DECLARATION

(Made in accordance with the degree rules of the Faculty of Arts, Australian National University).

This thesis is my own composition and I have acknowledged all sources from which I have drawn.

[Signature]
RESERVES OF ABILITY IN AUSTRALIAN MALE YOUTH

An Exploratory Study

B.C. MILLIGAN B.A. Dip Ed.

A thesis submitted to the Australian National University in partial fulfilment of the requirements for the degree of Master of Arts, (in Sociology).

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In the former case, my thanks are due��actively to the staff and students of the Departments of Sociology in the School of General Studies and the Institute of Advanced Studies of the Australian National University. I am especially and most respectfully indebted to my thesis supervisor Dr. L. H角色 for his guidance and forbearance valiantly to anticipate my needs as the project developed.

Among those who shared in the construction of the present study were my wife and children less directly. The entire exercise would not have been possible without their indulgence.

Finally, I acknowledge the permission of the Department of Army for the use of service records and the assistance of the staff of the Army Psychological Research Unit in the extraction and collation of the records.
The course of study of which this thesis forms part has been both refreshing and demanding. I am grateful both to those who provided the refreshment and to those who shared in the consequences of the demands.

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Among those who shared in the consequences of the demands my wife and children loom largest. The entire exercise would not have been possible without their indulgence.

Finally, I acknowledge the permission of the Department of Army for the use of service records, and the assistance of the staff of the Army Psychological Research Unit in the extraction and delivery of the records.
This thesis is centred on an empirical study of reserves of ability among Australian male youth, using a technique adapted from the European research of Wolff and Hernqvist. The study is pitched at the level of the senior years of secondary schooling. A cross-sectional design is involved, the data being based on a sample of National Servicemen enlisted in the calendar year 1971.

The study is conceptualised within the issue of equality of educational opportunity. The main empirical focus is on the relationship between measures of social class, intellectual ability and educational attainment. The principal point of departure in the method of estimating reserves of ability is the use of the benchmark assumption that children of the higher social classes receive all the education that their abilities, interests and temperaments allow. This assumption has the effect of confining the discovery of reserves to the ranks of the lower social classes.

The study investigates the extent of matriculation reserves among lower social class members of the sample. Estimates of reserves in the entire twenty-year-old male age group are then projected. Using the ratio of male to female senior secondary school enrolments, estimates are also made of the number of reserves in the corresponding female age group, and in the population age group as a whole. These generalisations are subject to limitations arising from problems of sampling and measurement and the study is regarded as being essentially an exploratory one.

Some implications of the approach used in the study for the mobilisation of reserves are discussed.
Chapter 1
INTRODUCTION

As a social institution, education is required to serve the interests of society and the needs of individuals. It is pertinent to both requirements that individuals advance as far educationally as their abilities allow. The structure of economic reward operates to fuse these interests and needs to some extent; the nexus between occupational and educational systems is strong in modern societies. But there has also been a persistent tension between Jacksonian (conservative-elitist-instrumental) and Jeffersonian (liberal-populist-expressive) ideas about the nature and purpose of education. Further, there is wide variation in the levels of educational attainment between different societies, without any reason to suppose matching variation in the educability of their populations. This suggests that societal interests, rather than human needs, have been dominant in determining the scale of education provided. If this arrangement seems to be defensible on the basis of rational norms of efficiency, it is not entirely functional for the reasons given below.

Firstly, societies appear to be relatively poor judges of their own future needs. In modern societies there is usually a significant lag between the emergent demand for skilled manpower and its supply. A contributing factor, besides faulty planning and the rapidity of technological change, is that the rational approach to educational selection in these societies concerns itself more with the problem of 'false positives' than with the problem of 'false negatives'.

1. The questions that this kind of proposition raises are merely deferred at this stage and not begged indefinitely.

2. In the United States context, Jencks (1968) reports that men's educational attainment accounts for about 35% of the variation in their occupational statuses, and that educational attainment 'is by far the most powerful measurable determinant of occupational status,' (p 282).

3. The distinction corresponds to that between 'Type Two' and 'Type One' errors in tests of statistical significance.
In other words, there is more concern with the incidence of failure among the minority admitted to a particular level of continuing education than with the question of whether the excluded majority contains individuals who might have succeeded at that level. This emphasis is reflected in rigorous selection standards, and although less immediate regret may attach to a strategy of this kind in a context of restricted provisions generally for further education, it is conducive to the lag effect. It may well be that shortages of qualified manpower are preferable to large surpluses, or to the creation of what Halsey (1962) calls an 'academic proletariat', but we have yet to witness either of the two in the Australian context. Only in a 'closed' society in which the requirement for talent is restricted to a small elite is there likely to be an evident surplus of talent, (McClelland, 1958).

Secondly, despite the dominant influence of the occupational system on what skills, and what levels of skill, are taught in the school, and despite the fact that a person's level of education largely determines his occupational prospects, there is no direct relationship between job requirements and the abilities developed through school learning. Indeed, Young (1961) has foreshadowed the breakdown of any society based on an exact or quantitative principle of converting talent into occupational status. Further, whilst work is becoming increasingly complex in modern societies, it is also becoming increasingly trivial as a component of the individual's life space, (Musgrave, 1965). And even within the work situation, the social climate, rather than individual skill, may be the principal determinant of productivity and of job satisfaction; at least this was the import of the 'Hawthorne' and similar studies.

Finally, because education is often perceived as an expensive consumer good, notwithstanding strong evidence of its capital investment value (Schultz 1961, Wheelwright 1970), the provision of education has typically been conservative in scale. (The situation is changing, but
more, it would seem, in response to public demand than to initiatives arising specifically from the economic sector).

In terms of total societal benefit, it is arguable that the dominance of economic over human considerations in the provision of educational opportunity should be reversed. This position would draw indirect support from the above comments, and more direct support from the following observations.

Just as work has become more complex, so too has the social matrix and the moral basis of society. Norms are no longer (if they ever were) simple reflections of uniform consensus about elemental standards of conduct. The present controversial issues, such as freedom, authority, even de-development, are no longer the preserve of social philosophers; they impinge upon the lives of every man. The capacity to extract meaning from modern life and the quality of social interaction are increasingly dependent on the learned ability to understand, and operate on, the reality of a complex social environment. Galbraith (cited by Nalson 1970) has pointed out that social conflict is increasingly between groups differing in educational level, as qualifications rather than capital become the keys to power and authority.

At a more practical level, the automation of production has led to a decrease in working hours and to increased leisure time. As Dow (1966) notes, these changes particularly affect those workers who are usually least well prepared educationally for the constructive utilisation of leisure.

The discussion so far is meant to be taken as asserting the primacy of the human over the economic, the expressive over the instrumental, functions of education. It subscribes to Halsey's view that 'the arrangements of society for the production of skill and wealth must, in the last analysis, take their place as means to the end of an enriched life for the individual citizen', (Halsey, 1962, p20). The discussion
might also be taken as advocating the notion of universal higher education. There is some merit in this notion but the tyranny of standards is deeply entrenched in the educational systems of modern societies,¹ and is unlikely to yield to blandishments about the quality of social life.

It would seem to be more realistic to propose that talent wastage be minimised by assisting each individual to attain the maximum level of education consistent with his or her ability, and at the standard that prevails in the system in question.² It is desirable, therefore, that a society has some notion of the extent of talent loss, or the reserve of ability, which exists among its population. Halsey (1962) notes that 'although adequate methods of estimating reserves of potential talent are available to all, very few countries have taken advantage of them', (p43). Australia seems to be a case in point, and it is appropriate now to focus on the Australian scene.

A strong article of faith in the orthodoxy of educational thought in Australia is that our centralised system best satisfies the requirements of efficiency and equality of opportunity. Australian sociologists have recently been exposing the 'myth of egalitarianism' but the claim of providing equality of educational opportunity is often used to rebut criticism of our centralised system. Certainly this claim was vigorously asserted and defended by Dr. Mossenson, the Director of Secondary Education for Western Australia, in a recently televised discussion on problems of Australian education.³ Furthermore it has to be remembered that

1. The tyranny exists in all modern societies, but its mode of expression and the dynamics of selection may vary. In regard to the former, Clark (1960) distinguishes between 'forcing out' and 'cooling out'; with reference to the latter, Turner (1960) distinguishes between open contest and latent sponsored processes of selection.

2. It is tacitly accepted that standards will continue to be applied and that they will reflect societal or economic interests to some extent.

3. The discussion was presented by the Australian Broadcasting Commission network on 4th April 1972.
historically the present system developed out of the chaos of a decentralised one which patently was neither efficient nor provided equality of opportunity (Barcan, 1964).

Although the objectives of efficiency and equality appear to reflect the distinction between economic and human values they can be related: an efficient education system (and an efficient society generally) is likely to be one which provides opportunities for talent to be actualised, in whatever sectors of society this talent may be found. Again, an efficient education system, operating as does Australia's in the context of a concern for standards of achievement, would be one in which entry to successively higher levels of education was determined solely on the basis of ability.

For example, if standards or other factors operate to restrict university enrolment to 10% of an age group, then efficiently, and with concern for equality of opportunity, those students would be drawn from the top decile of the ability distribution in the group. To the extent that such restrictions were arbitrarily severe, so that a higher proportion could in fact be expected to cope with university education, there would still be reserves of ability (persons who had not attained the highest level of education commensurate with their ability), but they would exist within a context of equality of such opportunity as the system provides.

1. As one manifestation of this concern, Conway (1971) remarks that 'few citizens in the world are more impressed by paper qualifications than Australians (or hold them) in such ridiculous veneration,' (p221). That is, we seem more concerned in Australia about what Jencks (1968) calls the 'certification' rather than the 'socialisation' function of education.

2. Something like this percentage of Australian school-leavers undertook full time university courses in the late 1960's, the period with which the present research deals.

3. The fact that ability, as measured by intelligence tests, is a poor predictor of university performance—or to put it more accurately, that differences within the relatively narrow range of ability of university students explain understandably little of the observed variance in their performance—doesn't affect the logic of this illustrative argument. It would, however, suggest the need for a broader approach to the measurement of ability to handle university work.
Under stringent circumstances, therefore, there is likely to be a large group of 'false negatives' (potential graduates who are refused admission) but a relatively small number of 'false positives' (admitted students who are unsuitable university material). Were university places to be liberally provided, the effect would be reversed.

The preceding argument is, of course, too mechanistic and it glosses over some significant problems. But to the extent that an education system, and more cogently, a society, departs significantly from the above 'model' both its efficiency and its concern for equality would be questionable. In underdeveloped societies, any such departure is likely to be plain; in complex developed societies the interplay between social qualities and educational performances is liable to be more subtle, and departures from effective equality of educational opportunity have generally to be teased out. If inequalities do exist in such societies they are unlikely to yield to a simple process of what Shils (1965) calls 'consensual modification'. Rather, persuasive information about their existence, loci and extent will be necessary.

Some regional studies (to be reviewed later) have shed doubt on the confidence of our claims concerning efficiency and equality in education, and the recent committee of enquiry into education in South Australia found it necessary to make twelve separate recommendations designed to reduce inequalities in that State, (Karmel, 1971). But the reality of the situation appears not to have been tested on a national level. This is understandable: apart from Departmental coyness about cooperating in independent research (Bassett, 1970), there are obvious problems of standardisation involved in the

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1. This is not to say Australia is without glaring inequalities; the educational problems of Australian aborigines and non-English speaking migrant children are the most obvious cases in point. Although neither group is likely to contribute many representatives to, say, the top decile of the national distribution of ability as measured by conventional tests, this neither explains nor diminishes the problem of their education.

2. This bureaucratic defense mechanism is in turn understandable. Meynihan (1968) points out that 'information about human behaviour is rarely "neutral" and...information about the performance of large institutions will almost always be threatening', (p23).
collation of national data.

Notwithstanding the latter difficulty, this study will serve to indicate whether the Australian education system is efficient in providing equality of opportunity. In concise terms, the study aims to investigate the extent of the reserve of ability among a national sample of young male adults, and to examine some structural correlates of its variation. The inquiry is focussed at the matriculation level, in view of the importance of this qualification for subsequent life chances. As a recent Monash University report puts it, 'the Universities' entrance criteria are a major determinant of Australia's present class structure' (cited by Fensham 1970, p167).
Chapter 2

ANALYTICAL CONCEPTS AND PROBLEMS OF DEFINITION.

As the introductory discussion implies, the concept of equality of educational opportunity underlies the investigation of reserves of ability. In theory, if equality of opportunity in all of its various forms were effectively to be achieved, either there would be no reserve of ability or the residual reserve would be entirely random with respect to its social composition. Under these circumstances, each individual would be in a position to attain the maximum intellectual level that his genetic endowment would allow, and the maximum educational level that his developed ability would support. But that is a post hoc version of what the concept denotes and it obscures the complexities involved.

The concept of equality of educational opportunity may take various forms, no one of which need devolve upon considerations of ability. Moreover, the realisation of any one form which does involve such considerations would not of itself guarantee the full utilisation of an age group's intellectual potential. A major problem here is that intellectual potential cannot be measured as such, and that measured ability is affected by social experience. Thus, the 'genetically' bright but culturally disadvantaged child is unlikely to attain his maximum intellectual development, is likely therefore to do less than justice to his real potential on ability tests, and is also likely to adopt a spuriously low level of educational aspiration. Unhappily there is no formula by which we may correct an IQ,

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1. Equality of opportunity does not imply equality of outcome, even among persons of the same level of ability. There will always be individuals who do not fully use the opportunities provided but, under conditions of effective equality of opportunity, there should be no tendency for them to cluster in particular sectors of society.
say, for the effects of cultural disadvantage.\textsuperscript{1} Twin studies may appear
to provide some rationale for such a procedure, and differences of more
than 20 points in IQ have been found between separated twins (J. McV. Hunt
1961). However, it has been rare for separated twins to be allocated to
conspicuously different cultural environments, and, in any case, sensitive
and reliable instruments for measuring differences in educational
environments are lacking, (Bloom, 1964).

