived.

A PPBS should not stand or fall on the soundness of its basic program structure because this would be denying the usefulness of the accompanying tools and techniques of program analysis.

As in many spheres of activity, the very effort of classifying and disaggregating is a rewarding activity because it gives a greater insight into the essential distribution of effort and its effectiveness.
Measurement of Performance and Selection of Criteria

Chapter 8

8.1 General

Developing a means of measurement of performance and isolation of suitable criteria appear to be the most difficult parts of establishing a planning-programming-budgeting system. Where there is clearly defined production of some commodity or service, especially in a form that can readily be reduced to statistics, there is obviously not much of a problem; but in a government department like Army which is not revenue-collecting and which produces a collective or public good as classic as defence, difficulty is experienced in expressing the service or work produced in meaningful performance terminology - of generating unique, simple, helpful measures of effectiveness.

This difficulty is shared, apparently, by all agencies who have endeavoured to introduce PPB systems. A system is relatively easily established for planning, programming and budgeting purposes, for the presentation of cost information, and for the rigorous analysis which precedes major budgeting proposals. But when it comes to the actual point of evaluating performance, for example by organising performance feedback in order to test the efficiency of allocative decisions, agencies appear to hold back from the final necessary step. This could stem from the sheer difficulties of selecting output measures or the difficulty in measuring them or the unwillingness to face up to performance appraisal.

It could be also that actual performance is dwarfed by the normative judgments and appraisal which are a part of overriding intangible elements. Thus in spite of performance evaluation being included in the original conceptual design of PPBS, despite President Johnson's reiteration of its importance in 1968, very few agencies have proceeded to a comprehensive performance evaluation system.
The Australian Department of Defence has not included any reference to performance measurement in its particular style of PPBS, concentrating on the planning function (as manifested in its Five Year Rolling Program). It probably sees performance measurement as the function of the individual Services, at least initially; but sooner or later it must take an active part in the evaluation of performance in order to test the effectiveness of its planning measures in the attainment of defence objectives.

8.2 Why Performance Measurement in Program Budgeting

Program budgeting is planning oriented; its main goal is to rationalise policy-making by providing (a) data on the costs and benefits of alternative ways of attaining proposed public objectives, and (b) output measurements to facilitate the effective attainment of chosen objectives. As a policy device, program budgeting departs from simple engineering models of efficiency in which the objective is fixed and the quantity of inputs and outputs is adjusted to an optimal relationship. In program budgeting, the objective itself is variable; analysis may lead to a new statement of objectives. In order to enable budget makers to evaluate the costs and benefits of alternative expenditure options, program budgeting focuses on expenditure aggregates; the details come into play only as they contribute to an analysis of the total (the system) or of marginal tradeoffs among competing proposals.

Differences between planned and actual results may show:

(a) The plans may be unattainable. This may happen because the assumptions or estimates on which the predictions were based were wrong in the sense that predictions could reasonably have been expected. Or the difference may arise from the general uncertainty surrounding the outcome, such that better predictions could not reasonably have been expected. Under the circumstances the planning model or the estimates should be revised.
(b) The resources available to the firm may not have been used to carry out the given plans as effectively as would have been possible. Those who implemented the plan can be held in some sense responsible; it should therefore be possible to take some action to effect an improvement in future performance.

In either event, the progress of a firm may be looked at as an iterative process in which the execution of one plan makes it possible for the firm to learn more about its resources and its available activities; and this may make it possible to formulate a better plan for the next occasion or, at least, one that will be better matched by results. The iterative process will not necessarily lead to a steady improvement, however, for the opportunities available may change as quickly as the firm's performance. Only if there is improvement in the activities of planning and of execution of plans - if the management gets better at its job - can improvement be ensured (94).

Performance monitoring or measurement is thus an essential complementary activity of planning. It provides the feedbacks by which the planner can gauge the effectiveness of his previous planning and influence the direction of his future activity. (If various management elements know by how much they have missed the target, the first step has already been taken toward instituting corrective measures.)

It was noted by N.W.F. Fisher (74) that, while comprehensive reporting of the activities of Australian road authorities occurred, there were no known attempts to measure performance in terms of objectives. He observed that this was a more general malaise: "In particular there appears to be no general or particular requirement to systematically record and report, in quantitative terms as far as possible, on the output and achievements of various government programs. As a result there is little or no monitoring of the output of government programs and no thorough measurements of effectiveness. This
latter aspect is one of current concern to myself and it has been disconcerting to find how little data are available on which to base estimates of program effectiveness, as against intermediate outputs, and as a result how only too easy it is to fall back on expenditure as a measure of effectiveness." (74 p.8)

In many people's eyes the military as an institution is little different from any other institution which is being increasingly sharply resource constrained. It should compete for funds on a basis of goal attainment and such goal attainment can only be demonstrated in terms of output measures, or indications which in a program budgeting framework must be quantifiable and/or observable in some form.

8.3 The Military Problem of Performance Measurement

Defence is the archetype of a public good, a good that is most suitable for outright production by the national government, and is neither left entirely to private enterprise nor merely bought under contract from the private sector. Moreover, unlike most other activities the success in shaping defence forces is judged in almost inverse relationship to the extent that these forces actually have to be used, so that a good defence program must be evaluated largely in analytical and conjectural terms, rather than by the test of performance (4 p.175).

Base installations in the Australian Support Area (as opposed to the more combat operational Field Force) are comparable to an industrial complex and are subject to normal management control criteria; examples include the use of automatic data processing for inventory and stock control and the achievement of certain levels of productivity. Output and measurement of performance in these cases are readily quantifiable.

It is more difficult with combat units of the Field Force. While the strength of a unit relative to its establishment can be and is a simple matter of continuous and quantitative
assessment, the less easily defined qualities of corporate and individual morale and state of training raise the question as to what indices of fitness should be taken as the starting point for a quantitative evaluation of a unit.

For numerous military weapons systems and program elements (units) there are no satisfactory measures of effectiveness. If we consider an infantry or armoured unit, a frequently used proxy for effectiveness is firepower. But there are dangers in that such a measure may be used mechanically - the worth of an additional unit depends upon many other factors such as type of firepower (nature of weapons and ammunition with which the unit is equipped) mobility, auxiliary equipment, morale, terrain, climate and so on. There are other program elements such as communication, support, intelligence or security activities which have measures of effectiveness which are not nearly as satisfactory a yardstick as firepower is for the fighting units.

"Moreover, as is true of incremental costs, incremental effectiveness can differ greatly from average effectiveness, for in military activities there are not constant costs to gains. The worth of another unit of firepower, for instance, depends upon what other forces are available, what the enemy has, and how he reacts. If one's firepower begins to surpass that of the enemy, one's effectiveness suddenly increases more than proportionately....

"Second, though actually a point closely related to the preceding discussion, army program elements yield multiple and incommensurable achievements. Cruisers, destroyers, and certain long-range aircraft can serve multiple purposes. Even forces for which there seems to be a relatively clear-cut metric of effectiveness usually turn out to have several incommensurable capabilities. Manned bombers, Polaris and land-based missile systems all yield several different capabilities - for city destruction, for tactical-target destruction, and for announcement of intentions - and each yields different combinations of these
capabilities. These achievements cannot be made commensurable by putting them in terms of a common denominator. To show an indicator of one achievement and omit others could be highly misleading. To show indicators of all such achievements could generate a clumsy budgetary exhibit that would be very costly in use.