As is implied above, equality of educational opportunity is
easier to define in the breach than in the observance. Even so, the
concept cannot be defined in an entirely independent manner. F.J. Hunt
(1970) observes that, like stratification, inequality of educational
opportunity is a concept which can only be examined in terms of the behaviour
from which its presence was originally inferred. And this is so whether
the approach involved is philosophical or sociological, analytical or
empirical.

Basically, the concept of equality of educational opportunity
is a normative one. That is, the notion of what constitutes both equality
and opportunity is affected by societal judgements of educational need
and sufficiency. Coleman (1968) and Dow (1971) observe that the notion
of equality of educational opportunity was barely comprehended in the
past. Rather, the educational status quo was endorsed by all classes
as providing differentiated opportunities consistent with their status and
their destination. What Dow terms 'the class based intellectual Calvinism'
of the British working classes retarded their enthusiasm for any other
than practical, elementary education whilst leading them to acknowledge

\textsuperscript{1} Nor would there be much point in doing this unless programmes
existed which could transform the statistical correction into a
real gain. Level of performance in an IQ test, which is itself
validated against the average child of normal background and
normal educational experience, remains generally indicative of
the pupil's level of functioning in school learning tasks.
that the children of ruling classes required a more substantial preparation for their higher destination in life. In Australia, also, education beyond the elementary level was originally a private and voluntary undertaking confined to the heirs of wealth, and the right of all to secondary education has only become a reality in the last twenty years with the abolition of secondary qualifying exams. Until comparatively recent times, therefore, 'education was a corollary rather than a determinant of social class position', (Floud 1962, p95), and the concept of educational opportunity in each society starkly reflected the class structure of that society.¹

Halsey (1962) notes that the basic right to education is contingent in practice on the availability of educational resources (as between developed and underdeveloped societies, for example), and on assessments of the capacity of the individual to profit from education. However, he concurs with Wolfle's comment that 'if one nation can bring an eighth, or a quarter or a half of its youth to the satisfactory completion of the general secondary level of education, another nation cannot claim that only three or four or six per cent of its youth is intellectually qualified for that level of educational attainment' (cited by Halsey, p26). Yet differences of this scale do exist in the world,² and differences of a lesser, but still pronounced, scale exist between various sectors or systems of education within developed societies. In Australia in

1. Remnants of intellectual Calvinism among the lower socio-economic classes may still exist in Australia: estimates of the level of education regarded as being desirable and sufficient to 'get along' in Australia today are related to the socio-economic status of respondents, (Jones, 1971). However the evidence also points to a rise in educational aspirations among all classes over time.

2. See any edition of the International Yearbook of Education.
1968, for example, there was a ratio of almost two to one between the highest and lowest State figures of school participation rates among seventeen year old males, (Karmel, 1971).

Finally, Dow (1971) points out that the concept of equality of educational opportunity is one which begs the instrumental question: "opportunity to do or become what?" Thus its meaning and significance hinge on the selection of the end to which opportunity refers and in terms of which its attainment is to be judged.

None of the foregoing problems is held to be sufficient to arrest inquiry in this area, (and some are liable to be problematic for social inquiry generally). What they do suggest, however, is that the outcome will be quite sensitive to the definitions and techniques used, and that any assessment of the extent of equality of educational opportunity, or of reserves of ability, in a given society should be regarded as being of a relatively short-run character.

It is proposed now to review ways in which the concept of equality of educational opportunity has been defined, and used, analytically.

Dunn (1970) considers the problem of equality of educational opportunity from the point of view of the distribution of educational resources, including both material and personnel factors. Evetts (1970) also notes that equality in the share of educational resources, regardless of individual differences in pupils' ability or apparent needs, is one sense in which the concept has been used. The instrumental meaning which is implicit in this notion is the opportunity to make effective use of whatever developed abilities one brings to the educational process. The strategic questions involved are the extent to which an equal resources approach can secure this opportunity, and the extent to which compensatory approaches are necessary and justified.
Dunn goes on to argue that 'while an equal minimum resources approach has much to commend it...some efforts at a compensatory approach are essential if society wishes to make real inroads on inequalities of educational opportunity', (p 133). In any case, as Lieberman (1959) points out, absolute equality in the provision of resources is unattainable, so that some minor inequalities have to be disregarded in assessing whether or not reasonable equality of this nature exists. He implies that the social distribution of such minor disparities is a random one, and ignores the possibility that they might cluster around particular segments of the population, and that their combined and cumulative effects may well result in major, systematic inequalities.

In the Australian case, for example, it would appear that the gap between minimum and optimum resources is great and widening. Even within the government school sector, differences in the degree of parental support of schools, coupled with matching subsidy formulas, suggest that by the time a respectable 'floor' is established, the 'ceiling' will have floated to a higher level. ¹ For this kind of reason, the South Australian Committee of Enquiry, (Karmel, 1971) recommended that the subsidy formula be abolished in favour of a needs approach. ² Certainly it is now clear that

1. When the Independent Non Catholic sector is brought into consideration, the discrepancies are clearly magnified. Indeed the issue of privilege appears to be replacing that of religion per se as the focus of the State Aid conflict. The conflict may not be without its positive functions. Rich private schools at least provide an example of the total resources which can be brought to bear on the educational process. For as long as they exist, and particularly for as long as all taxpayers contribute to their growth, there is the chance that these schools may come to serve, unintentionally, as models for the aspirations of all sectors of the community. (The social, as distinct from educational, structure and function of such schools is another question).

2. South Australia has the only government to have so moved and its action was repudiated by the then Federal Minister for Education and Science. Again, since the needs approach merely involves a redistribution of funds it will lead to a rationalisation rather than elevation in the general quality of education provided in State schools.
not all pupils are able to take the same advantage of what education provides in the way of equal (or nearly equal) minimum resources; factors outside the classroom combine to produce differences in response to such resources. Short of a quite general and rapid movement to provide 'equal generous' resources it would seem that some selective inequality of provision may be essential in attaining effective equality of opportunity. But if this is a logical requirement, the question of its perceived legitimacy remains.

Dow (1971) makes the point that compensatory education is seen to be quite legitimate in relation to the physically handicapped, but there is little community awareness of, or support for, the necessity of compensatory education in relation to the culturally handicapped. Moreover, the extent to which compensatory measures are effective is an open and empirical question, and the evidence to date appears to be conflicting. When it is considered that one half of the intellectual growth evident by the age of seventeen has normally occurred in the first four years of life (Bloom 1964, p68), and that the home environment continues as a powerful influence on educational aspirations and achievement, the presentiment is strong that actions confined to the formal educational process will be insufficient to overcome the problems of cultural handicap. This was clearly the burden of Acland's criticism of the compensatory school programmes which flowed from the 1967 Plowden Report in England, (Acland 1971).

Dow (1971) suggests that the meritocratic value which underlies most usages of the concept of equality of educational opportunity is misplaced and is irreconcilable with the ethic that every child is of equal intrinsic worth. She argues that 'the drive for equality of opportunity has been in essence a drive to create social mobility' (p162), and Dahrendorf (1969) refers to the 'stubborn tendency of modern societies to institutionalise mobility by making a person's social position dependent
on his educational achievement', (p115). For Dow, the principle of open access to privilege which is held to be the promise of the meritocratic society is neither realisable nor morally acceptable as it stands. It is unrealisable in her view because of imperfections in the measurement of talent; it is morally unacceptable because of its negative implications for those of indifferent ability. Because a meritocratic approach basically underlies the present inquiry, it is appropriate to consider Dow's argument at greater length.

By definition, the meritocratic approach is designed to sustain certain inequalities, and Dow refutes any attempt to distinguish between 'permissible' and 'impermissible' inequalities. This distinction is made implicitly in the United Nations Declaration of Human Rights, and explicitly by Lieberman (1959). The general tenor of the distinction is that inequalities associated with the ascribed and collective characteristics of race, class, religion and place are impermissible, whilst those which arise from the individual characteristics of merit and ability can fairly be regarded as permissible. The difficulty here is that ascribed characteristics affect the development (and utilisation) of the individual's ability; again, measured ability is in part socially determined. It is this problem especially which will impose a limit on any attempt to bring about a class - or race - free opportunity structure.

1. Gardner (1961) puts the latter point more strongly: 'extreme emphasis on performance as a criterion of status may foster an atmosphere of raw striving that results in brutal treatment of the less able, or less vigorous, or less aggressive', (p18).

2. The problem of the social determination of ability is an endemic one. The only way to engineer an opportunity structure which is independent of social origins would be to remove social variation at least during the formative period of intellectual development. This would probably require that all children be segregated at birth into intelligence nurseries and exposed to a common programme of stimulation. Slow developers (the genetically dull) could be screened out at an appropriately early stage and reunited with their parents. Additionally, to reduce social class differences in genetic potential, mating would have to be randomised between classes. These "Brave New World" techniques are not advocated by the author - they are merely logical requirements if the meritocratic ideal is to be fully realised. But then its durability in practice would be questionable, (cf Young, 1961).
Dow implies that inequalities in the distribution of status and esteem which derive from differences in ability are no more permissible than those which derive from other kinds of difference. She proposes that the meritocratic value be replaced by the ethic that all persons be accorded equal status and esteem as individuals. Similarly, Gardner (1961) cautions that achievement not be confused with human worth, and Vlastos (1962) observes that if a person 'is valued only for his merit, he is not being valued as an individual' (p44).

McLaren (1970) too asserts that 'the only practical form of equality of opportunity is such an equality of material provisions as will enable each person to realise himself as an individual within society,' (p85). In particular he deplores the idea that a person's social and cultural background should be regarded as 'something to be overcome according to our notions of what is good for him,' (loc cit). Implicit here is the point that an individual has the right to reject, as well as to expect, opportunities to progress in directions valued by the dominant culture.

The principle underlying these sentiments has been a familiar one in ethics and in the philosophy of education, and it draws on the concept of natural and indivisible human rights. But it seems to be at variance with the reality of social experience, and Dow recognises that its effective attainment would require that competition and ranking be legislated out of education and economic systems. History suggests that this would be an unlikely event; psychology suggests that it would be undermined by other elements of 'human nature', whilst Dahrendorf (1968) argues that sociologically it is simply impossible to conceive since it runs counter to the very moral mechanism of human society.

The point of this conflict of ideals can be said to hinge on the distinction between a natural equality of rank and inequalities of social character. In so far as society is inclined to ignore the former in rewarding the latter, it raises a moral objection. But in so far as
society is itself regulated by a moral (that is, normative) apparatus, inequality of social character can be said to be a 'natural' effect, though one which is arbitrary in terms of human nature, (Dahrendorf, 1968). Thus Dahrendorf locates the roots of social inequality in the very character of norms, and in authority relations which are enacted through their enforcement.

For Dahrendorf (1969) 'the ideal of a society in which all distinctions of rank between men are abolished transcends what is sociologically possible', (p22). Plainly, stratification is endemic to human society. But to accept this proposition does not require one to affirm that the precise system of stratification which exists in a given society, at a given time, is 'functional' for that society in the sense of being necessary and inviolate. This requirement is the burden of the classic functionalist model of social explanation. It is a gratuitous one though it lends itself to support of the educational status quo in developed societies. Tumin (1967) observes that 'smoothly working and stable systems of stratification, wherever found, tend to build-in obstacles to the further exploration of the range of available talent,' (p54).

This hints at the roots of 'intellectual Calvinism', but the fact that the situation is at least susceptible of change serves as a reminder that a meritocracy is merely one of the possible principles of social ordering.

The strong implication of this sociological perspective is that if ranking were to be eliminated from education systems it would find an outlet in some other normative context of social life. But education is a dominant value and achievement is rewarded accordingly, whilst access to it is restricted in ways both 'rational' and invidious - and if access were not restricted, education would not be strongly valued. The experience of social ranking encountered in education is likely therefore to obscure the actor's perception of a state of natural human equality.
rapprochement seems possible only to the extent that society redistributes rewards in accordance with conscientious effort at all levels of ability, (or educability). Thus Gardner (1961) argues that "an excellent plumber is infinitely more admirable than an incompetent philosopher," (p86). But nowhere in ethics is it proposed that equality of educational opportunity entails equal educational outcomes per se. For this to arise it would be necessary to restrict the education of all to the level attainable by those of least ability. Rather, Floud (1960) poses the 'fundamental problem' as follows:

How may differences in educational performance be reduced to differences of natural endowment? Some pupils will always do better than others, but it is desirable that the order of inequality should be, as it were, a natural one, unmarred by factitious and irrelevant social differences, (p93).

As she recognises, such a meritocratic ideal is unlikely to be attained in practice given the existence of individual differences in interests and temperament, for example, and given again the right of individuals to reject the opportunities provided. Nevertheless, and despite the hoary problem of measuring differences in 'natural endowment', this would seem to be the kind of ideal which should inform and guide policy in the 'open' society. This is not to say that it is free from possible dysfunctions: unless movement towards the realisation of this ideal were to be accompanied by a greater provision of places at all levels of education, a 'zero-sum' situation would arise. For then some currently successful students of modest ability would be forced to yield their scarce places to students of higher ability.

Given that the scale of educational provision in Australia

1. Or, as the social philosopher Wilson (1966) puts it: 'the rules of the game (should be) arranged so that merit and desert are rewarded, rather than qualities which the individual can do nothing about,' (p64). Bracketed words not in original text.
seems always to have been conservative in character, this 'zero-sum' implication may explain much of the apathy surrounding the concept of compensatory education for the culturally disadvantaged. It may also hint at the potential resistance which any widespread attempt to apply the concept would encounter.

Using access to higher education as a criterion, and ability and social class as referents, Rogoff (1961) proposed a typology of patterns of equal opportunity:

a. the 'radical' pattern, in which ability alone determines access to higher education;

b. the 'moderate' pattern in which both ability and social class influence access, (with ability factors having an effect equal to or greater than that of social class position);

c. the 'conservative' pattern in which social class alone determines access.

It is clear that the 'radical' and 'conservative' patterns of equality of educational opportunity are especially ideal-typical in character. In relation to educational outcomes, they will be disconfirmed to the extent that neither ability nor social class is a sufficient condition of educational attainment. Rogoff points out that her typology can serve as a 'crude research tool' for evaluating the relative effects of social class and ability on educational attainment. The logic of her approach requires that the problem of interrelationship between the two independent variables be handled, operationally, by controlling for each in turn. Social class and ability are also the principal independent variables involved in the 'broad approach' (see below) to the measurement of reserves.