"Third, there is another vital aspect of effectiveness (or of costs) that a program budget cannot costlessly show — namely, the uncertainties. There is inherent uncertainty about the effectiveness of weapons systems and other program elements, because there is doubt about enemy reactions, other nation's reactions, future strategic contexts, technological development, and other contingencies. As just one example, there is usually uncertainty about the vulnerability of our systems, such as command and control, and therefore doubt exists about the value of countermeasure systems." (29)

J. Withers (56) noted that the application of marginal analysis is not universally valid in defence areas. Straightforward use of marginal principles requires that military effectiveness be related to resources by a smooth continuous concave function. In many circumstances discontinuous or convex relationships are readily conceivable. In certain naval and air force applications "lumpiness" may be common, thus producing discontinuities. As for concavity, one quite important case in the military sphere is increasing physical returns to scale (in accordance with Lanchester's Law).

R.N. McKean attributed to F.W. Lanchester the statement that "the fighting strength of a force may be broadly defined as proportional to the square of its numerical strength multiplied by the fighting value of its individual units" (27 p.12).

Lanchester's Law, as it is commonly known, indicates in its various modifications that any firepower advantages in combat are likely to yield an edge that is more than linear in proportion.
8.4 Effectiveness Versus Performance (Efficiency)

Measures of effectiveness have been defined by the Canadian Treasury Board (98) as yardsticks to assess the real value (or output) of an activity in terms of its quantitative benefit resulting from the related expenditure.

An effectiveness measure is distinguished from a measure of performance or work measurement in that it places emphasis on the social or other benefits accruing from an objective rather than the completion or accomplishment of a project in terms of number of units of output.

In highway construction, for example, each measure of effectiveness indicates how effective the highway will be in fulfilling the stated objective. One measure of effectiveness might be the use of a highway in terms of the number of people it will carry between localities, but the measure of performance might be the length of highway built in a certain time period.

8.5 Measuring Output and Quality of Performance

The contribution of public sector programs is generally measured simply by the real resources employed i.e. by inputs, and not by outputs. The reason is obvious: the inputs are in fact purchased, whereas the outputs are not in fact sold, so there are data readily available for the former but not for the latter. Attempts to improve upon this have often taken measures of work-load as measures of output (e.g. number of children at school, number of cases treated in hospital) and although these are better than input measures, they neglect to take account of quality of performance, and hence are likely to be inadequate as measures of efficiency.

Workload indicators, as above, do not indicate anything about the quality of output. Secondary indicators, such as pupil/teacher ratios or numbers of medical staff per bed, are also dubious concepts from an efficiency or quality of performance point of view, since they imply that the more these resources are used the better the service will be, and they deny implicitly that other inputs may increase the quality of the
service. Worse still they sometimes preclude the possibility of testing the efficiency with which teachers of hospital staff are utilised, because it is widely assumed that every increase or decrease in staff automatically represents a quality change on the output side as well as a cost change on the input side.

The most useful of indicators (those which give a good indication of quality) are neither measures of workload nor even (implicitly) measures of input, e.g. success of failure in examination, reductions in mortality and morbidity rates, or improved lifetime earnings.

It is concluded that it is preferable to avoid the usual kind of detailed work-efficiency indicators such as number of traffic tickets per officer or cost per patient day. Such measures may be quite appropriate for management control purposes but are of little use as output measures for a program budgeting system.

8.6 Implied Valuations

Even when we have acceptable measures of performance, we need to reduce them to a common denominator in order that activities with differing output-mixes can be compared with each other. The common denominator is usually money, which means that money values have to be placed upon various components in (say) education, health etc. Some find this process abhorrent, but to react in this way is both untenable and unhelpful.

It is untenable because implicit in every decision to build (say) a hospital or school, is a decision not to use the resources involved on (say) roads or housing. Resources spent on the latter may save more lives, or improve general living standards more, than expenditures on the former (or vice versa). It is important to know the implications, for example in terms of the implied values placed on human life, of whatever decision is made, and to pretend that we never make such valuations, even implicitly, is hypocrisy (55 p.13).
8.7 Program Size Indicators and Effectiveness Measures

Program size (or volume) indicators are estimates of the quantity of goods and services produced by a program in terms of the number of public consumers or beneficiaries or the volume of public goods or services provided. Program effectiveness measures relate actual output to planned output. For example, a program size indicator for a cancer control program could be the number of persons tested and frequency of examination for each specific type of cancer. The program effectiveness measure, on the other hand, would estimate the number of persons cured or the reduction in the mortality rate for a specific type of cancer. The program size indicator estimates the magnitude or size of the program, but gives no indication of the program's impact upon society in terms of achieving its objective. If an agency feels it cannot quantify effectiveness measures, the measures should still be described as accurately as possible.

The relationship of workload measures, program size indicators and program effectiveness measures may now be illustrated by reference to the evaluation of a driver training course:

<table>
<thead>
<tr>
<th>Program Category</th>
<th>Objective</th>
<th>Program Sub-Category</th>
<th>Objective</th>
<th>Program Effectiveness Measure</th>
<th>Program Size Indicator</th>
<th>Work Load Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimise the probability of deaths, injuries and property loss due to traffic accidents.</td>
<td>Improve driver capability.</td>
<td>Percentage decrease in traffic accidents of those persons with driver training course compared with other persons.</td>
<td>Number of persons completing training courses.</td>
<td>Number of training course applications processed.</td>
<td></td>
</tr>
</tbody>
</table>
As used in PPBS literature, the word "output" has been applied indiscriminately to the following quite different phenomena (p.10):

(a) the capability of a system (program element) to perform;
(b) the immediate product (goods or services) produced by the system;
(c) the utilities (benefits) of the product, for target groups;
(d) the number and/or type of target groups benefited;
(e) the effect of the benefits on some variable of the target group; or
(f) the net resulting change in the state of the universe resulting.

These are of course merely sequential consequences flowing from any "system" consuming resources (inputs).

It has been stated that the most common output measures (or "program indicators") are crude measures of volume or program magnitude (such as the number of students enrolled or graduated from a college) and give little or no indication of the quality of education offered. The use of such crude indicators can be expected however to serve as a quick reminder of the basis of prior year decisions on program size, to provide an indicator of change that can be expected to accompany changes in expenditure and to raise questions about prospective levels of expenditure.

The criteria for selection then become (91):

(a) Relevance - they should be directly related.
(b) Simplicity - they should be simple but informative.
(c) Availability of data - the information needed for the selected indicators should be obtainable in useable form and collected on a continuing or periodic basis.

In many cases, and this applies particularly in the military sphere, it will be difficult to distinguish an indicator of program size (stated in terms of major physical components
funded by the program and to be used in providing the program services) from indicators of the volume of services produced by those resources (91 p. 402). Numbers of infantry battalions or ships or aircraft fall into this category - they are the indicators of program size, and yet at the same time represent the service provided in terms of latent military capability which may never be utilised.