1. The interrelationship arises not merely from cultural bias in the techniques used to measure intelligence, but also from the tendency to intra-class choice of marital partner.
of ability, and this approach uses a similar technique of control. It should be possible, therefore, from the data generated in the present study, to investigate the extent to which the 'real' type of equality of educational opportunity in Australia corresponds to each of Rogoff's ideal types.

To recapitulate, this chapter has been concerned with the general analytical concept of equality of educational opportunity, and with the relationship between this concept and the more narrow one of reserves of ability. The discussion has some clear implications for the operational measurement of reserves. Firstly, the obtained estimates of reserves will be sensitive to the educational norms of the society concerned, and to the techniques of measurement used. In particular, when dealing with a heterogeneous society, in which the quality of intellectual stimulation of the young child varies significantly from one sector or sub-culture to another, estimates of reserves based on conventional measures of developed intelligence will be conservative in scale. Finally, research into reserves of ability is clearly not just a matter of establishing social facts; it must be seen, at least in part, as endorsing a meritocratic principle of social ordering.
Chapter 3
A REVIEW OF RELEVANT EMPIRICAL STUDIES

In empirical research into the problem of equality of educational opportunity, some measurable referent, desirably independent of, but related to, educational achievement is required, with achievement itself constituting the dependent variable. Usually some measure of mental ability is used as a referent (or as an intervening variable) in this context, and where measures of this kind are used the research can be extended to provide an assessment of reserves of ability. Logically, any other variable satisfying the requirements of measurability, independence, and validity could be used. Social class is such a variable and it is one which may, in a given context, prove to be as good a predictor of educational achievement as is ability. But the idea that social class should be the arbiter of educational opportunity is an unconscionable one, however much this 'conservative' pattern may outcrop in social practice.

Among the factors which satisfy the above requirements, the most legitimate contender for selection as an independent variable is measured ability. This is not to overlook the influence of social factors on measured intelligence. Nor is it to place a spuriously high or exclusive value on the latter as a predictor of educational achievement. But it is relevant that ability as measured by conventional tests is a comparatively objective and reliable index of a person's current standing, relative to his age-group, in respect of certain reasoning skills, and that these skills (and so his assessed intelligence) are related to school learning and achievement.

It is proper and constructive that sociologists, and 'environmentalists' generally, should be critical of any vaunted claims

1. That is, nominal or analytical independence; the logic of this area of research requires that there should be a functional relationship between achievement and the referent in question.

2. Social class and ability are themselves correlated to some extent and the relationship between social class and achievement is usually seen to be reduced when the effects of ability are partialled out.
about the innate basis of measured intelligence, about culture-free tests, or about the constancy of the IQ. It is held to be unreasonable and misleading to ignore the evidence, available particularly from intra-family studies involving siblings of various degrees of genetic relationship, that intelligence tests appear to measure innate capacity to some extent, and that at all levels up to tertiary education, measured ability is the best single predictor of achievement.\(^2\) As Gardner (1961) puts it, 'anyone attacking the usefulness of (ability) tests must suggest workable alternatives', (p49).\(^3\) Where measures (or controls) of ability are excluded from empirical research into the problem of equality of educational opportunity, they are conspicuous, and beg the question, by their absence. The salient question begged is that the educational achievement of different social classes or groups varies more than does their ability.

The use of ability measures in this general area of research does not render inquiry any less sociological. The real focus remains on the problem of differential life chances within social systems which provide varying degrees of structured access and constraint. This problem is a prototypical one for sociological inquiry and it can be conceptualised in various ways, no one of which commends itself as being superior. The study of reserves of ability also subscribes to the fundamental sociological interest of uncovering the extent to which group or structural effects overlie individual differences in achievement. Again, no single theoretical approach is likely to be adequate to integrate all facets of the problem.

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2. See, for example Jencks (1968) and Fraser (1959). At the tertiary level again the degree of intellectual homogeneity which exists among students operates to limit the statistical relationship between ability and achievement.

3. 'Workable' in this context clearly implies predictive validity. The discovery of any real alternative, at least within the framework of the theory of mental abilities, seems likely to be conditional upon a prior change in educational aims and curriculums. (It is possible of course that alternatives suited to the existing educational context will arise in other areas of knowledge eg. neurophysiology.)
Clearly, the assessment of reserves of ability belongs to the category of empirical research; it provides the data for explanatory theory, but does not, of itself, explain anything. And this is so generally of empirical associations between social variables and behaviour. Since Durkheim used this general kind of relationship for profound methodological purposes it has passed into the realm of 'social fact'; it constitutes, as it were, a warrant for sociological theorising. The role of explanatory theory in the present context would be to account for the dynamic processes by which differences in social background are translated, independently of ability, into differences in educational achievement. The present study does not aspire to this role.

The studies included in this review were chosen according to their methodological relevance in the case of overseas work, and their general topicality in the case of Australian work. The more restricted nature of the former criterion is based on the belief that international comparisons of specific outcomes (e.g., reserves of ability) are generally unprofitable. It is held that each national education system is a unique product of historical influences and contemporary needs and values, and that educational outcomes cannot be evaluated and compared without first interpreting their significance in relation to the entire normative life of the societies concerned.

At the operational level of research, also, there will obviously be difficulties in obtaining strictly comparable data. For example, there are no culture-free tests of ability, and the quality of education varies significantly between, and even within, nations. The only reasonable standard assumption, despite Jensen (1969), may be that of equi-potentiality in the 'biological' intelligence of various populations, but this assumption cannot be tested. This is not to deny that comparative research has value, but with respect to the present problem it will be more helpful to relate Australian data to the norms and values of Australian society.
In fact, the most relevant research from a methodological point of view has been of overseas origin. Basically, the present research will follow one of the methods used by Wolff and Harnqvist (1962), and Husen and Boalt (1968), in Sweden, in assessing national reserves of ability. The principal concepts and techniques used by these workers are introduced in the following chapter.

Little other overseas work appears to have been directed specifically towards assessing reserves of ability, and none has been pushed to the same methodological extent as this European work. However, most of the overseas studies reviewed here have assembled the ingredients necessary to enable reserves of ability to be calculated, and each has provided unmistakeable evidence of their existence.¹

Floud, Halsey and Martin (1958) attempted to assess the extent to which equality of opportunity prevailed in the English education system. They defined the concept operationally as requiring that those with the same IQ have the same chance of entering grammar school. The existence of wide regional differences in the availability of grammar school places in England does not affect the logic of the above definition, but it does affect the interpretation of the results obtained. Thus, even if ability were the sole criterion of selection, the actual chance of selection at each level of ability would vary from region to region. Moreover, social class may still operate as a latent factor in this context. As Douglas et al (1968) note, the middle and upper classes have the inclination and wherewithal to move their families to areas which provide a greater number of places.

¹ The basic ingredients required are a national sample, a measure or measures of ability, data on educational attainment or achievement, and a measure of socio-economic status. Additional variables such as sex, ethnicity, geographic location, family size, etc. can be used to identify the main social sources of reserves. They were not so used in the Swedish studies, but some will be included in this research.
The Floud, Halsey and Martin sample comprised male pupils in two regions of contrasting social and economic character. The principal conclusion of the study was that 'the present differences in the proportion of the contribution of various occupational classes to the grammar school intake can be explained almost entirely in terms of the unequal distribution of measured intelligence' (p56). In other words, at that time and for that sample at least, it appeared that equality of educational opportunity as Floud, Halsey and Martin had defined it, did in fact exist. They observed, however, that the generally satisfactory situation they found 'does not dispose of the problem of equality of educational opportunity since measured intelligence is...an acquired characteristic...and we are under an obligation to examine the differences of environment which undoubtedly contribute largely to differences in measured intelligence,' (p65). They provided some coarse evidence of such environmental effects but conceded that the features of the home environment which entered into their analysis could not be regarded as social determinants of intelligence. When they extended their study (and their criterion) to look at secondary achievement, they observed that 'there are marked differences according to their social means in length of school career and opportunity for further education enjoyed by children at the same general level of ability', (p146). But their evidence in this respect was incidental and based on rather small sub-samples. There was clearly a need for a systematic national study of these aspects of the problem.

The work of Douglas et al (1968) satisfied this need. They undertook a longitudinal study of the secondary school career of a national sample of more than 5000 boys and girls. With respect to both school leaving and attainment the data confirmed the tentative finding of

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1. Presumably, however, reserves of ability were still to be found nationally at the point of entry to secondary schooling. In poorly provided areas there would have been cases of non-selected pupils with levels of ability and educational achievement higher than those of some selected pupils in better provided areas. In other words the observed equality existed within, and not across, regions.
Floud, Halsey and Martin that a sharp social gradient existed even when intelligence (a non-verbal measure in this case) was controlled. In other words, the generally satisfactory situation, by Floud et al's criterion, which existed at the point of selection for secondary schooling, was not maintained thereafter.

Douglas et al found, for example, that for both leaving age and results in the General Certificate of Education (GCE) examination 'the fact of being middle class roughly doubles the chance of educational success even after allowing for differences in measured ability', (p48). There was little difference in this respect between boys and girls, but it was found that the pupils of working class parents suffered less relative disadvantage in schools with a good record. (Since the assessment of record was based on independent evidence the statement is not as tautological as it sounds). Even where parental interests and expectations were high, only 25% of manual working class pupils of high ability stayed beyond the minimum leaving age in poorer secondary modern schools, compared with 60% in the better schools of this type. Clearly, significant reserves of ability existed by the end of secondary school.

In terms of sampling and basic variables the Crowther Report (1959) is the English study which most resembles the present research. It concentrated also on the secondary school years and used psychometric and sociological data obtained from a one per cent sample of British National Servicemen. Although it did not proceed in detail to estimate reserves of ability it concluded that 'available resources of high ability are not fully used by the present system', (Vol I p8). For example, it showed that 42% of recruits in the top 10% of the ability distribution had left school by the age of sixteen; that is, before they had had an

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1. High ability was defined as including the top sixteen per cent of the distribution of intelligence in the age-group.
opportunity to attempt the G.C.E., though 83% of actual candidates at that level of ability succeeded in passing at least four G.C.E. subjects. More significantly, this reserve of talent was strongly related to social class differences. For example, in this top ability group only 19% of the sons of professional and managerial fathers had left school by the age of sixteen, while 63% of the sons of 'manual' fathers had done so, (calculated from Table Ia, Vol 2, p118).

Apart from this general finding, the most relevant aspects of the Report vis-a-vis the present research are that ability group was rather ill-defined by a simple summation of scores in a battery of assorted ability, aptitude and attainment tests; that less than 3% of recruits in the lower half of this 'ability' distribution had stayed at school beyond the minimum leaving age and less than 1% had obtained the G.C.E., and that only one recruit out of 2402 in this ability range had proceeded to tertiary education, (Table 3a Vol 2 p122). These statistics suggest that it would be wasteful to search for matriculation reserves among early school leavers in the bottom half of ability distributions, especially in the context of educational systems in which a minority of the age group proceed to this level, and in which there is zealous concern for standards of performance.

The Robbins Report (1963) covered essentially the same variables as the Crowther Report. It served to update the evidence relating to terminal attainment and achievement in the secondary school, and it extended its canvass into the area of higher education. It found continuing evidence of class based inequalities at the secondary stage, and these persisted independently of measured ability. Within the tertiary level, however, the relationship had lost its significance, suggesting that those working class students who do enter tertiary education have (and have had to) overcome whatever cultural disadvantages their home environment offered. The Robbins Report, inter alia, noted the Swedish work of Wolff and Harnqvist and made a useful criticism which will be mentioned later.
Wolfle's American research (Wolfle, 1954) was pitched at the level of college education. Although the study was ostensibly directed towards resources of specialised talent, Wolfle observed that 'the possibility of differential selection of students for specialised fields...is theoretically attractive, but not practically feasible at present', (p139). He therefore based his survey on the pool of all specialised fields combined.

A national sample which had originally been tested at fourteen and was followed up in subsequent years was used. The ability test employed was of a mixed item type, similar to that used in the present study.

Wolfle distinguished between essential and non-essential determinants of entry to college, the distinction corresponding generally to that noted above between permissible and impermissible bases of inequality. He found that both sets of determinants were operative; in effect, Rogoff's 'moderate' pattern of equality prevailed. Thus, 'the probability of entry to or graduation from college did not get close to 100, even at the highest intelligence level', (p149) - in this case the top 0.1% of his sample, among whom only 69% graduated from college. Again, he found that 'the probability of enrolling in college decreases more sharply as one goes down the ability scale for children from economically and socially less favoured homes than it does for children from more favoured homes', (p163). However, as in the British case, chances of graduation from college once admitted were relatively little influenced by home background as such. Rather, background factors appeared to show up in the areas of choice of college and major field of study.

Consistent also with the British case, Wolfle found that only a small proportion of students in the bottom half of the conjoint distribution of ability and high school grades enter college, and that few of those who do ever graduate. Wolfle did make some projections about the extent of college reserves in the American population; the precise figures are of little interest here, but the approach was based on the notion of 'bounds
of ability' and involves reserves in the 'narrow sense', (see below).

Folger, Astin and Bayer's work (1969) served to update and to confirm Wolfe's general findings. Their investigation was based on 'Project Talent' data and involved a five-year longitudinal survey of the educational and occupational destinations of a national sample originally drawn and tested in 1960, when members were in the senior grade of high school. The major criterion variables, as for Wolfe, were chances of entry to, and graduation from, college, and the principal independent variables used were ability and socio-economic status. As in Crowther's British study, ability was defined by a composite score on a conglomerate of reasoning, attainment and aptitude tests. Complete follow up information (gained by means of a postal questionnaire) was obtained for only sixteen per cent of the original pool of 100,000 cases. Since the authors acknowledge that questionnaire response rates differed systematically by race and class, and since the study was unable to take account of dropouts in the earlier years of secondary schooling, it is probable that their estimate of college reserves (for example, 20%-30% among students in the top ability, and bottom SES, quintiles) were conservative. Here again, the independent effects of SES on college graduation chances were substantial.

The Coleman report (1966) on equality of educational opportunity in the United States went substantially beyond the scope of the studies already mentioned. It provided national data on the relationships between achievement and a comprehensive range of social and psychological variables. Perhaps its main import was to suggest the need for more attention to the influence of the peer group on educational achievement. However its special relevance to the present study lies in the criterion measure used.
Observing that scores on the verbal intelligence test showed the highest correlations with scores on other tests of ability, achievement and attainment, and arguing that the usual achievement tests cover material that is common to all school curriculums (so limiting the variance between schools in tests of this type), the researchers made the critical decision to use the verbal intelligence score as the index of achievement. This decision effectively prevented their being able to control for any initial differences in ability between the students of different schools. On the one hand, the decision may have worked to magnify the apparent effect of the school; on the other, it may have operated indirectly to boost home background effects at the expense of school effects. There is no way of estimating which of these tendencies was the stronger; it simply turned out that school effects accounted for little of the variance. However, Dyer's reanalysis of the data, using conventional achievement measures as the dependent variable, found more pronounced effects associated with the school, (Dyer 1968).

Much of the relevant Australian work of an empirical character has been collected by Fensham, (1970). However, none of the empirical studies in the collection is based on a national sample - which is again understandable given the lack of standardisation in both ability and achievement measures used in the various State systems - and none includes all of the ingredients necessary for the assessment of reserves of ability.

Most of the Australian studies purport to show that aspects of the social environment are closely related to educational outcome. For example, Fensham shows that the distribution of Commonwealth Secondary and tertiary scholarships in Victoria bears an inordinate relationship to the general type of school attended. Relationships of a similar direction but lesser

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1. The apparent effect of the peer group may itself have been based partly on an underlying relationship between ability and self selection of school. Commenting on the Coleman Report, Wilson (1968) observes that 'the hypothesis of contextual effect is always vulnerable to the counter-hypothesis of self selection', (p83).
degree have been found in a New South Wales survey conducted by Verco and Whiteman (1970), and reported elsewhere.

Hunt's study on nine Melbourne secondary schools of differing type and socio-economic clientele is supportive of Fensham's results in finding positive correlations between school resource variables and pupil achievement. (The data also showed that these resource variables were both inter-related and associated in turn with family background variables.) McLaren's similarly based study of five Melbourne High Schools showed wide differences in their retention rates between Forms 1 and 6, but little inter-school variation in the proportion of matriculation candidates who succeeded in qualifying.

Fitzgerald quotes Blazely's longitudinal data on the 1962 cohort of Form I pupils in Tasmanian schools as showing that seventy per cent of the sons with professional fathers gained entry to the matriculation form compared with twenty-five percent among the sons of unskilled workers. (South Australian figures, published in the Committee of Enquiry's report noted earlier, show a similar trend with retention rates between Grades 8 and 11 of 48% for pupils in the lowest socio-economic class and 73% in the highest. And as the report notes, these figures probably underestimate the real disparity since they are based on Government school pupils only). Fyfield compared the secondary completion rates of Victorian rural and metropolitan male pupils and found a differential of almost two to one in favour of the latter.

Among relevant studies not included by Fensham, Balson (1970) investigated the relationship between social class and a variety of dependent variables (attainment, achievement, aspiration, selection of courses) in six secondary schools of differing prestige and clientele in the provincial Victorian city of Geelong. Although an appropriate measure of ability was obtained in the course of data collection, the distribution of ability was
neither reported nor apparently used to control for any of the effects of social class. Again, Balson found generally significant relationships between social class and the dependent variables.

Radford's monograph (1962) reported the results of a comprehensive national survey of Australian school leavers in the years 1959-1960. His data showed clear evidence of a social bias in the patterns of recruitment to different types of school, in the patterns of retention during secondary schooling, and in the patterns of recruitment to university and to higher status occupations on leaving school. His findings with respect to the social bases of recruitment to university have been updated in Anderson and Western's study (1970) of first-year enrollees at six Australian universities in the period 1965-67.

In none of the studies mentioned thus far were ability controls effectively used to qualify or interpret the results obtained. As noted earlier, in the absence of such controls it is merely a matter of inference that the educational performance of socially differentiated groups of students varies more than does their ability. It is true that in the case of social factors, e.g. father's occupation, which might reasonably be expected to correlate with the pupil's ability, the magnitude of the relationship with educational outcome is generally such as to suggest the likelihood of strong residual effects, even if ability were controlled. In other cases, there would seem to be no valid reason to suspect that ability factors have any strong claim for consideration as intervening variables. This would apply for example to those studies which report significant differences in educational attainment between rural and metropolitan samples. In fact, on a broader canvas of this nature, the strongest prima facie evidence for the existence of reserves of ability among Australian youth comes from official statistics showing wide inter-State differences in the proportion of the age cohort which completes a full course of secondary education. It is surprising that so little attention has been turned to this fact, since it is one which
is patently inexplicable at the level of individual differences. In
the more usual areas of sociological concern, however, it remains the case
that the results reported in the Australian literature owe an indefinite
debt to the intervening effects of individual (and group) differences in
ability.

A recent study by Wiseman (1970) in South Australia does incorporate
ability measures. His research design resembles that of Floud, Halsey and
Martin in that it involved a longitudinal study of the secondary school
careers of pupils in two schools in contrasting socio-economic areas. 'At
both schools striking differences were revealed in the continuation rates
of students from different social backgrounds,' (p225). There were
significant interaction effects between social class and ability, but 'the
home influence occurred independently of ability as well, in both schools...' (p229). Although these results accord with expectations, some of their
force is diminished in this instance because the statistical analyses
were based on samples of varying composition.

The most satisfying Australian research from a methodological
point of view appears to have been that by Gilchrist and Hammond, (1971).
This research was of a longitudinal nature and it utilised ability controls.
The main finding relevant to the present study was that university entrants
and their non-entrant intellectual peers differed significantly with
respect to socio-economic status and other family and school background
variables. The data were based originally on a Melbourne sample of primary
school boys and in their published form cannot be used to estimate reserves
even in that restricted context.

The Australian studies reviewed above can be said to provide strong
presumptive evidence that there is a considerable national reserve of
ability among Australian youth, and that this reserve emanates principally
from the lower socio-economic classes. The present research, both by
drawing on a national sample and by incorporating ability measures, will
enable this presumption to be tested empirically.
Chapter 4
THE DESIGN OF THE STUDY

Operational Concepts

The concepts of 'resources' and 'reserves' of ability are focal to the research and require operational definition. The definitions set out in the following paragraphs are taken from Wolff and Harnqvist (1962).

Resources comprise 'that part of a given population which, according to a suitably chosen group of criteria, is capable of following some well defined type of continued education', (p147). Clearly the reference here is to human rather than material resources in the form of organisational facilities. The existence of suitable facilities is merely implied.

Implicit also is an acceptance of the existing framework of education. The notion of resources as used here does not posit any fundamental change in educational arrangements; it treats the situation as it is and with reference to measurable criteria, rather than as it might be and in relation to some different philosophy of education. In particular, the linking of resources to criteria and capability in the above definition assumes the operation of some selective function and hints that it will be of an involuntary ('forcing-out') rather than voluntary ('cooling-out') character.

Whilst the definition of resources says nothing about the social mechanisms of selection, the approach to measuring reserves throws these into relief.

Reserves comprise 'that fraction of the resources which does not actually receive the type of education under consideration', (p147). In plain words the reserve represents the difference between those who theoretically could and those who actually do attain the level of education in question. If there is effective equality of educational opportunity, at least within the resource group which satisfies the criteria of capability, there will be no reserves at the level in question other than those which
arise from accidental or voluntary effects.¹

Again, the definition of reserves is independent of the existing scale of educational provision; it assumes that the entire resource group can be accommodated at the level of education concerned. This is not to overlook the possibility that educational standards may be devised or manipulated in a manner calculated to keep enrolments in line with the scale of existing facilities. The clearest example of this process of rationalisation in Australia occurs at the tertiary level with the use of admission and progress quotas. The relatively meagre provision of secondary scholarships suggests that this process reaches down into the senior secondary school.

The approach followed here for the measurement of reserves does not make any allowance for such effects. It cannot assess, for example, the extent to which public examination standards in the secondary school are influenced by administrative considerations regarding the staff and facilities available to handle continuing students. Rather, the present approach involves a survey of intellectual and other characteristics of pupils who have continued with their secondary education and who have met existing examination standards.

The Measurement of Reserves

Wolff and Harnqvist suggest that reserves can be measured in four ways, according to the dimensions 'narrow-broad' and 'actual-potential'.

'Reserves in a narrow sense are defined with respect to a single criterion', (p147). For example, an IQ of 115 might be found to be the minimum level of intelligence necessary to obtain a university degree. In this case, the 'reserve of graduates' would represent all suitably aged members of the population with an IQ of 115 or higher who have not taken a degree. (A more restricted view would confine the category of reserves to

¹ 'Voluntary' in this context is intended to refer to the exercise of an authentic choice, based on awareness of one's own capabilities and of the consequences entailed in the choice which is made.
those at this level of ability who have not attempted a degree). Wolfle's work on college reserves in the United States exemplifies the narrow approach. This approach also involves the concept of bounds or thresholds of ability (see McClelland 1958), and implies the existence of a relatively fixed pool of talent. Further, in using ability as a sole criterion of suitability for higher education it ignores the influence of non-cognitive factors in academic achievement.

'Reserves in a broad sense are defined with respect to the whole complex of psychological traits ... required for successfully completing the type of education considered', (p147). This approach recognises that ability is not a sufficient condition and that factors like interest, motivation and temperament also contribute to success. In this case the approach to estimating reserves takes as the 'resource base line' the rate of achievement of students from the higher social strata, the assumption being that these students will proceed as far educationally as their ability, interests and temperament will allow.

The Robbin's Report (1963) noted that this assumption did not fit the British situation at the time, since there was evidence of a continuing rise in the attainment of children in the higher social groups. Martin (1972) produces evidence suggesting that, in Victoria at least, the children of higher social classes may not have been fully mobilised educationally at the outset of the 1960's: 'despite the increase in retention rates in secondary schools and in the number of undergraduates in Victoria during the 1960's, there has been virtually no change in the social composition of students entering the University of Melbourne', (p92). Of course factors other than class mobilisation may contribute to this finding: the provision of university places and scholarships has not kept pace with the increase in the numbers qualified for entry, and the University of Melbourne may well differ from other universities in its social bases of recruitment. Unfortunately, there appears to be no independent evidence
to check whether the children of higher social classes were in fact fully mobilised educationally at the time relevant to the present research. To the extent that they were not, of course, any estimate of reserves using the broad approach will tend to be conservative in scale.

In effect, the broad reserve is a function of the difference between the achievement rates of the highest and other social classes over the ability range, and at the educational level in question. A subsidiary assumption seems to be that among other relevant traits those of an irreversible nature (for example, temperament) are distributed equally across social classes. If children of lower social classes are presently less interested than those of higher classes in continuing their education, this need not be viewed as an irreversible condition.¹ (It may be a prevalent one, however, suggesting that the mobilisation of reserves will be a problem).

Stated more generally, the underlying rationale of the broad approach is that there are both class-related (aspirations, interest) and individual (ability, temperament) determinants of educational progress. The measurement of broad reserves involves holding individual factors constant as it were, allowing the inference to be made that social class differences in educational progress reflect the operation of eradicable group effects. Since they take account of correlates of performance other than ability, broad estimates of reserves will be smaller, but more valid, than estimates in the narrow sense. The assumptions involved in estimating broad reserves are compatible with Rogoff's 'moderate' type of equality, whilst her 'radical' and 'conservative' types (using single and different criteria) correspond to the narrow concept of reserves.

'Actual reserves are those present in a given population at the age at which the continued education usually starts', (Wolff and Harnqvist 1962, p147). By this definition, an actual reserve of, say, university

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¹. In fact, this is an extension of Wolff and Harnqvist's argument and, as will be seen below, it is one they were not prepared entirely to pursue.
ability would comprise the fraction of a group of young adults which has not proceeded to university level, but which is assessed as capable, in either a broad or narrow sense, of following a university education.

The research design in the case of assessing actual reserves is cross-sectional in nature and is exemplified by the Crowther Report. It should be noted that the closer the modal age of sample members is to the normal age for attainment of the educational level in question, the higher the estimate will be, by virtue of including among the reserves at that time individuals who will proceed to the level concerned at some later stage of their lives. However, at the level of education involved in the present research - that is, senior secondary level - it seems that a relatively slight proportion of each Australian age group returns to study after a break in formal schooling. (In fact it appeared that only 0.5% of our Australian National Service sample had done so by the age of twenty. Others may, of course, gain provisional or adult matriculation status at an even later stage).

'Potential reserves refer to the corresponding group in the same population but at a much earlier date (eg. at the end of the primary school)', (Wolff and Harnqvist 1962, p147). The research design in this case is necessarily longitudinal in nature and is exemplified by the work of Gilchrist and Hammond. As Wolff and Harnqvist point out, estimates of actual reserves are usually smaller than those of potential reserves because of the intervening effects of the social environment on measured ability. There are no culture-free tests and the test performance of children from different social classes diverges over time especially where measures of verbal ability are concerned (Deutsch 1967).

The present research is directed towards the investigation of 'actual' reserves in the 'broad' sense - that is, towards the most conservative of the possible combinations. Again, the findings will tend to be even more conservative to the extent that talent in Australian upper
social classes was not fully mobilised during the time frame of the research. The selected approach involves a response-inferred, rather than antecedent, concept of equality of educational opportunity. In essence, equality will be seen to have operated to the extent that various socially defined groups of persons of the same ranges of measured ability and presumed temperament have experienced the same educational progress. To the extent that such groups have experienced different educational progress, some inequality of educational opportunity may be inferred. Generally, however, the present study will be inadequate to locate the agencies of inequality with any acceptable degree of precision.