8.9 Process and Output Variables

Jesse Burkhead of Syracuse University (155) distinguishes between the proximate results of the current expenditure decision which he calls "process variables" and the contribution of the system or program as a whole which he calls "output variables". This distinction is illustrated in the following figure:

**Figure 8.1**

*Input, Process and Output Variables* in the Educational Process

<table>
<thead>
<tr>
<th>Input Variables</th>
<th>Process Variables</th>
<th>Output Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Land, Labour, Capital)</td>
<td>(Current Expenditure Policies)</td>
<td>(Benefits to the Individual and Society)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student time</td>
<td>Class size</td>
<td>Increased intellectual curiosity</td>
</tr>
<tr>
<td>(a) classroom</td>
<td></td>
<td>Development of creativity</td>
</tr>
<tr>
<td>(b) at home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personnel time</td>
<td>Teacher-pupil ratio</td>
<td>Increased lifetime earnings</td>
</tr>
<tr>
<td>(a) administrative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) teaching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buildings and Equipment</td>
<td></td>
<td>Growth of informed electorate</td>
</tr>
</tbody>
</table>

* not related in figure

From the above figure and a comparison with section 8.7, it appears that the "process variable" tends to equate with the "program size indicator" and possibly some of the "workload measures" while the "output variable" is more akin to the "program effectiveness measure".
On this basis, input, process and output variables in the military field might be as shown in the following figure:

**Figure 8.2**
**Input, Process and Output Variables in the Military Field**

<table>
<thead>
<tr>
<th>Input Variables</th>
<th>Process Variables</th>
<th>Output Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soldiers</td>
<td>Wastage/retention rates</td>
<td>Trained Army</td>
</tr>
<tr>
<td>Training</td>
<td>Staff/student ratio</td>
<td>Availability for civil emergencies</td>
</tr>
<tr>
<td>Administration</td>
<td>General administrative employment ratio</td>
<td>Defence preparedness</td>
</tr>
<tr>
<td>Equipment</td>
<td>Expense per man</td>
<td>Honouring of treaty obligations</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Equipment repaired</td>
<td>(No implied relationships)</td>
</tr>
<tr>
<td>Accommodation</td>
<td>Square feet/man</td>
<td></td>
</tr>
</tbody>
</table>

8.10 **Other Output Terminology**

The principal types of output indicators can now be isolated:

(a) **Volume indicators.** These display the quantity of services in terms of number of public consumers of beneficiaries. (Depending on a point of view, volume indicators arising from the National Service Scheme would be numbers of national servicemen trained and discharged each year.)

(b) **Quality indicators.** The quality of a public service may be measured in terms of its characteristics, its duration, its content, or the extent or degree to which it serves its purpose. It is very difficult in the military sphere to measure the absolute quality of the final output. Quality indicators during the "process" stage are more readily discernible, for example, number of men passing certain physical tests.
(c) **Comparative indicators.** These are designed to show the volume of services in relation to population, area or some more specific measure of potential, scope or program need. Military comparative indicators could be patrols per mile of frontier, number of vehicles per division or even number of soldiers recruited per 1000 of population.

(d) **Expenditure/output indicators.** These are useful when changes in expenditure are marked and can be accounted for simply by a planned change in operation or activity. In the Army it is difficult to establish the causal relations between input expenditure on the one hand and program development or output on the other. This is because of the traditional "lumpiness" of military output referred to in section 8.3, the lumpiness being more pronounced in a small army such as that of Australia. In the US Army it might be possible to link the number of extra divisions with additional expenditures voted by Congress. The Australian Army is striving to maintain one division with all its infrastructure, whereas the US speaks of adding divisions to an already vast Army; and "module packages" make sense in the latter case.

8.11 "Performance" and "Non-Performance" Levels of Achievement

The distinction in US financial reporting systems between performance and non-performance levels of achievement was noted by Kingshott (87). "Performance" refers to results achieved by internal organisation policies and decisions, as opposed to items beyond management's control. A percentage share of a market is regarded as a performance item for which marketing and manufacturing personnel must be held responsible; on the other hand a change in the total size of the market as a result of, say, the government economic policies is a non-performance item not subject to the control of management. The
idea is to use performance items positively as a way of measuring and of improving the quality of management. Translating the business analogy to the Army recruiting field, a percentage share of the total number of men offering for service in any of the three Services (Navy, Army and Air Force) would be a performance item, but a change in the total numbers of men offering for service, as a result of high or full employment, would be a non-performance item.

8.12 Availability of Data

Apart from the conceptual difficulties which exist in defining adequate benefit measures or measurement of program performance, one major factor affecting the quality of benefit measures is the availability of data from which measures may be constructed. The formulation of benefit measures involves, either implicitly or explicitly, setting standards and making assumptions. Having done so, data on program activities may be collected so that performance can be measured against these standards. However, it is recognised that measures of performance and benefit might simply be creatures of what data are available and these data may not be completely relevant to the standards against which the measurement should be made.

Because of the difficulties in measuring the results of programs in terms of benefits produced or capabilities attained, simple output measures have been used to quantify program results, and they typically represent the things for which agency or departmental personnel are held accountable. Whilst they do not directly measure program benefits and effectiveness, they may be useful in evaluating the efficiency of organisational units. However, without a link between output measures and measures of benefit or effectiveness, the use of output measures may be self-defeating in that the quality of results may be overlooked in attempts to meet or exceed stated quantitative goals (130 p.24).

This is a common accusation levelled at all attempts at performance measurement that they lead to over-zealousness to attain results (in terms of meaningless output or output
which can be readily identified and quantified) at the expense of quality. Control standards can be used to counter this tendency. If it is believed that the advantages of performance measurement outweigh the disadvantages, then the defeat of such a tendency becomes a challenge to management at all levels. Industry had to solve this problem in order that mass-produced goods or goods produced under piece-rate conditions compete against goods produced by more traditional methods.

8.13 Departmental Achievement Analysis

Departmental achievement analysis can be extremely valuable because it allows each departmental manager to be given objectives against which his performance and that of the department can be measured. It allows scope for initiative and flexibility in the use of resources to meet changing circumstances.

Production activities may employ a wide range of different labour grades, drawn from several departments. Which of these should be subjected to achievement analysis must depend upon the degree of control considered necessary. It is perhaps an unwise policy to attempt a detailed analysis of every conceivable cost centre as represented by individuals or small groups. Over ambition in this direction, leading to a multiplicity of facts, figures and prediction curves, could involve so much effort for little or no return that disillusionment with the whole process of achievement monitoring might set in.

8.14 Individuals and the Organisation

Although appraisal systems can be established for individuals, the aim of performance measurement is to improve organisational efficiency, and the organisation's effectiveness in attaining desired objectives. The system, as originally conceived within the PPB system was not intended to be a rating system for managers. Nevertheless with the types of cost comparison the system offers, military commanders or civilian chiefs within the Department of Army will have to exercise leadership to prevent the system from degenerating into just that. While comparisons of like organisations may contain clues
to which operation is better managed, careful analysis is required to draw valid conclusions. For example, different climatic and operational conditions can make comparisons between like organisations fallacious. Penny-pinching that saves costs but degrades morale and facilities can look good on a financial statement, at least in the short-term. Similarly, a manager who has to overcome poor facilities and morale may need to spend more than one who has inherited a good situation. Special circumstances and vagaries that tend to even out in the long-run can distort monthly, quarterly, or even annual comparisons.

There is a need for due cognizance to be taken of the "erratic" factors which can distort comparisons, and it is in this area that the element of judgment on the part of higher commanders or staff officers is most critical.
9.1 General

To know more about costs alone is better than nothing. In choosing between alternative pieces of equipment, weapons or even personnel manning strategies, the decision-maker would certainly rather have information about their costs alone than have no idea about either costs or effectiveness. (Yet as the previous chapters have indicated, sufficient ignorance about effectiveness can make the value of cost information relatively low.)

The Army provides a public service and in doing so, it must make the same kinds of decisions as those made by private enterprise. Having been told what services should be supplied and how much, the Army must decide how to provide the services most efficiently. A businessman knows generally how much it costs him to provide his product or service, and can compare these costs with the market price. The difference between his costs and his sales revenue is profit which, in the long run, is a measure of how well he is managing his business. The Army, on the other hand, has no such clear-cut test of how well it is achieving its goals. As we have seen, planning-programming-budgeting system (PPBS) was introduced into the US Department of Defense and later extended to other departments in an attempt to solve the problem, amongst others, of measuring goal achievement and hence efficiency of operation.