The Sample: Process and Characteristics

Although it is desired to make some projections about reserves of ability in the male cohort generally, this was not the population from which the research data were immediately drawn; the sample for this study was drawn from the 1971 intake of National Servicemen. By virtue of his occupation, the author has access to psychological test and biographical data for members of this intake. The basic information is entered on individual records which are raised when the recruit undergoes psychological testing at the outset of his service. Permission to use these records for the purposes of this study was given by the Department of the Army.

In broad outline, the sampling procedure consisted in drawing 200 cases from each of the four record pools corresponding to quarterly intakes of National Servicemen in the calendar year 1971. The 800 cases comprise a ten per cent sample of the annual intake of 8000 recruits and a 0.75% sample of the estimated population of 107,000 males aged twenty in 1971. In 69 (or 9%) of the 800 cases the records were found to be incomplete or unsuitable, and the research data are based on a total of 731 usable records.

1. This estimate is based directly on the number of 15 year old males in the 1966 Census count.
The grounds on which the 69 cases were discarded were as follows:

- Father deceased, or retired and previous occupation unknown: 38
- Incomplete information in other respects: 20
- Secondary schooling overseas: 11

The first two categories of exclusion are self-explanatory. Together they account for the bulk of the losses and their nature is such that they are unlikely to be related in any systematic way to the variables of interest. Since the study is concerned with the Australian educational system it seemed advisable also to discard cases in which not all of the person's secondary education had been completed in this country.

Apart from these categories of exclusion, three different restrictions were involved or invoked in the sampling process. It is necessary to consider ways in which these restrictions might operate to limit the confidence with which findings can be generalised. The restrictions in question relate to the ability distribution of the sample, to the procedure used to extract the records and finally, and more generally, to the operation of the National Service scheme itself. The first two of these restrictions were deliberately applied; the last was inescapable.

In respect of the variable of intelligence, sampling was confined to cases of at least average ability. (This restriction was effected in the process of drawing the records by ignoring all cases with an IQ rating below 100). The decision to use this sampling criterion was based on the belief that matriculants - and the 'reserve of matriculants' is the main focus of the research - are likely to come overwhelmingly from the top half of the ability distribution, regardless of social class. This belief seemed to be warranted on a priori grounds: a minority of the age group succeeds in matriculating, and there is a relatively high failure rate
among those who contest the matriculation examination in each of the Australian states. The belief is also strongly reinforced by the data obtained in the present study. The data are presented in Table 1 and show a marked decline in the proportion of matriculants within groups at successively lower levels of ability:

**Table 1**

**Ability Distribution of Matriculants**

<table>
<thead>
<tr>
<th>Ability Category</th>
<th>Matriculants (n=116)</th>
<th>Total Sample (n=731)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ 100-109</td>
<td>9%</td>
<td>43%</td>
</tr>
<tr>
<td>IQ 110-119</td>
<td>31%</td>
<td>32%</td>
</tr>
<tr>
<td>IQ 120 &amp; above</td>
<td>60%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Although the IQ band 100-109 contains 43% of the total cases, it contributes only 9% of the matriculants. Again, only 2 of the 116 matriculants had an IQ rating of 100 to 105, but this band included 141 members of the total sample of 731.

The evidence suggests that an ability threshold effect operates where matriculation is concerned, and it suggests also that the discovery of matriculation reserves in the bottom half of the ability distribution would defy credibility in the present context of Australian education.

Thus, the above sampling restriction is considered not to affect the power to generalise from the findings of the present study; the conservative effect it might be supposed to exert with respect to the estimate of reserves clearly would be more apparent than real. Finally, the use of this restriction virtually increases the scale of the sample. The 731

1. As is noted below there appear to be no national figures available to show the percentage of the age group in general, and of matriculation examinees in particular, which succeeds in matriculating. On the partial evidence available, however, the figures appear not to have exceeded 15% and 66% respectively during the period covered by the present study.
cases can be said to represent roughly a 20% and 2% sample of National Servicemen and age cohorts, respectively, who are of at least average ability.

The extraction of records from each quarterly pool did not proceed in a strictly random fashion. The records are filed alphabetically and the procedure followed was to draw from each file the first 200 cases which met the ability criterion. This procedure was adopted for practical reasons. In order to obtain a suitably random sample of the required ability level it would have been necessary to generate four sets of 400 or more random numbers, draw the corresponding records from each file and discard cases below the ability standard. Alternatively, the files could first have been split on the basis of the ability criterion, with 200 cases then being drawn at random from each of the higher ability groups. Since the filing system is a manual one and the records are not serially numbered neither of these approaches was considered to be practicable in terms of time and effort.

In the event, it proved unnecessary to proceed beyond the letter 'C' in any quarterly file to obtain the required number of cases. In terms of the research methodology, two questions of possible sampling bias are especially relevant: is a sample comprising persons whose surnames commence with the letters A to C liable to be differently constituted with respect to the main variables of interest (social class, educational attainment, school type, location etc) than a sample of persons whose surnames commence with the letters A to Z? And, secondly, is the pattern

1. The files are located in Melbourne and the time and effort involved was that of the staff of the records agency. Further, these are master records and are liable to be required at short notice. (For this reason, also, records were despatched to the author in small lots for the purposes of data transcription).

2. As a form of ability control was involved in the sampling procedure it is not a variable at issue here.
of relationship between social class and educational attainment liable to vary significantly between these two kinds of sample?

Data to be presented later suggest that, with the crucial exception of educational attainment, the research sample appears to be distributed as might be expected on the relevant variables, after account is taken of the ability restriction in the sampling process. Moreover, it is suggested in what follows that the deficiency with respect to educational attainment appears to arise mainly from and within the operation of the National Service scheme itself.

On the second question, there appear to be no suitable parameters available to serve as a means of testing the validity of the relationship observed in the present sample between educational attainment and social class. Since the sample seems to match up reasonably well in most other respects, it is considered unlikely that it would yield an atypical relationship between class and attainment. (Two kinds of atypicality are pertinent here: an inflated estimate of reserves would result if lower social class groups in the 'A to C' sample had a generally lower level of educational attainment, and the higher social class groups a higher level, than was the case in random 'A to Z' samples; a depressed estimate would result if the opposite trends were to be found). However, it is acknowledged that in this case, more so than in the case of the ability restriction, generalisation of findings must proceed with some caution.

Finally, since the National Service scheme operates in a selective rather than universal fashion it is necessary to consider what effects this might have on the representativeness of the enlisted group,

1. In relation to the question posed, this kind of evidence is of course indirect. But no direct means exist to compare two samples of the kind in question, and the object of the study is to say something about reserves in the male cohort generally.
(and consequently, on the representativeness of any samples drawn from this group). It is proposed briefly to outline the operation of the scheme, and then to present empirical data relating to the above question.

With the exception of persons of substantial aboriginal descent, all males ordinarily resident in Australia are liable, on reaching the age of twenty, for military service under the provisions on the National Service Act. The Act requires that all such persons register for National Service in the half-year in which they reach the age of twenty. This requirement affects about 100,000 males each year. The pool of registrants is submitted to various administrative processes of reduction designed to produce an annual intake of approximately 8000 recruits.

At the time of registration, certain classes of persons may claim outright exemption (e.g. theological students, clergy, mentally and physically disabled individuals), or indefinite deferment (e.g. married registrants, members of the Defence Forces, those who opt for part time service in the Citizen Forces). Others may signify, at that time, their intention of claiming conscientious objector status; in these cases, the claim is referred for legal testing before any further administrative action is taken.

The major process of reduction commences with the conduct of a random ballot of birthdates. This ballot ordinarily removes about 70% of registrants; these are granted indefinite deferment of their National Service obligation. Among those remaining, indentured apprentices and full time students may apply for temporary deferment; this status may also be granted in cases of exceptional hardship. Persons granted temporary deferment normally proceed to render service at a later age, when their reason for claiming deferment no longer applies. Thus, each National Service intake,

1. This exception means that the present study is unable to take account of reserves of ability in this sector of the population. (Nor, as was implied earlier, can it deal with the problem of reserves among recent migrant members of the age group).

2. This study was undertaken while the National Service Scheme was operative, and all references to it are made in the present tense.
and the present research sample, contains a proportion of older recruits. Their inclusion in the research sample is necessary to ensure that the sample represents the full range of educational attainment to be found in the cohort population. In effect, each older recruit is regarded as being an educational surrogate of a currently deferred twenty year old. The extent to which this equation seems to work out in practice will be considered below.

The non-deferred group is subjected to medical screening, and individuals with a sub-intermediate level of education are additionally subjected to mental ability testing designed to screen out those who do not meet the minimum intellectual standards for enlistment.

According to the most recent statistics available,¹ the process of reduction breaks up as shown in Table 2.

Table 2
Disposal of Registrants June 1965 - June 1970 (inclusive)

<table>
<thead>
<tr>
<th>Disposal Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Registrant Pool (n=536,000)</td>
<td>100%</td>
</tr>
<tr>
<td>(Fail to register)</td>
<td>0.2%</td>
</tr>
<tr>
<td>Exempted (theological, disabled)</td>
<td>0.4%</td>
</tr>
<tr>
<td>Balloted out</td>
<td>70%</td>
</tr>
<tr>
<td>Other Indefinite Deferments (marriage, Citizen Forces)</td>
<td>5.0%</td>
</tr>
<tr>
<td>No longer liable (medical, intellectual)</td>
<td>11%</td>
</tr>
<tr>
<td>Unavailable (student etc. deferments)</td>
<td>3.0%</td>
</tr>
<tr>
<td>Called up or available for call up</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

These figures are cumulative for the entire period and do not necessarily reflect the disposition of the annual registrant pool. There appears to be no information of the latter kind available but it seems certain, for example, that more than 3% of the annual registrant pool is

engaged in full time studies or apprenticeships. Here again, the precise figures cannot be recovered from official statistics.

Of the various elements of reduction, some (e.g., the ballot and medical rejection) can be expected to produce no distortion in the composition of the enlisted group, at least in relation to the variables of interest in the present study; others (e.g., intellectual screening) can be expected to reduce the representation of persons of lower educational attainment and social class; others again (e.g., Citizen Force option, 'theological' exemptions and conscientious objection) can be expected to reduce the representation of persons of higher educational attainment. Since the study is concerned with reserves in the upper half of the ability distribution and at the highest level of secondary attainment, the last of these possible effects is of most interest. It is appropriate now to consider the relevant empirical data.

The use of the ability restriction in the sampling procedure implies that the research sample can be expected to contain a larger proportion of members from the higher social classes and the higher levels of educational attainment than is to be found in the general age group. This expectation appears to be borne out in the case of social class. Using Broom, Jones and Zubrzycki's (1965) occupational scale, the distribution of fathers' occupations for members of the sample and the occupational distribution of the adult male work force are as shown in Table 3.

1. The work force data are taken from Jones (1971) and are based on the 1966 Census. Although it would have been preferable to quote 1971 Census figures, especially figures based on those age groups most likely to include fathers of twenty-year-olds, these data are not yet available.
Table 3

Occupational Distribution - Fathers (Sample) and Male Work Force

<table>
<thead>
<tr>
<th>Occupational Category</th>
<th>Sample %</th>
<th>Work Force %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Upper Professional</td>
<td>6.8</td>
<td>3.5</td>
</tr>
<tr>
<td>2. Graziers</td>
<td>2.3</td>
<td>2.7</td>
</tr>
<tr>
<td>3. Lower Professional</td>
<td>3.0</td>
<td>4.5</td>
</tr>
<tr>
<td>4. Managerial</td>
<td>9.8</td>
<td>7.9</td>
</tr>
<tr>
<td>5. Shop Proprietors</td>
<td>1.9</td>
<td>0.8</td>
</tr>
<tr>
<td>6. Farmers</td>
<td>7.7</td>
<td>4.4</td>
</tr>
<tr>
<td>7. Clerical Workers</td>
<td>12.7</td>
<td>11.4</td>
</tr>
<tr>
<td>8. Armed Services, Police</td>
<td>1.2</td>
<td>2.2</td>
</tr>
<tr>
<td>9. Craftsmen</td>
<td>22.0</td>
<td>21.4</td>
</tr>
<tr>
<td>10. Shop Assistants</td>
<td>1.1</td>
<td>2.6</td>
</tr>
<tr>
<td>11. Operatives</td>
<td>6.0</td>
<td>11.8</td>
</tr>
<tr>
<td>12. Drivers</td>
<td>6.6</td>
<td>6.5</td>
</tr>
<tr>
<td>13. Service Workers</td>
<td>5.9</td>
<td>4.6</td>
</tr>
<tr>
<td>14. Miners</td>
<td>1.1</td>
<td>0.9</td>
</tr>
<tr>
<td>15. Farm Workers</td>
<td>1.9</td>
<td>3.9</td>
</tr>
<tr>
<td>16. Labourers</td>
<td>9.9</td>
<td>10.9</td>
</tr>
<tr>
<td><strong>Total:</strong> Percent</td>
<td>99.9</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Number</strong></td>
<td>731</td>
<td>3391540</td>
</tr>
</tbody>
</table>

Compared with the work force generally, the sample of fathers' occupations is over-representative of upper professionals, managers and shop proprietors and under-representative of operatives, labourers and farm workers. The apparent reversal in the case of lower professionals may be a function of the age structure of this sector of employment; it is a sector which includes the recent growth categories of technicians and
para-professionals. By the same token, it is to be expected that managers would be found mainly among the older age groups. In general the observed distribution takes the expected direction, though perhaps not as strongly as would be indicated by the known positive relationship between social class and measured intelligence.

In respect of educational attainment, population data are even less accessible. The required data in this case relate to the proportion of the twenty year old male age group in 1971 which had met matriculation standards. A question on educational attainment was repeated in the 1971 Census (having been asked for the first time in the 1966 Census), but the results are not yet available and the question was directed to highest grade or form reached rather than completed.

The most useful data obtained are those recording the educational attainment of the entire National Service registrant pool (of 'about 100,000') for the calendar year 1967. These data were kindly provided in advance of their publication, by Mr. J.D. Craig of the Department of Labour and National Service. Attainment in this case was defined as highest grade or form completed, though not necessarily successfully completed. Craig used a nine point code to standardise his data on a national basis, and the code terminated with the matriculation form in each State. His figures showed that 16% of registrants had completed the matriculation year of schooling.

Two adjustments must be made to this figure to obtain a valid population estimate for the present study. Firstly, account has to be taken of the increase between 1965 and 1968 in the proportion of the male age group attempting matriculation. (The specified years are those in which matriculants from the 1967 and 1970 registrant pools are most likely

1. This was ascertained from the Bureau of Census and Statistics.
respectively, to have obtained that qualification). And secondly, allowance has to be made for the rate of failure among matriculation candidates.

In respect of the former adjustment, the Commonwealth Year Book shows an increase of 41% between 1965 and 1968 in the percentage of male 17 and 18 year old secondary school enrolments, with an accompanying increase of only 5% in the size of the total male 15 to 19 age group in that period. It seems, therefore, that there was a real net increase of 36% from 1965 to 1968 in 17 and 18 year old male enrolments. On this count Craig's figure is adjusted to read 22%.2

Victoria appears to be the only Australian State to publish figures relating to pass rates in matriculation examinations. For the years 1965 to 1968 the percentage of Victorian candidates which satisfied matriculation standards ranged from 65 to 67.3 Other States (eg. Queensland and South Australia) use a percentile system to grade performance in matriculation subjects and the thirtieth percentile is the minimum necessary to secure a 'pass'. When the Wyndham Scheme was introduced in New South Wales the Education Department announced that it was expected that 70% of students who sat for the examination in each subject would pass the subject.4

On this evidence, and notwithstanding the facts that students vary in their

1. The two age groups are combined in an attempt to rationalise the effects of purely structural changes in education during that period. The introduction of the Wyndham Scheme in New South Wales, for example, added a year to the median age of matriculation examinees in that State. (The first matriculation examinations under that Scheme were held in 1967).

2. Because the necessary information is lacking, no allowance can be made for students who leave school during their matriculation year. To the extent that this involves a significant number (though it probably does not), it would tend to depress the estimate of reserves obtained in this study.


4. From personal recollection.
ability between subjects and that a set of minimum passes is usually insufficient to meet matriculation standards, it seems reasonable to apply a correction term of 0.67 to the revised figure of 22% above in order to derive an estimate of the percentage of the 20 year old age group in 1971 which had met matriculation standards. The resultant estimate is that 15% of this group had matriculated.

If the earlier assumption of an ability threshold is tenable, and if older recruits do effectively substitute for 'missing' 20 year olds, then the proportion of matriculants in the present sample should be double that in the entire age group; that is, it should amount to 30%. The actual sample figure is 16%. Thus, although older recruits in the sample are drawn from more than one age group (29% of sample members span the ages 21 to 25), and although a higher proportion of older members has matriculated (29% compared with 11% among 20 year old sample members), their inclusion is apparently insufficient to offset the 'loss' of 20 year old matriculants. The deficiency seems attributable to the combined effects of options, exemptions and deferments under the National Service Act. In the event, it would seem that the estimate of population reserves derived from the research sample will have to be multiplied by a factor of 16/30 to produce a valid estimate of matriculation reserves in the upper ability half of the twenty year old male population.

Other respects in which it is possible to compare the distribution of the sample with that of the relevant population have to do with type

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1. The sample contains 511 twenty year olds. Thirty per cent of this number - the expected matriculation share - is 153. The actual number of twenty year old matriculants in the sample is 54. It would appear that slightly less than two in every three 20 year old male matriculants in 1971 who were neither ballotted out nor medically rejected were to be found in the ranks of optees, deferees and exemptees, (and objectors of various kinds). Subjectively, this is a credible figure, given especially the expansion of tertiary education facilities at the time, though no factual data are available to check it.
of secondary school attended and geographical location. The school type data are given in Table 4.

**Table 4**

**Type of School Attended**

<table>
<thead>
<tr>
<th>School Type</th>
<th>Sample</th>
<th>Male Pupils aged 13-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>79%</td>
<td>77%</td>
</tr>
<tr>
<td>Catholic</td>
<td>14%</td>
<td>15%</td>
</tr>
<tr>
<td>Independent Non-Catholic</td>
<td>7%</td>
<td>8%</td>
</tr>
</tbody>
</table>

The two distributions appear to correspond more closely than might have been expected having regard to the truncated nature of the sample and to the indirect relationship which might be thought to exist between measured intelligence and type of school attended, as mediated by social class. However, the contingency co-efficient between school type and intelligence (categorised) in the present sample is only 0.08, and the associated chi-squared value is not significant (p>0.25). It does appear that the effects of the National Service Act on the composition of the enlisted group are more marked in relation to the variable of educational attainment than they are for the factors of social class or school type per se. There appears to be no requirement to make an adjustment for sampling deficiencies in these latter respects.

Since there is no known significant relationship between the distribution of ability and place of residence in the Australian context, the 'geographical composition' of the sample should closely resemble that of the population as a whole. This is actually the case, as is indicated in Table 5.

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1. These are 1969 figures calculated from the Bureau of Census and Statistics Bulletin, 'Schools 1969'.

2. Minor supposed exceptions such as the A.C.T. notwithstanding.
### Table 5
Geographical Distribution of Sample and of Australian Population (1966 Census)

<table>
<thead>
<tr>
<th>State</th>
<th>% by State</th>
<th>% in Metrop Area within State</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW(&amp; ACT)</td>
<td>33</td>
<td>37</td>
</tr>
<tr>
<td>Vic</td>
<td>29</td>
<td>28</td>
</tr>
<tr>
<td>Qld</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>SA(&amp; NT)</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>WA</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Tas</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Aust</td>
<td>100%</td>
<td>99%</td>
</tr>
</tbody>
</table>

There are some minor differences between these distributions but they should not affect the validity of any generalisations made about State and area scales of reserves. New South Wales and the metropolitan areas of that State and of Tasmania are under-represented in the sample; Western Australia and its metropolitan area are over-represented. Except in the case of Tasmania, where sample numbers are few, the direction and extent of these discrepancies correspond closely with those observed by Craig for the entire 1968-9 intake of twenty year old National Servicemen, suggesting again that they arise from the operation of the National Service scheme itself rather than from faulty sampling in the present instance.

### Independent and Dependent Variables

A summary of 'the major social variables associated with opportunities for effective education' in the Australian context has been prepared by Trethewey (1970, p173), on the basis of the studies reported in Fensham, (1970). The list comprises family related variables (size, socio-economic status and parents' educational levels); neighbourhood
related variables (geographical location and the sub-culture of the local community); religious and ethnic background (orientation to achievement, language problems); school related variables (school policy and facilities), and peer group measures (attitudes to authority etc).

In effect, this list provides a repertoire of variables which the present study should take into account. However, information is not routinely collected from National Servicemen in respect of all of these variables. Accordingly, the set of independent variables actually used in this study was limited to those of the above variables for which information was available, viz: social class (father's occupation), geographical location (state and area), school type, family size (and order of birth). Additionally, a measure of ability was used as an intervening variable and educational attainment constituted the dependent variable.

The approach to the measurement of reserves requires that the sample be divided into two social classes - a higher and a lower group. The higher group was formed from members whose fathers were currently engaged in professional or managerial employment; that is, in categories 1, 3 and 4 of Broom et al's 16 point occupational scale (Table 3), and this group accounted for 20% of the sample. The lower group comprised the remainder. This basis of division departs slightly from that adopted by

1. The biographical information is obtained during the course of supervised psychological testing. The information is entered by the recruit on his own record form and is not subsequently checked or verified unless the recruit is a candidate for officer training, or is referred for psychological interview for some other reason. Checking of information had been completed for about half of the present sample.

2. Apart from the variables already mentioned, the only other information routinely obtained from recruits relates to their own occupation and job history, and their sporting and recreational interests. This information has no bearing on the present research.
Broom and Jones (1969). They added category 5 (Shop Proprietors) to the Professional and Managerial group. However, in view of the seemingly wide range of activity and status associated with this category, and of the possible consequences of this for the central assumption involved in the study of reserves,¹ it was felt advisable to relegate this category to the lower group. Again, the ultimate effect of this decision - and possibly also, of the inclusion of graziers in the lower group - on the estimate of reserves is likely to be conservative in character.

Although the original 16 point scale correlates favourably with other indices of social class (Broom & Jones, 1969), any derived versions of it, such as the two way classification used here, must be regarded as having questionable validity. In one phase of the analysis of results, however, the more descriptive and 'face-valid' terms, 'manual', 'non-manual' and 'farm' are used, after the fashion of Broom and Jones, to the group the original categories.

Geographical location was defined both in terms of State and area of residence. In the case of the former, members from the ACT and Northern Territory were pooled with members from the States responsible for the conduct of education in those territories: that is, New South Wales and South Australia respectively. This procedure was used to assist in obtaining the desired focus on educational systems. In any case, the number from the Territories (9 in all) was too small to warrant separate treatment.

Area of residence was defined in terms of metropolitan and 'Other' areas, in accordance with the classification used by the Bureau of Census and Statistics. The distribution of sample members by State and by area was given in Table 5.

¹. That is, that students from the higher social classes receive all the education that their abilities etc allow.
School type was determined with respect to last type of secondary school attended. Since a personal history of type of school attended was not recorded, it is possible that some members of the sample had spent a small part of their secondary schooling in the type of school with which they have been identified in the present study. As already indicated, three categories - Government, Catholic and Independent Non-Catholic - were sufficient to include all cases, and the sample distribution for these categories was also presented above. (The recorded information did not allow a secondary classification of technical and high schools to be made reliably).

For the purposes of analysis family size was recorded in three categories, 1 and 2 children, 3 and 4, and 5 and over, with representations of 25%, 48% and 27% respectively. As noted above, family size appears to have some relationship with educational outcome in the Australian context, though the reported effect is quite possibly confounded with ability factors. Floud (1962) goes so far as to express the belief that 'once the grosser material handicaps are eliminated and parents' attitudes come into their own as independent variables, the size of the family rather than its socio-economic status emerges as potentially the most important single indication of the educative quality of the home environment,' (p105). She adds however, that 'it is notoriously difficult to investigate the determinants of family size at different socio-economic levels,' so that more direct indices of family culture are normally used.

Further, Adams and Meidam (1969) point out that the effects of birth order may moderate the relationship between family size and attainment which is usually found in cross sectional samples. They note that first borns may be advantaged by the more favourable attitudes towards education of younger parents, and that last borns may benefit from the typical improvement over time in family economic circumstances. Since cross sectional
samples rarely involve more than one member of any family they are inadequate to allow these possible effects to be explored. Adams and Meidam surveyed 585 whole families and found 'the oldest male least likely and the youngest most likely to attend college, regardless of social class or family size,' (p277). Although the present study is cross sectional in nature, data on birth order have been included for the light they may shed on gross position effects on educational chances. The three-way classification of first (including only) born, last born and 'other' has been used, and these categories account for 35%, 25% and 40% respectively of sample members.

The use of conventional ability measures inevitably brings a degree of tension to research of this kind. The lines of tension have been clearly and comprehensively drawn in Richardson and Spears (1972). The influence of social factors on the development of intelligence is such that 'conventional estimates of reserves exclude students who might have been in the 'potential' group if other means of assessing talent had been available', (Folger et al 1970, p308). The 'broad' approach to the measurement of reserves does not entirely dispel the force of this argument. Granted this general problem, however, it also makes a difference which kind of conventional measure is used.

The studies previously reviewed have used a variety of test types: verbal (Coleman et al), non-verbal (Douglas et al), general ability (Wolfle), and conglomerate test batteries (Crowther, Folger et al). Of these various measures the ostensibly 'pure' ones - verbal and non-verbal tests - may be least satisfactory as means of investigating reserves. Although verbal measures appear to be more closely related to most indices of educational performance than other types (Coleman et al), they are also the ones which are most sensitive to the cumulative effects of cultural disadvantage, (Deutsch et al, 1967). On the other hand, although non-verbal measures are less closely related to environmental differences than verbal measures (Fraser 1959, J. MoV. Hunt 1961, Gilchrist and Hammond 1971), they are
also likely to have less predictive validity for educational performance in the way this is usually assessed. The suggestion is that verbal measures would tend to under-estimate reserves and non-verbal measures to over-estimate them.

The use of conglomerate measures may seem to be a plausible solution, given that pupils are normally required to pursue 'mixed' academic courses. However, the 'smorgasbord' nature of these measures raises serious doubts about the logic of addition involved in deriving a composite score. Hence the real meaning of such scores is also uncertain.

The ability test taken by National Servicemen (The Army General Classification Test or Test AGC) resembles the one used by Wolfe in being a theoretically derived test of general reasoning ability.1 Test AGC is a 100-item cyclic omnibus test in two parallel forms and was built by the Australian Council for Educational Research from an original pool of over 700 items. It samples various item types (verbal, numerical, spatial) and various reasoning processes (analogies, series, classification), Administration of the test is preceded by an extensive practice period on a simulated version to help minimise the effects of differences in test experience.

Test AGC was designed to discriminate among adults over a wide range of intelligence; its mean item difficulty level is 0.52,2 and it places no premium on specialised knowledge or verbal sophistication. It seems more likely than most conventional tests to satisfy Crowther's requirement to serve as an 'indicator not only of developed ability but

1. Test AGC was fashioned on the Spearman-Thompson hierarchical model of intelligence, and Test AGCT (the one used by Wolfe) on the Thurstone Primary group factor model. But when second order factors are extracted from the intercorrelations among Thurstone primaries, the total factor structure resembles a hierarchy of the Spearman-Thompson kind.

2. These and other test statistics quoted are taken from an unpublished research report by Lt. Col A.G. Owens, I Psychological Research Unit, Melbourne, 1970.
also of ability where it is latent: that is, where it has not shown itself in the recruits' progress up the ladder of formal education', (Crowther 1959, p114). Indeed, there are instances in the present sample of wide discrepancies between the relative levels of test score and formal education.