We saw that PPBS was designed to analyse the objectives of an agency or department, develop alternative means of reaching those objectives and identify the most effective alternatives in terms of benefits and costs. The importance of costs emerges particularly when it is difficult or improper to measure the benefits of a particular program. When the benefit cannot be completely expressed in dollars, cost-effectiveness analysis can be used to compare alternative ways of executing the program.
9.2 **Orthodox Cost Effectiveness Analysis**

It is useful to examine the conditions for which cost-effectiveness was originally developed (133 p.2):

(a) a well defined task;

(b) satisfactory measures of effectiveness in performing the task;

(c) a good idea of the kind of operational organisation required;

(d) no innovations so radical that they cannot be costed with reasonable accuracy.

These requirements are usually satisfied in a slowly changing environment where the problem is that of selecting a better, but not too dissimilar, replacement for an obsolescent system. In these circumstances, past experience is a reliable guide to the conceptual framework required.

The clearest cases where one can show improved military efficiency arise when cost-effectiveness analyses are applied to narrow repetitive activities, as in logistics. Rigorous derivation of maintenance policies to replace "rules of thumb", for example, draws upon capital theory from economics, reliability theory from statistics, and mathematical decision theory. The powerful combination of mathematical and statistical decision theory, in particular, supplies much more than techniques for computation (83 p.28).

A major area of difficulty concerns the measure of effectiveness; there may be several of these for the same task, depending on the conditions under which it is performed. The derivation of a single measure, which seems a necessary step for a unique ranking of the alternatives, involves either the selection of one set of conditions as critical, or the derivation of a weighted average of the several measures, the weights being selected according to the importance attached to the different situations.

The choice of measures of effectiveness is crucial because the merits of each particular possible configuration of a system may appear different from a different point of view.
The selection of a preferred design or range of possibilities of action may hinge on the choice of the measure of effectiveness. The choice of indices may preclude certain alternatives even before analysis, and in fact already represents a design decision (11 p.8).

Another difficulty concerns the question of what costs to include and what to leave out. In the early stages of cost-effectiveness, a few basic principles of costing were enunciated:

(a) only new costs which would be incurred by adopting a system should be included;
(b) a single cost is required, for which it is necessary to make a suitable combination of annual and operating costs;
(c) the object is to get not absolute costs, but reliable relative costs which are accurate enough for budgeting purposes;
(d) the time scale for the introduction of the new system has to be considered as it may have a considerable influence on cost.

The general effect of these difficulties was a tendency to produce a bias in favour of extremes. The effectiveness per unit cost for a very minor change can be very high because, when marginal increases in effectiveness and cost are both small, their ratio can become large purely by random error. On the other hand that of a radically new system is over-estimated because there is a tendency to over-estimate effectiveness and under-estimate costs when available data are inadequate. This bias could produce wrong decisions, but, being suspected, could be allowed for in presenting results (133 p.2).

Cost effectiveness analyses (especially those of an ad hoc nature) are bedevilled with difficulties similar to those outlined above. Weighing the costs and gains attributed to each alternative is unquestionably the right approach to problems of choice, yet actual analyses should be used with caution. "Effects
that are incommensurable or even non-quantifiable in any generally valid way (e.g. impacts of alternative systems on the probability of war) abound; uncertainties about future contingencies are pervasive; heroic judgments have to be made; and the quality of analyses varies but is costly to appraise." (29)

9.3 Program Costs and Individual Weapon System Costing

The three cost categories of R & D, investment and operating costs correspond to the three main phases in the life of a system.

R & D costs are defined as all costs associated with developing a new capability to the point where it is ready for introduction into operational use. Such costs include not only equipment (prototypes, test vehicles etc.) required in a development program but also the related facilities, supply and personnel costs.

Investment costs include all the one-time costs required to introduce a new capability into operational use. They include the cost of procurement of the weapons, initial training, initial spares etc.

Operating costs include all the costs required to maintain the system in operational readiness throughout its useful life (also called "recurring costs").

The following is an illustrative list of elements of program cost (91 p.379):

1. **One-time, fixed, costs**, which are essentially invariable with size and duration of program, viz: Research Planning Test and evaluation.

2. **Investment costs**, which vary with size of program but not duration, viz: Land Building and facilities Equipment and vehicles Initial training.
3. **Recurring costs** ("operating and maintenance" costs), which vary with size and duration, viz:
- Personnel salaries, wages and employee benefits for direct operations
- Maintenance of equipment, vehicles and buildings
- Miscellaneous materials and supplies
- Miscellaneous support ("overhead" costs).

The appropriate choice of what costs to include is sometimes not a matter of attaining maximum detail, but rather the availability of information to the decision-maker (or his cost analyst) at the point in time the decision must be made. If there is a time constraint in the selection and assembling of cost information, the cost categories should at least be structured to be of maximum use to the analytical problem at hand. They should be used to highlight the differences among the alternatives under consideration - "... more aggregation where the alternatives are alike, less where they display different features" (135 p.2).

Citing a cost element explicitly rather than in an aggregate is a matter both of its relative size and variability in the analysis at hand. Obviously, where the results of a decision are sensitive to variations in a particular cost element, the cost element must be separately identified.

9.4 **Costs which should be Included**

The following types/categories of cost should be included, or at least considered (and therefore consciously excluded or otherwise):

(a) "Marginal" or "Incremental" Costs

If we are estimating the costs for a specific program, only the additional costs that are incurred are relevant. In the study of cost accounting, one may find references to incremental, marginal, variable, proportional, direct, differential and prime costs. Although each of these has a specific meaning, in general they all reflect an attempt to separate those costs
which are influenced by the alternatives from those which are irrelevant. "Sunk" costs, representing resources which have already been committed (or at least can be presumed to have been committed prior to the beginning of the time period being considered) are irrelevant. This says that events in the past are not directly pertinent to current choices; the cost of a resource, purchased in the past and still existing or held in stocks, is not a relevant measure of the cost of using it on a current activity. Nevertheless, past events determine, in part, the spectrum of opportunities available now. For example, the fact that $1,000,000 was spent last year on a facility is not pertinent to the cost analysis. There may be of course psychological and political reasons why the government will be concerned about the previous expenditure. Nevertheless, approving an inferior alternative because of the $1,000,000 expenditure is from a technical cost point-of-view "throwing good money after bad". Only the future costs of the facility, for example those for operation, maintenance, and rehabilitation, are pertinent. Of course if there is a potential salvage value, e.g. for facilities, this return would be pertinent to any program alternatives which could consider disposal of the facilities as part of the alternative.

(b) **Fixed and Variable Costs**

A major part of cost analysis will be spent in attempting to determine which costs are fixed and which costs are variable in the context of the particular program alternatives being considered; it is necessary to identify which of the current on-hand facilities can be used in the
revised operation. Certain other costs such as supervisory and facility costs, might not be affected or might only be partially affected by the change. Only that portion of the costs which are affected in the switch-over from one system to the other represent true incremental costs.

In the long run no cost is actually fixed. For example, even the cost of departmental leadership is likely to increase as more and more programs are added to the department.

The basic cost analysis problem is to determine, for each situation, what costs will change and to what degree (91 p. 377).

(c) Total Costs

It is necessary to consider the total costs when assessing the program alternatives. It is the difference in total cost required that is generally relevant when comparing alternative programs.

An important consideration is to consider all costs. In costing out a program, cost should be considered regardless of accounting object class, organisational unit, or source of funding. For any particular program, costs are likely to come from more than one department and more than one funding source or account. However, care must be taken not to include arbitrary allocations of costs which will provide irrelevant information for decision-making.

Financial repercussions of a program might be expected to occur outside the government or agency. These secondary financial effects whether affecting the government's own budget or other sectors of the economy are important considerations. The estimation of such effects is often very complex and particularly difficult, but nevertheless
essential for program analysis. Such financial effects are called external costs and benefits, or simply "externalities". (Since defence is a major activity of government it would be quite wrong from the overall national point of view to reckon its costs as if it were an isolated private enterprise, keeping its own books without regard to external economies and diseconomies.) (23 p.2)

(d) Opportunity Costs

The term is meant to convey the very important notion that if resources are put into one program, other opportunities for use of the same resources have been forgone. The "values" of these forgone opportunities are the opportunity costs of putting resources into the selected program. These "values" are therefore relevant to program selection.

Because a decision-maker is interested in selecting the best alternatives available, he must concentrate on the various opportunities open to him. He therefore must recognise that the cost of any kind of action or decision consists of the opportunities that are sacrificed in taking that action. It is often difficult to comprehend all the alternatives available and thus it is difficult to know all opportunity costs; yet the basic idea of opportunity cost is invaluable in helping to allocate resources properly.

Opportunity costs are handled in actual analysis by either:

(a) attempting to input a dollar value to the resource under consideration (perhaps by using current market values) and including the inputed value as a cost; or
(b) considering alternative uses of the resource as explicit alternatives which are all explicitly evaluated.
The latter approach will probably be the most practical in most situations. At the very least, it would be necessary to indicate explicitly as a "negative benefit" the loss of the resource for other uses (91 p.382).

(e) Controllable Costs
When controllable costs are shown separately, the effect of a department's management on operations is not confused with factors beyond its control.

9.5 Techniques for Estimating Costs
The following techniques are taken from Mushkin (91):

(a) Use of unadjusted current data applied to the future. This costing technique is primarily applicable to costs that are not expected to change significantly. Price level changes may, of course, also affect the future costs of program components even if nothing else changes, but this is a separately-treated problem.

(b) Preparation of internal "engineering" estimates. As new programs are proposed which involve components significantly different from current or past program components, other techniques are needed. The major technique currently in use is for cost estimates to be prepared by internal experts (e.g. engineers or others doing the program design) for the new components. One difficulty in "engineering" estimates is that if many program alternatives and variations are required, the estimate preparation time may become substantial. Allied to these are "shadow" costs used as surrogate market prices. When there is no market for the services of the organisation, shadow costs are calculated as a means of allocating the internal resources of the organisation.
(c) **Use of vendor estimates.** Price quotations may be obtainable from, say, a seller or builder. If the quotes are for already existing items or minor modifications of such, they should be accurate. To the extent, however, that a firm commitment is not implied by the estimate and to the extent that complications might arise in making the item, uncertainties in the cost estimates will exist.

(d) **Use of statistical estimates.** Statistics, properly utilised, can be useful in extracting the most information from historical data. The basic concept is to take the historical and current data that are available and make inferences from them as to future events. The use of means, medians, modes, frequency distribution etc. adds some complexity but these are still basically quite comprehensible to the layman. A more advanced but often useful technique is the use of "regression analysis".

(e) **Use of cost factors and cost models.** There is likely to develop a repetitive need for the preparation of cost factors and cost equations which can be applied to a number and variety of costing problems, e.g. maintenance cost per year per vehicle. These would need to be updated periodically. Individual cost factors or cost equations might be prepared at any convenient level of aggregation - single accounting object classes, a single sub-object class, or aggregation or object classes.

A collection of these cost factors and cost equations, which together could provide estimates of the total program cost for different variations of a certain type of program, is occasionally called a "cost model".
9.6 Special Problems in Cost Analysis

Two special problems which loom in the assembling of cost information are:

(a) **Price Level Changes**

Multi-year financial plans and program analysis costs are usually expressed in "constant" dollars. That is, no adjustments are made to reflect possible future price changes which are due to general changes in the local or national economy. This is convenient and avoids added problems and computations. In addition to the problem of attempting to predict the trend of the general economy, the price index is likely to differ for each element of cost, i.e. payroll costs, construction costs, various types of equipment etc. Each potentially requires its own price index projection.

The comparison of the costs of various programs cannot of course be made at different points in time. Cost elements must be identified in time as well as in magnitude. They then may be discounted back at some common rate and the present costs (values) of two or more programs compared.

(b) **Uncertainty in Cost Estimates**

Uncertainty can arise due to possible unexpected difficulties or unexpected delays and complexities.

A second special problem in program cost analysis is the need to provide some indication of the magnitude of the uncertainty in the cost estimates. The magnitudes and likelihoods of the cost uncertainties can affect the final program decisions and should be clearly stated and presented as best as one can to the decision-makers. Several techniques can be used ranging
from simply providing qualitative statements such as: "the costs are accurate" or "highly uncertain", to more elaborate techniques which attempt to estimate the likelihood and size of the uncertainty. One, often suggested approach, is to provide "high", "low" and "most likely" estimates (rather than just a single estimate" for each major program alternative.

The approach of "high", "low" and "most likely" was developed to a fine degree in time estimates for the occurrence of events in PERT analysis (Program Evaluation and Review Technique) such as used in the Polaris Missile program. (PERT is related to Critical Path or Network Analysis.) When a completely new weapon system was being developed, reliance could not be placed on single time estimates because no one person had sufficient or previous experience. The approach was made possible by the use of the computer which could handle the very large number of time computations.

9.7 Cost-Benefit Analysis and Its Role

A brief reference to cost-benefit analysis is made in order to indicate its advantages and disadvantages as an analytical tool and to point out its relationship with cost-effectiveness studies.

It has variously been defined as a systematic comparison between the cost of carrying out a service or activity and the value of that service or activity, quantified as far as possible, in order to take into account all costs and benefits (direct and indirect, financial and social). Costs and benefits must be adjusted for the future by discounting them to present values. The discount rate calculation defines a functional relationship that makes inputs and outputs at different points in time commensurable with each other by assigning to them equivalent present values. There are two ways of approaching this problem, one through net present value (NPV) and the other through internal rate of return (IRR).
The present value criterion selects those investments or activities where the sum of all revenue or benefits, less all costs, each adjusted for futurity by use of a discount rate, is positive. Instead of using NPV as the criterion, a benefit cost ratio (B/C ratio) can be calculated and used as a device for ordering alternatives which have ratios of greater than unity. The internal rate of return chooses the investments where the rate of discount that makes the present value of all revenues or benefits, less all costs, equal to zero is higher than the appropriate interest rate (148).

The three criteria, NPV, B/C ratio and IRR could give different optimal decisions based on the same data. It is considered, however, that not one single criterion is superior under all circumstances (149). For example, the choice between competing projects cannot validly be based solely upon their internal rates of return as some reference must be made to the external cost of capital.

Cost-benefit analysis is seen by Alan Dean of the Federal Aviation Agency as an attempt to measure tangible and intangible benefits against the cost of achieving those benefits, whilst cost-effectiveness analysis is usually most valuable in selecting alternative approaches to the achievement of a benefit already determined to be worth achieving.

The most publicised phase in PPBS (a certain notoriety was attached to the systems analysts or McNamara's "whiz kids") is program analysis, and it is here that cost-benefit analysis is dominant. It is, however, strange in retrospect to note that the analytical techniques used when PPBS was introduced into the Australian Department of Defence were cost-effectiveness techniques (i.e. establishing least cost for specified effort, or most effect for given cost), rather than cost-benefit. The benefits of more efficient defence decisions could not be quantified and valued. The gradual extension of PPBS to other areas of government activity, where benefits can be recorded, and the improvement of analytical treatment of benefits, have allowed cost-benefit analysis to become the major analysis
This is especially so in the area of investment projects, e.g. roads, power and water and to a certain but increasing extent, in the soft-ware programs like manpower planning, education and health."