The reliability of the test is high, with Hoyt co-efficients of 0.94 reported for each of two different National Service samples in 1969. It has high internal consistency, with an average item-test biserial co-efficient of 0.55, and it correlates strongly with other measures of general reasoning ability, (mean correlation of 0.85 with the four tests of the Otis Higher series). No evidence of its predictive validity for educational performance has been reported, but the test has suitably high concurrent validity with a contingency co-efficient of 0.41 existing between test scores and educational attainment in the present sample.

Being a point scale the test itself does not yield a direct measure of IQ but IQ equivalents have been derived for each raw score and will be used here in preference to the latter for ease of communication. Three categories of IQ are used in the analysis of results: 100-109, 110-119 and 120 and above, and these account for 43%, 32% and 25% respectively of sample members. The sample IQ standard deviation is 8.52 and 68.1% of cases lie below IQ 117. The comparable parameters for the normal distribution of intelligence are 16 and 34% (rounded), suggesting that the sample is suitably representative of the upper half of the normal population.

It is more likely than not that recruits would attempt to do their best on the test. They are advised that the results will play some part in their selection for officer training and in their allocation to employment levels generally. They are unlikely to see any point in 'faking

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1. This, of course, was Crowther's rationale for the use of the composite battery.
bad' on the test as their mental fitness to undertake military training has already been established.

Finally, there are some problems about the use of indices of educational attainment in the Australian context. In this regard, it is somewhat misleading to talk in terms of a single Australian educational system. There are separate State systems and, within and across them, so-called independent sectors of education. The study might be said, therefore, to relate to reserves of ability in several different populations. However, there are comparable and identifiable stages of secondary education in each system, and these can be used as 'natural bounds' to provide standardised indices of educational attainment on a national scale.

In each State and sector, Junior (or Intermediate) and Matriculation examinations were still being conducted during the period covered by the research. Although the median age at which pupils presented for examinations at each level varied slightly from State to State,¹ the separate State examinations denote similar standards of attainment and tend to be equated nationally for personnel selection purposes. Further, in all States with the exception of Tasmania, the age-grade relationship was such that few pupils—and then probably only the most able ones—were compelled to continue beyond the Intermediate year by virtue of being below the minimum school leaving age.²

Accordingly, educational attainment is reported in three categories: less than, or terminating with, Junior or Intermediate; progress beyond Junior but unmatriculated, and matriculated. These categories

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2. Because minimum school leaving ages did vary at the time, and because students present (and represent) for matriculation examinations, especially, at different ages, age of leaving school is an inappropriate index of educational attainment in the Australian context.
include 49%, 35% and 16% respectively of sample members. The use of
this classification makes it possible to calculate, for each social class
and for each level of ability, the probabilities of transition (from junior
to senior stages of secondary education), and completion (of matriculation
requirements); these probabilities are compounded in the calculation of
reserves.

The determination of whether or not a member's examination
results satisfied matriculation requirements was simple enough in the
case of those who had proceeded directly to university. In other cases
the recorded details were checked against the statement of matriculation
requirements set out in above-referenced College of Education booklet,
or against University handbooks in cases where members had attempted
matriculation under subsequently changed provisions. In all cases, members
were deemed to have matriculated if they satisfied the requirements of
any one University in their State.

To sum up this chapter, it is clear that the estimate of reserves
obtained from this study will be sensitive to the concepts and assumptions
involved in its design, and to the processes of sampling and measurement
it employs. The preceding discussion suggests that the net operational
effect of these factors will be conservative in direction, though it would
seem necessary to apply a specific reduction term to the sample estimate
of reserves to adjust for the extent of under-representation of matriculants.

There are other more general limitations to the study. It can
shed no direct light on the existence of reserves among female youth, and
therefore in the entire age group, though it may be possible to approach
this problem indirectly by taking account of male to female enrolment ratios
in the senior secondary school. Further, the sample comprises persons whose
secondary education has, to all intents and purposes, been completed, and
was completed during the middle to late 1960's. The study cannot therefore
depict an entirely current situation with regard to Australian educational
practice, and it cannot reflect any tendency for individuals to resume their
educational careers after a significant break with formal schooling.
Preliminary Analysis

If Australian educational practice was characterised by a radical type of equality of opportunity, then in theory a perfect positive correlation would be found between the distributions of ability and educational attainment for Australian samples. However, perfect relationships of any meaningful kind are seldom found in (social) nature and in this case any element of unreliability in the techniques of intellectual and educational assessment will have an attenuating effect. Moreover, particular allowance has to be made for the truncated nature of the ability distribution in the present sample. It would suffice to indicate that the radical pattern prevailed if the correlation between ability and educational attainment for this sample was a high positive, though imperfect, one.

The value of the contingency co-efficient associated with the joint distribution of ability and educational attainment in the sample is 0.41; the accompanying chi-squared value is significant at the 0.005 level of probability. Although very broad classifications both of ability and attainment have been used, and although the contingency co-efficient takes a maximum value of 0.82 in the case of 3x3 frequency tables (McNemar 1962, p200), it seems reasonable to infer that Australian educational practice falls a long way short of meeting the radical criterion of equality of opportunity, at least at the level of secondary education. (Since recruitment to tertiary education in Australia is heavily, though not solely, dependent upon performance at the secondary level, the suggestion is that at no point on the Australian educational ladder is a thoroughly radical form of equality of opportunity to be found). The existence of a modest relationship between ability and attainment is also prima facie

1. It is appreciated that the contingency co-efficient is a relatively 'weak' statistic, but the assumptions involved in the use of 'stronger' measures of relationship are not satisfied by the available data, (McNemar, 1962).
evidence of the presence of reserves of ability.

The fact that an ability threshold effect appears to operate where the matriculation level is concerned does not invalidate the inferences drawn above. A certain level of ability may be necessary for success in Matriculation examinations, but if it is the case that no pupil below this level of ability succeeds, it is also clear from the data presented earlier that many above the 'threshold' fail to reach matriculation standard.

Although the real type of equality of educational opportunity in Australia has been seen to depart from the radical 'ideal type', the very fact of a positive relationship between ability and attainment implies that the thoroughly conservative pattern also does not exist in practice. The conservative 'model' requires that a perfect (or near perfect) positive relationship exists between social class and attainment. Only, therefore, if the observed relationship between ability and attainment was explained entirely by social class would the existence of this relationship be compatible with the conservative model.

For the present sample, the contingency co-efficient between the distributions of social class and ability is 0.19. Although the associated chi-squared value is again significant at the .005 level of probability it is clear that differences in the ability of sample members are not simply co-extensive with differences in social class. However, there is a contingency co-efficient of 0.34 between the distributions of social class and educational attainment in the present sample; the accompanying chi-squared value is significant at the .005 level.

These statistics suggest that the real type of equality of educational opportunity in Australia tends to follow the 'moderate' pattern in which both ability and social class contribute to attainment but with

1. Because contingency co-efficients are not comparable unless they are based on frequency tables of the same dimensions, (McNemar 1962, p201) the three-way index of social class-manual, non-manual and farm - was used to calculate this (and the succeeding) statistic. The corresponding co-efficient for the two-way index of social class was 0.18.
ability exerting (slightly) the stronger effect. The statistics also suggest that a relatively large amount of the sample variance in educational attainment remains to be accounted for by factors other than social class and ability, as defined and measured here. The extent to which the other independent variables used in the study appear to contribute to this and will be touched on in the later discussion.

The primary data from which the assessment of reserves can proceed are set out in Table 6.

Table 6

<table>
<thead>
<tr>
<th>Educational Attainment</th>
<th>Ability Category</th>
<th>IQ 100-109</th>
<th>IQ 110-119</th>
<th>IQ 120 &amp; above</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prof &amp; Other</td>
<td>Manag Class</td>
<td>Prof &amp; Other</td>
<td>Manag Class</td>
<td>Prof &amp; Other</td>
</tr>
<tr>
<td>&lt; Intermediate</td>
<td>19 198</td>
<td>7 97</td>
<td>3 37</td>
<td>361</td>
<td></td>
</tr>
<tr>
<td>&gt; Inter, not Matric</td>
<td>18 72</td>
<td>22 70</td>
<td>20 52</td>
<td>254</td>
<td></td>
</tr>
<tr>
<td>Matriculated</td>
<td>4 6</td>
<td>16 20</td>
<td>34 36</td>
<td>116</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>41 276</td>
<td>45 187</td>
<td>57 125</td>
<td>731</td>
<td></td>
</tr>
</tbody>
</table>

On the basis of the above data it is possible to calculate, for each social class and at each level of ability, the sample probabilities of transition (from the junior to senior forms of secondary education), and of completion (of the matriculation requirement). The transition probabilities are shown in Table 7.
Table 7
Probabilities of Transition from Junior to Senior Secondary Forms

<table>
<thead>
<tr>
<th>Social Class</th>
<th>Ability Category</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IQ 100-109</td>
<td>IQ 110-119</td>
</tr>
<tr>
<td>Prof &amp; Manag</td>
<td>n</td>
<td>Prob</td>
</tr>
<tr>
<td>22/41</td>
<td>.54</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>78/276</td>
<td>.28</td>
</tr>
<tr>
<td>Total</td>
<td>100/317</td>
<td>.32</td>
</tr>
</tbody>
</table>

Regardless of level of ability, the sons of professional and managerial fathers experienced a better than even chance of continuing beyond the Intermediate level of education. At the highest ability level, members from this background appear to have been fully mobilised as far as continuing secondary education is concerned. However, it was only in this highest ability band, (which corresponds to the top decile in the normal distribution of intelligence), that members from other backgrounds appeared to enjoy better than even prospects of progress. And even at this ability level there was a clear differential in favour of the higher social class group.

The general situation reflected in Table 4 appears to support Wiseman's observation on senior school recruitment patterns in South Australia. Having divided his sample into social class groups along similar lines to those used in the present study, he observed that from the proportion of each group who stayed at school (beyond Form 3) it can be said that these students included the "typical" child with a professional or managerial father, but usually only the "exceptional" child from any other background, (cited by Karmel, 1971, p375).

It must be noted, however, that the rates of transition shown in Table 7 for each social class are undoubtedly depressed by the under-representation of matriculants in the sample. On the other hand, in view
of what appears to be an appropriate distribution of social class in this sample, it is likely that the differentials observed between the two social classes are typical ones. That is, it seems reasonable to regard the data in Table 7 as having relative though not absolute validity. These data cannot, therefore, be claimed to provide direct support for Wiseman's conclusion. But what they at least suggest is that higher class pupils in Australia have a discernible advantage over their lower class intellectual peers where the question of continuing secondary education is concerned.

In general, and taking the entire range of ability into account, members of the higher social class category enjoyed a rate of progress almost double that found for the lower category. This appears to be a ubiquitous ratio, tantamount to a social fact, in the area of the sociology of education, at least in the 'Western' world. The above figure is consistent with those reported by Crowther (England), Wolfe (the United States of America), Husen and Boalt (Sweden) and Karmel (South Australia), even though different measures of social class and attainment were used in each case. In the present study, and in those of the above studies in which ability measures were used, the differential in favour of the higher social class category is more pronounced at the lower levels of ability.

Completion probabilities are recorded in Table 8. They are based on the rate of matriculation success among those who continued their education beyond the Intermediate year.

Table 8

Probabilities of Successful Completion of Matriculation Among Continuing Students

<table>
<thead>
<tr>
<th>Social Class</th>
<th>Ability Category</th>
<th>IQ 100-109</th>
<th></th>
<th>IQ 110-119</th>
<th></th>
<th>IQ 120 &amp; above</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Prob</td>
<td>n</td>
<td>Prob</td>
<td>n</td>
<td>Prob</td>
<td>n</td>
</tr>
<tr>
<td>Prof &amp; Manag</td>
<td>4/22 .18</td>
<td>16/38 .42</td>
<td>34/54 .63</td>
<td>54/114 .47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>6/78 .08</td>
<td>20/90 .22</td>
<td>36/88 .41</td>
<td>62/256 .24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10/100 .10</td>
<td>36/128 .28</td>
<td>70/142 .49</td>
<td>116/370 .31</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. It will be seen that this situation introduces an added degree of complexity to the actual estimation of reserves.
Here again, the 'absolute' rates shown for each category of social class cannot be accepted as representative rates for these categories in the age group generally. But since the sample is adequate in other respects, the differentials between the two categories and the slope of the gradient between different ability groups are likely to approximate the parameters in question.

Since completion probabilities are related to a senior and demanding level of education, a reasonably marked gradient of completion between different ability groups is to be expected. This gradient exists, but so also does a differential in favour of the higher social class category for each level of ability. Again, across the entire range of ability represented in the sample, there is a familiar ratio of 2:1 between the higher and lower class completion rates.

When the rates of success are based on the total number in each social class category who actually contested the matriculation examination, rather than on the numbers originally entering the senior years, the differential is considerably reduced. Sixty-three percent of higher class contestants succeeded in qualifying compared with 50% among lower class candidates. This suggests that much of the between-social class variance reflected in Table 8 is attributable to the greater drop out rate among lower class pupils during the course of the senior years. The actual drop out rates are 25% for higher, and 48% for lower, social class members of the sample. In each case, the rate bears an inverse relationship to level of ability.

The two sets of probabilities - transition and completion - from Tables 7 and 8, are presented graphically in Figure I.

---
1. The concept of an ability threshold below which no pupil succeeds in matriculating may be tenable, but the corollary that no pupil above the threshold will fail would follow only if ability was both a necessary and sufficient condition of success. That this is clearly not the case is indicated by evidence in the present study, and elsewhere, which suggests the play of non-cognitive factors in educational performance.
Figure I
Transition and Completion Probabilities of Higher & Lower Classes

Figure I shows that the social class differentials are greater in the case of transition than completion probabilities. This suggests that talent loss from the lower social classes is greatest at the point of transition from junior to senior forms. When the evidence of a relatively high subsequent drop out rate among lower social classes is also taken into consideration, the impression is gained that a 'cooling-out' rather than 'forcing-out' process is at work, at least in relation to the interim stages of pursuit of matriculation goals.¹

Wolff and Harnqvist's Swedish data were also characterised by a greater social class discrepancy with respect to transition, than completion, probabilities. Indeed, in their case the completion curves for the two social classes were moderately close to one another at all levels of ability, and almost converged at the highest ability level. (This effect

¹. Certainly, very few upper ability pupils are likely to be forced out by the modest academic barrier of the Intermediate year.
seems to have been in part a derivative of the stringent qualifying examination conducted at that time for entry into the senior secondary school. Those who surmounted this barrier were probably more homogeneous with respect to academic interests and ability than the corresponding group in the Australian case). On the basis of this evidence, Wolff and Harnqvist argued that the most promising and strategic point of application for efforts to mobilise reserves was at the transitional rather than post-transitional stage of secondary education. They argued further that the underlying factors responsible for the social class variation in transition probabilities were different in kind from those responsible for the (generally lower) variation in completion probabilities. Their theorising in this respect bears heavily on their technique for calculating reserves, as will be made apparent in the discussion which follows.