(74)

Until measures of effectiveness are isolated and better means found of quantifying the benefits of military activity (conflict studies are helping in this respect), it is probable that the technique of cost-effectiveness analysis is more appropriate in the Australian defence scene. An assumption will have to be made that national defence generally, or a certain armed force, its size or its credibility, is a benefit which the nation desires but is not prepared to quantify. Studies are then carried out in the framework of the classical constant-budget maximum effect or constant-effect unequal budget conditions. The prevailing expenditure mood of the Government prefers the former. This requires the Department of Defence to adjudicate between competing Services demands for manpower and equipment, in order to keep total expenditure within an upper limit which has probably been fixed arbitrarily as a certain percentage of Gross National Product (GNP). The Department of the Army is then forced to rethink its program to see how it can best expend the funds allocated to it. It can do this either intuitively or through lower level cost-effectiveness studies.

Caution must be observed in using cost-benefit analysis. Such analysis is concerned with economic efficiency taken as the maximisation of dollar values of the products of a system, rather than utility, and maximisation of output by itself does not maximise utility. It cannot be relied upon to define the system design which optimises a community's defence preparedness. Also it rests on two fundamental assumptions which do not hold in practice, one being that monetary values can be obtained for every aspect of an activity or project, the second being that these monetary values (or prices) reflect their real defence value to the nation. There are other limitations in using the analysis particularly those relating to the choice of discount rate and the various biases towards either benefits or costs, but they are not discussed further here.
To reject cost-benefit analysis for the reasons above would be unwise, however, because it would encourage both analysts and decision-makers to give full play to their own subjective and possibly narrow judgments. Recognition of the limitations of the analysis is a valuable "first step", because it calls for means to supplement the analysis by bringing out explicitly the values and intangibles upon which it is difficult to place a monetary figure.

Cost-benefit analysis provides a conceptual framework for the quantitative appraisal of governmental activities. It makes a valuable contribution to the decision-making process even without forcing the issue on detailed costs and benefits. The attitude of mind which it engenders, that of defining a problem, seeking alternatives, and identifying all the effects is in itself an important function. The fundamental rethinking which precedes the actual installation of a new piece of equipment or managerial technique is responsible for much of the gains which ensue.

It is essentially a means of adopting the rules for profit-maximising investment behaviour by private firms to fit the different circumstances under which governments (or departments of the Services) operate. It is the government's answer to the absence of profit as an indicator of operational efficiency.

9.8 The Role of Cost Accounting

The emphasis in PPB systems is upon estimating future program costs for often advanced and unique types of programs. Unlike fiscal or cost accounting, it is not aimed at determining what has been spent and how efficiently. As such, PPBS cost analysis requires somewhat different skills and abilities.

A PPBS by no means eliminates the need for the management control aspects of accounting systems. The current cost accounting systems in fact will be a chief source of information for program cost analysis. However, the cost accounting system is not likely to yield sufficiently the types
of data required for program evaluation. Program cost analysis data needs are likely to place additional demands on, rather than become a substitute for, information currently obtained by the internal management information systems.

The demands of PPBS program analysis for cost estimates may well necessitate the formation of a special jurisdiction-wide program cost analysis unit. Such a unit should be part of the program analysis function and be available to assist the program cost analysis needs in any department or agency of the jurisdiction (91 p.392).

9.9 The Concept of Accuracy

There is a popular addiction to absolute accuracy which, whilst being a prime virtue of public and private accounting, is unnecessary and positively wasteful in the area of defence planning. Depending on the purpose of a particular analysis, an order of accuracy of 10-15 per cent (2) may often be adequate. The reason for this is that the inaccuracies which are caused by making the best available (as opposed to the most diligent and painstaking) are small compared with the inaccuracy involved in costing major weapons systems which are to come into service five or ten years into the future. This is of course the old question of orders of accuracy and their relevance in particular situations. The costs of attaining greater accuracy are highly relevant also.

9.10 Cost Optimism

"Optimism" in a cost proposal is the difference between the earlier estimated cost and the final or actual cost. The former is invariably much lower than the latter. There are three notable variables in the development of any weapon system. These are: first, the cost of development; second, the length (time) of development; and third, the performance (quality) of the system. Because, in the military sphere, importance is usually placed first on the quality of the weapon and next on the date of operational delivery, it is the target cost that is usually neglected when unforeseen technological and other difficulties occur.
In a sampling of development programs for twelve major weapons systems carried out by Peck and Scheree, it was found, for example, that the average cost variance was 3.20, i.e. it cost 220 per cent more to develop the weapon than originally predicted. The time variance was only 1.36 and the performance standards were almost always met. Thus the unpredictability and uncertainty inherent in developing a weapon system manifest themselves most severely in the cost area.

9.11 Cross-walk Grid (Translation Grid or Budget Cross-walk)

New York City's "Sviridoff Report" (97 p.349) saw a program budget as a natural complement to the traditional expense budget. The Report suggests that the latter should be retained to serve the function of enforcing accountability. There is some sentiment in the US Bureau of the Budget in favour of ultimately replacing the present budget structure by a program format. This is not necessarily desirable nor, it appears, practicable. After six years' experience, the US Department of Defense still presents its budget to Congress in the traditional form. Provision is made in current Bureau of the Budget planning for "cross-walk" grids to transpose expenditures from one budget structure to another. Cross-walks are simply cross classification of data to meet different purposes.

"Translation grid" or "budget cross-walk" are synonymous technical PPBS labels for the technique of translating program costs and funding into the normal budgetary format. The Australian Post Office has used the expressions "transformation matrix" or "cross-walk matrix" in deriving a matrix which could be used to transform from the existing plant account format for each "activity" into costs in program budgeting format (67).

9.12 Procurement and Cost-Effectiveness

If the Army or any Service department is simply required to reckon "cost" as the money charged to its own departmental budget, then the allocation of resources producing the highest cost-effectiveness for the department may not produce the highest cost-effectiveness for the nation as a whole.
It may be cheaper in money cost terms to import an article than to have it manufactured in one's own country, but there are other factors (23 p.3) which are mentioned here but are not elaborated upon:

(a) the effect on foreign exchange reserves;
(b) the loss of opportunity to provide employment for one's own industry;
(c) the possible need to pay for unemployment benefits or relocation of labour if domestic facilities are not used;
(d) the loss of opportunity to develop skills and experience in one's own country, with consequent future dependence on foreign suppliers.

The relevance of the first three of these factors depends on whether the resources of the country are fully or under-employed.

Procurement then becomes a very complex affair and any cost-effectiveness study must encompass a wide range of externalities as well as traditional factors. It is obvious, however, that whilst a project may be condemned on the grounds that insufficient attention has been paid to external diseconomies, it would be inconsistent to argue for or against a defence purchase solely on the strength of one externality such as internal employment or even the building of a national defence industrial infrastructure.
Chapter 10

Conclusions

10.1 General

It is acknowledged that what commenced as an ambitious attempt to define efficiency criteria and then investigate means of improving administrative efficiency within the Department of Army has lapsed by default into a consideration of certain aspects of government financial activity and a detailed look at the important elements of program budgeting. The transition from a prescriptive endeavour to an expository result – from an attempt to reach a goal of a model of financial management to an exposition on the difficulties of reaching that goal – is analogous to the traveller who aims at a distant hill only to find that it is a false crest. Having reached the false crest, he sees the distant and achievable goal but also sees the obstacles which lay between the crest and the goal.

One may well ask what is wrong then with proceeding quickly to the final goal instead of resting on the crest. It is possibly the fear of finding another false crest beyond which even greater obstacles lie. It is also, more likely, that the traveller needs to re-equip himself, generate new resolve, pause for guidance, probe the unknown for new paths, stand back a little and cogitate on a new course of action.

The effort, however, has been extremely worthwhile, at least in the opinion of the author. It has provided an insight into the external and internal financial control operating from without and within a government department; it has attempted to reveal how relevant economic efficiency criteria are to the internal administration of a department; and it has traced the growth of program budgeting and sought to determine how useful program budgeting techniques are in the Australian defence environment. In this latter aspect, it has placed emphasis on the derivation of programs, the measurement of performance and the selection of performance criteria, and costing generally. Recognising that program budgeting is not the complete answer to greater efficiency, other measures for promoting efficiency have been suggested.
10.2 Advantages of Planning-Programming-Budgeting Systems (PPBS)

Although the pitfalls and difficulties of introducing a PPBS into any department may be extremely formidable and even perhaps over-riding, it is not difficult to see the advantages which program budgeting can confer on an organisation. Without any attempt to place them in order of importance, the following advantages are appropriate:

(a) Assistance in clarifying and quantifying the objectives of managers at all levels within the context of the overall objective. (The more lucid articulation of objectives is a gain in itself.)

(b) Improvement in the methods for allocating resources in line with overall objectives, by providing a rational procedure for approaching resource allocation decisions (through building blocks such as activities and programs).

(c) Improvement in the ability of managers at all levels to assess, via performance measurement, their contribution towards organisational objectives.

(d) The subjecting of all activities to a degree of formal analysis. It highlights the benefits to be gained from cost-effectiveness and cost-benefit studies.

(e) Provision of better communication and understanding through consistency. Consideration of targets, goals and costs in terms of objectives will be matched by budgets and subsequent accounting throughout the organisation in compatible terms.

(f) With formal program elements for analysis and with costs and benefits clearly associated with each, the opening of the way for the application of computer-based techniques to help make many of the allocation decisions.
(g) Simplification of the identification of growth areas, areas singled out for rapid or privileged expansion. (96 p.24)

(h) Simplification of detailed reviews of activity, thereby making money available for re-allocation as the result of termination or pruning of programs of lower priority.

(i) Improvement, statistically, of the quality of decisions in an organisation with a large range of activities. Under conditions of uncertainty - and the defence environment is a most uncertain one - making numerous small errors may be the appropriate way that one gropes towards a set of major decisions which most efficiently satisfy the organisation's aspirations.

(j) The use of broad and rough estimates, because of the model-building approach which does not depend for its justification upon the possibility of assigning exact values to all the variables. (Values can be refined as the time frame shortens.)

(k) Improvement in the quality and organisation of information for executive decisions (a PPBS can be viewed as an information system).

(l) Recognition that the true cost of an activity or project is the opportunity which is thereby sacrificed of carrying out other activities or projects.

(m) The forcing of managers at all levels to make choices rather than allowing activity to be generated simply by default. Funding of activity is based on justification by analysis and measurement of performance.

(n) Possession of organisational benefits as a result of the output-orientation of activity. Inevitably, it appears, the definition and classification of programs and sub-programs will differ from the structure of the organisational hierarchy.
Hopefully, reorganisation wherever possible on a program basis will reduce overlap and interdependence.

10.3 Pitfalls and Difficulties

Because of the many government, agencies or departments which have attempted to introduce program budgeting systems, it is not difficult to isolate certain pitfalls and difficulties in the implementation of such systems. They are as follows:

(a) Officials sometimes consider a PPBS to be the solution to their past accounting and decision-making problems. Although a PPBS can be considered as a device for providing better information for decision-makers, it does not necessarily make the task of the decision-maker any easier. By providing the decision-maker with a vast array of alternative courses of action, each factually documented and each subjected to a comprehensive cost-benefit analysis, it may make the choice more difficult. There is a greater chance, however, that the final decision will be a correct one.

(b) There is often a lack of adequate data. The data that are in fact provided will always be less useful than the data that could in principle (that is, in a world free of cost) be generated (29).

(c) Sufficient numbers of trained and experienced analysts are difficult to obtain.

(d) There is a tendency to equate budgeting and planning, particularly among managers with finance and accounting backgrounds. While budgeting and planning are interconnected, they are separate in principle as well as in detail (13).

(e) A temptation exists to call on budgeting officers to handle planning assignments. (The budget is not a kind of forecast but a statement of intended action.)
(f) A program budgeting system continues to mean different things to different people, depending on the emphasis they give to special cost-effective or cost-benefit analyses, the degree of centralisation of authority and the need for performance measurement.

(g) It is sometimes not possible to consider substitution possibilities among systems that are not obvious substitutes, such as air transport and infantry divisions, or aircraft for different purposes (29). This can arise if there is too much attention to detail in cost-effectiveness studies, and not sufficient attention to the broader conceptual issues.

(h) There are cost difficulties, such as:

(i) the allocation of "overhead" or "common" costs;

(ii) variation in accuracy of estimates from element to element (both through absence of data and through motivation of officials) within each activity;

(iii) the identification of incremental costs of each activity.

(i) A basic difficulty occurs in being able to generate simple, helpful measures of effectiveness. Many program elements yield multiple and incommensurable achievements.

(j) There is an absence of constant costs or gains to scale ("lumpiness") in the military sphere.

(k) There are possible costs of centralisation. The greater the extent to which higher levels make the choices, the less profitable it is for lower levels to devote their resources to thinking about these choices. Their time and energy can better be spent on matters that remain under their jurisdiction (29). The penalty of centralisation is loss of communication, participation and involvement.
(1) There are dangers in pushing attempts to measure what cannot be measured too far, or assuming that in some sense the things that can be measured are the most important ones (97 p.350).

(m) Over enthusiastic promotion of the concept can occur and there is a tendency to minimise or even overlook the very important limitations and problems which unavoidably must arise in the practical implementation of a PPBS.

(n) Over-ambition, through attempts at a detailed analysis of every conceivable cost centre leading to a multiplicity of facts, figures and predictions, could result in much effort for little or no return (with subsequent disillusionment) (24 p.191).

(o) There are difficulties in justifying two costing systems, an accurate system for conventional budgeting, and a less accurate one for planning purposes (in the absence of one system which is acceptable for two purposes).

(p) It is difficult to decide who should determine objectives, particularly as they are essentially expressions of value.

(q) A tendency exists to skew managers' (and operatives') motivation in the direction of making a good showing on the quantitative side. (This can be countered by developing tools of qualitative analysis.)

10.4 Reasons for Adoption of a PPBS within the Army

Apart from accepting the advantages mentioned in 10.2, there are a number of additional reasons why the Department of Army should embrace a PPBS (as a concept package, not a particular system).

(a) The Department should not be found wanting if and when the whole Australian Government adopts program budgeting. This latter event will not occur suddenly, but as an evolving process
stemming initially from basic forward estimating. There is precedent in the US and the UK for the defence group of departments to be at the forefront of advances in the field of program budgeting. What is wanted is more than lip-service to the present Five Year Rolling Programme system (as adopted by the Australian Department of Defence) but rather a whole-hearted embracing of the concepts embodied under the title of PPBS.

(b) Irrespective of formal decisions by the Commonwealth on the adoption of PPBS, there will be a requirement for more and more systematic analysis and evaluation of expenditure proposals.

(c) The resources which the government can persuade the community to give up, in the form of tax revenues, will be less than the same public's demand for increased, improved and new public services of all kinds. In short, all levels of government face a permanent "budget squeeze" situation (65). This suggests a powerful incentive for politicians to require the adoption of every management innovation and tool which promises to improve the effectiveness with which public resources are employed. There is no reason to believe that the Department of Army will be any less subject to pressures to improve resource use.

(d) Program budgeting forces the asking and answering of hard specific questions. (Public servants and the Service Officers "who are content to go on year after year with the same old program administered in the same old way may find this question-asking process very uncomfortable").

(e) Improved information in itself is a significant achievement. Program budgeting involves the collection of much data, and as with all statistical data the very act of collection, assembly and analysis of financial data may
reveal areas for further investigation. The data themselves may point to potential problem areas. (No doubt it is a fine point of judgment which data are relevant and meaningful in the light of future likely problems.)

(f) An output approach (through program budgeting or the simpler functional costing) has the effect of bringing more closely together the military and financial planners; now a more direct dialogue between the military and financial planner is possible. It is possible for there to be a greater realisation that both are involved in a common problem of economic choice (2).

(g) Adoption of a PPBS forces an acceptance at all levels of the process of planning. The formulation of objectives for effort provides direction for the effort and a stimulus for action, even though the objectives may have to be modified in the light of discoveries made in the process. There is utility in mapping out stages in the development process and identifying checkpoints along the way (planning), even though the development plan may require radical revision (45). A disciplined approach to financial planning, such as is incorporated in a PPBS, does much to eliminate traditional lip-service to planning.

(h) It is emphasised that a PPBS need not have one single rationale or need to stand as a solitary conceptual being. It does not have to stand or fall on its general acceptance as a budgeting device. There are several planning and analysis tools within the PPBS package to make the adoption of the system worthwhile even for these alone. The PPBS provides a framework for the more effective utilisation of planning and programming, program budgeting, cost-effectiveness, cost-benefit analysis, network analysis, modelling and various operations research techniques.
The defence area of application is one which is ideally suited for the implementation of program budgeting techniques. Cost-effectiveness studies (essential adjuncts of PPBS) have been going on in the military sphere since World War II, and the Services are familiar with the development of expensive weapons and major equipments whose costs can be readily identified and allocated to programs. In addition, being not hedged in by local pressure groups and vested interests (as can occur with more domestically-oriented government departments) the Defence group has wide discretionary powers in the allocation of resources.

Even if it does nothing else but provide better and deeper information to assist in decision-making, PPBS will have served its purpose once introduced. The top military planners can more easily allow the exercise of their accumulated judgment and intuition if they have budget information presented to them in meaningful terms, such as force units and costs arranged in an objective-oriented fashion.

10.5 Lessons in Introduction

The attempts to introduce PPBS into several overseas countries are well documented. In addition, there is the recent experience of the Australian Department of Defence in introducing a form of PPBS, generally known as the Five Year Rolling Programme, with its attendant demands for analysis studies. The main lessons which appear to have been derived from the Defence experience have been previously documented by the author but are repeated below:

To ensure the intelligent and willing participation of all the staff elements concerned, in a major change of procedures as is involved in a planning-programming-budgeting system, there should be clearly recognisable benefits to justify the additional work imposed. Further, proportionate
benefits should accrue from the new procedures. As a minimum, a detailed feasibility study should be carried out to show whether the introduction of a new system is justified. There is a limit to the extent that trial and error methods should be used in the search for new workable systems.

(b) There must be, of necessity, a mass educational process to ensure that the agencies involved are sufficiently geared and motivated to use the financial data produced by program budgeting. Again, as a minimum, instructional publications or manuals must be produced which simply and clearly express the procedures involved, and which are widely distributed before the introduction of the system. The people contributing and using the data must be inculcated with the philosophy of functional costing and cost-benefit analysis.

(c) The tail should not wag the dog. The objectives and functions of the agencies are derived from the objectives of the parent enterprise. The endeavours of the agencies must be channelled through a hierarchy of objectives, so that the endeavours are clearly related to the attainment of the objectives of the enterprise. These latter objectives need to be continually revised in the light of the changing national security scene.

(d) There is the ever-present danger of becoming more absorbed with the procedural and administrative aspects of the system than with the purpose for which the system is designed to serve. The system should not develop into an accounting exercise or constitute "methods without meaning".
(e) The institution of performance measurement or appraisal is considered to be fundamental to any good PPBS. In fact it is a necessary prerequisite to any assessment of productive efficiency. Because a knowledge of financial costs is so essential to an effective appraisal of performance, the tendency to separate the accounting and the performance function must be resisted.

10.6 Worthwhileness

In simple terms, there are two methods of controlling public expenditure: resource (input) control and functional (output) control. Each system has its merits and each its faults. For many years it has been accepted that the two methods are irreconcilable alternatives; and the public departments have always been convinced that resource control is infinitely superior for reasons of economy and ease of administration. But in recent years the situation has changed. Public expenditure has expanded enormously both in absolute terms and in scope; the projects which absorb it extend over long periods and carry greater elements of risk and increased difficulties of prediction. In consequence, long term planning of programmes has come to be accepted as a sine qua non (76 p.313). Traditional methods are perfectly adequate over a wide area of financial management, particularly for accounting and audit, but output-budgeting is a prerequisite where policy and planning are concerned.

Whatever "system" is devised for the reconciliation of input and output budgeting techniques and their attendant concepts, it is virtually certain that there will be inadequacies in the system. The question then inevitably arises as to whether all the time and effort spent in quantification and analysis are worthwhile. One answer is that, as a practical short-term matter, it is obviously useful to know what resources are being devoted to which ends, even if effectiveness of performance is imperfectly quantifiable. Cost alone is helpful in certain situations of choice. Even if costs themselves
cannot be estimated accurately, a systematic attempt at functional costing will usually add something significant to our store of knowledge, if only in establishing the relevant orders of magnitude.

A second answer is that, whilst there may be cases where experience and intuition may work just as well as, or even better than, anything that systematic (but imperfect) analysis produces, systematic analysis is at least communicable. With a systematic exposition of assumptions and presentation of data, it is possible for issues to be discussed with much less scope for misunderstandings about issues concerning objectives, resource allocation between objectives, and input/output relationships. "This seems to be the essential and fundamental argument for more systematic appraisal of efficiency in government, and one in which a study of economics and in particular micro-economics has a significant part to play." (55 p.18)
A. Books and Pamphlets


56-60 Reserved.

B. Articles


70. **Control of Office Output and Costs.**


78. Groenewegen, P.D., "The Economics of Defence", Defence Policy and Procurement Symposium, the Sydney University Extension Board in Association with the Centre for Continuing Education ANU, 1971.


90. Modern Government, May 1969. (See Reference 150.)


92. Powell, C., "Have the Services Learned to Live with the Office of Systems Analysis", Armed Forces Management, United States, October 1965, p.76.


C. Government Publications


103. Australia, Estimating Generally, Department of Army Training Discussion, Canberra, 14 May 1968.


111. Australia, Australian Military Regulation 30(e).


123-125 Reserved.

D. Addresses, Statements


138. Reid, D.N., The Parliamentary Joint Committee of Public Accounts, Address by the Secretary, Joint Committee of Public Accounts, Commonwealth Public Service Board, Canberra, Undated.


140. van Gelder, M.M., Program Budgeting in a Military Environment Symposium Presentation, Department of Accounting and Public Finance, ANU, Canberra, 1970.


142-145 Reserved.

E. Additional References