Wolff and Harnqvist's technique for the calculation of reserves requires that, for each category of social class and at each level of ability, compound probabilities be derived from the product of the respective transition and completion probabilities. The compound probability is in effect an index of the secondary school career chances of the pupil; it measures the likelihood that a pupil entering the junior secondary school will go on to successfully complete the full course of secondary education. Stated more generally, the compound probability $P_{ij}$ that a pupil of a given social class $(i)$ and ability level $(j)$ will proceed from the junior secondary level to successful completion of the matriculation examination is given by the product $T_{ij} \times C_{ij}$, where $T_{ij}$ and $C_{ij}$ represent the corresponding transition and completion probabilities. The compound probabilities calculated on this basis from the data in Tables 7 and 8 above are shown in Table 9.
Table 9

<table>
<thead>
<tr>
<th>Social Class</th>
<th>Ability Category</th>
<th>IQ 100-109</th>
<th>IQ 110-119</th>
<th>IQ 120 &amp; above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof &amp; Manag</td>
<td>.10</td>
<td>.35</td>
<td>.60</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>.02</td>
<td>.11</td>
<td>.29</td>
<td></td>
</tr>
</tbody>
</table>

On this evidence, a pupil of average to above average ability (IQ 100-109) coming from a family representative of the 'Other' category of social class had only one fifth of the chance of his ability peer from a 'Professional or Managerial' family of successfully completing the entire course of secondary education. The corresponding chances at the bright normal (IQ 110-119) and bright (IQ 120 & above) levels of ability were about one third and one half respectively.

In general the data in Table 9 suggest that although secondary education career chances are sensitive to the pupil's level of ability, they are sensitive also to his social origins, (or to whatever potentialities and constraints for action these origins imply). Plainly, a significant element of pupil role performance in secondary education in Australia is linked ultimately to ascriptive qualities.

Issues in the Calculation of Reserves.

The most direct path to the calculation of reserves would involve applying the higher class compound probabilities at each level of ability to the total number of lower class members at the corresponding ability level, and then summing to obtain an estimate of the number of potential matriculants (the 'resources') in the lower class category as a whole. If the actual number of matriculants in this category were then subtracted from the potential number the remainder would constitute
the 'matriculation reserves'.

The suggested procedure makes use of the initial assumption that members of the higher social class will have achieved as much educationally (at least at the secondary level of schooling) as their abilities, interests and temperaments allow.¹ However, a further unforeshadowed assumption is also involved, namely that it is possible to raise the compound probabilities of lower social class members to the levels represented among the higher class category. This is an assumption which Wolff and Harnqvist were unprepared to make. Instead, they entertained the weaker assumption that it is possible to raise only the transition probabilities of lower social class members to the level attained by higher class members; they did not concede that the lower class completion (and consequently, compound) probabilities could similarly be raised.

In proceeding to calculate reserves according to their own assumptions, Wolff and Harnqvist derived an adjusted set of lower class compound probabilities by multiplying the transition probabilities for the higher class category with the completion probabilities for the lower class category. The expression \( P^1_{kj} = T_{ij} \times C_{kj} \) is appropriate in this case, where the subscripts \( i \) and \( k \) denote higher and lower class categories respectively, and \( j \) denotes the given (and common) ability level. The resulting probabilities when this approach is applied to the present data are .04, .18 and .39 at ascending levels of ability, compared with the higher social class compound probabilities of .10, .35 and .60 from Table 9.

Wolff and Harnqvist applied the set of adjusted compound probabilities to lower class frequency figures, in the way outlined above, to obtain their estimate of resources and, ultimately, reserves. The

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¹ The problem of the under-representation of matriculants in the sample is ignored for the present.
completion probabilities of the two social classes were sufficiently close for their data that the two different approaches would have yielded largely similar results. In the case of the present data, however, the actual lower class completion rate is, at all levels of ability, considerably less than that for the higher class. Thus, the estimate of reserves obtained from these data will vary significantly according to whether a liberal assumption (that compound probabilities for the two social classes are potentially convergent) or a conservative assumption (that only transition probabilities are potentially convergent) is accepted. The grounds for these assumptions will be discussed before proceeding with the calculation of reserves.

Wolff and Earnqvist's preference for the conservative assumption stemmed from their attribution of different causes at the transition and completion stages to the divergence in social class behaviour. They regarded the divergence at the transition stage as being essentially a matter of economic differences between the two classes; they saw the divergence at the completion stage as being related to more general aspects of the social environment. Further, they considered that economic hindrances to lower class progress at the transition stage could be more easily and directly overcome by changes in social policy than could the more complex hindrances to effective lower class performance at the subsequent stage.

In a somewhat similar vein, but different context, the Coleman report has been interpreted as accentuating the importance for educational achievement of hard-to-change background factors over easy-to-change characteristics of the immediate school environment, (Dyer 1968, Moynihan 1968). In this case the element of self-selection of school operated to link characteristics of the school environment with aspects of the pupils' wider social background.
Wolff and Harnqvist offered no tangible evidence that different causal factors were involved at the two stages; they merely asserted this, and asserted also that the factors were likely to be of an economic and socio-cultural nature respectively. Their interpretation gains some credence from the shape of their data. In the Australian case, where relevant independent evidence is also lacking, the shape of the data is so similar at the two stages that it is difficult to assert that entirely different factors are at work in each case, and difficult also to derive any clues about the nature of whatever factors are at work. Since it is credible, however, that both economic and socio-cultural factors contribute to Australian social class differences in educational attainment, it is intended to consider each in turn and to examine their implications for the mobilisation of reserves in this country.

Australia is generally considered as belonging to the league of affluent nations judged by its standards of living. However, a recent estimate suggests that some two million Australians (about 15% of its population) are living at a level of functional poverty, (Hollingworth, 1972). Since public education is but nominally free in Australia, and since the costs of educating one's children are continually rising, the impoverished classes, especially, may feel tempted or obliged to discourage their children from continuing their education beyond the minimum school leaving age. And it is not merely the direct costs of education which are pertinent; account has also to be taken of the denied gains which may seem to be associated with continuing education. Here reference is intended to the income foregone by allowing working age children to continue their schooling.

Families living in poverty, and lower class families generally, are liable to be fatalistic, and present rather than future oriented (Kahl, 1961). They may be unwilling, or unable, to defer the immediate gains to

1. Some clues may emerge when the data is related to other independent variables, but economic measures per se are not included among these variables.
be had from their children's employment in favour of the deferred gains which might arise from investing in their children's continuing education. (Probably, the child's own future nuclear family will be the ultimate beneficiary in any case).

The ready availability of scholarships, rather than actually free education, may assist in sparing the educational lives of some children in these circumstances. In Australia, the number of senior secondary scholarships has been increased considerably in recent years but the scale of provision seems to follow rather than anticipate demand, and the points of sudden increase appear to have borne a conspicuous and unseemly correspondence with troughs in the popularity of State and Federal governments. In any case, the inference is that the additional awards have been shared mainly by those already committed to continuing education. Unless some needs or proportional formula is applied, the distribution of scholarships, whatever their scale, will continue to bear an inordinate relationship to the social class of the recipients, (Fensham 1970).

The possibility cannot be discounted that economic factors contribute to the difference in educational attainment between Australian social classes. And since minimum school leaving and employment ages coincide, it is credible that the influence of purely economic factors will be greater at the transition than at subsequent stages of secondary schooling. But it is also likely that economic factors are insufficient to account for the entire difference in transition probabilities, and that poor material circumstances are not necessarily a barrier if other factors are favourable, (Banks 1968, Fraser 1959).

In relation to more general determinants of continuing education, Wolfle (1954) regards ascriptive characteristics such as class, race and sex as associated but non-essential factors. He reduces the essential requirements to four in number: adequate ability, a record of satisfactory progress in school work, money and the student's own desire. The design of
the present study takes account of the ability threshold; the economic factor has been discussed above and its importance is likely to be less in relation to secondary education than at the tertiary level involved in Wolfle's study. No measure of past academic progress is available for members of the present sample, but it is doubtful if this factor warrants separate status as a determinant at the level of secondary education. (Intermediate examinations are of modest standard and if progress does not match ability, presumably Wolfle would assert that lack of interest or application is involved).

Wolfle regards interest or motivation as 'in some ways the most important factor of all...for it has no effective substitute', (p156). It is reasonable to suppose that factors of interest or motivation underlie some of the differences in educational attainment between social classes. But these are singularly crude terms to use in the context of this general problem. Their use implies that the decision about continuing education is entirely at the disposal of the individual pupil and that it is made authentically. Again, the concept of interest appears to involve a psychological rather than sociological 'explanation' of a pervasive social phenomenon. It is true that Wolfle acknowledges that society at large must accept responsibility for the problem of motivation, and he offers suggestions about ways in which the problem can be alleviated by social action. But there are more cogent sociological perspectives to consider.

Jencks (1968) points to the contrasting social consequences which educational failure or drop out entails for the children of different classes. Limited educational attainment in the case of lower class children may lessen their chances of upward mobility, but it almost certainly implies downward mobility in the case of higher class children. This is the more so to the extent that class and status are increasingly dependent on qualifications rather than capital. Jencks suggests that this general situation is thoroughly appreciated by members of the higher classes, and that it operates as a powerful motivating force where education is
concerned. Its effect might be inferred from the data of the present study, and from what Eckland (quoted by Folger et al 1970) terms the 'persistence' phenomenon among high class-average ability American college students whose reaction to academic failure is to stay in rather than 'drop out'.

Deutsch (1967) notes that the lower class child typically lacks the 'coping mechanisms for internalising success or psychologically surviving failure in the formal learning setting', (p204). He argues that the continuity of values between home and school in the case of the higher class child might well mean that school failure will be generalised to his other social roles, but he also has more resources available for the recovery of the situation. The failure of the lower class child is more likely to be interpreted in the light of the parents' own unsuccessful encounters with social institutions and to be regarded therefore as final. The child is then liable to join Miller's 'school-rejecting' category of drop out, (Miller, 1967).

Hess, (1967) found evidence of a pronounced gap between the aspirations and expectations which working class mothers held for the educational and occupational futures of their children. The psychological outcome of this gap is likely to be a feeling of alienation from the institution which is identified as its cause, and the feeling will be reinforced in the child to the extent that the school and the wider society diverge in the qualities and performances they appear to reward. It is in this context, especially, that the peer group is liable to exert a strong attraction, not in the direction which Coleman reported, but rather as an agency of opposition to, and withdrawal from, the school. In these cases, the child is likely finally to join one or another of Miller's categories of 'school-perplexed' and 'school-irrelevant' drop out.

These observations on the impact of the wider social environment

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1. Miller's fourth and final category is the 'school-inadequate' drop out, but this refers to cases of low ability and is not apposite to the present discussion.
on school performance serve to demonstrate that the institution of education is in effect a sub-system of the total structure of stratification in society. Education may act over time to induce change in the wider system, but at any point of time what is happening in education is liable closely to reflect the social, economic and political structure of the host society. Thus, 'the roots of inequality in education lie in the deeper foundation of inequalities which exist in society at large', (Trethewey 1970, p177), and they will not yield to efforts confined to the education (sub)system alone. As McLaren (1970) notes 'the schools work best where they have least to do', (p61), by way of bridging the social distance between their own milieu and that of the home. We are inevitably brought back to the normative character of the unequal structure of educational opportunity and back to the realisation that 'equalising opportunity turns out to be inextricably tied up with creating a classless society', (Jencks 1968, p315).

The discussion so far points generally in a pessimistic direction as far as the mobilisation of reserves is concerned, and tends to support Wolff and Harnqvist's conservative approach. But there are some grounds for believing that this approach is too restrictive. Jencks himself notes that greater equality of opportunity may be secured if the overall size of the educational pie were to be increased, whilst at the same time guaranteeing the same absolute slice to the higher social classes. In his terms this would involve 'putting a floor under the downwardly mobile', (Jencks 1968, p315).

Jones' evidence shows that the size of the Australian educational pie - measured in terms of the proportion of each generation which attains particular levels of education - is indeed increasing over time, (Jones, 1971). What is apparently happening, however, is that the point of maximum impact of unequal opportunity is merely being transferred to successively higher levels of education. A generation ago the impact may have been greatest

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1. A further requirement would be that the family system of rearing children be discarded.
at the level of entry to secondary schooling; it is apparently strong at present at the senior level of secondary schooling; it may later be strongest at the tertiary level. Jencks notes that graduation from high school automatically became less class related when this level of attainment became the norm in American society. The relationship is still prominent at college level, but if colleges begin to offer BAs to all, the burden of maintaining a stable relationship between social class and attainment will shift to the graduate schools.

Despite this problem of a shifting locus of class effects, the evidence of Jones (1971) also attests to the fact that poorly educated parents place as much value on continuing secondary education - though somewhat less on tertiary education - for their children as do highly educated parents. That is, there appears to be a potentially stronger commitment to continuing secondary education among Australian lower classes than is presently realised. And if it is the case that rising educational aspirations are as yet unmatched by rising expectations, the fact remains that not all members of the lower classes are passive educational victims of that milieu.

The question again is whether a larger proportion of pupils from a lower class background can be expected both to continue and to successfully complete their secondary education. Wolff and Hernqvist accept the former possibility, but deny the latter. They imply, therefore, that there is some qualitative difference between those lower class members who do, and those who do not, successfully complete secondary education. They imply also that the achievement of the latter group cannot significantly be improved. Again, these would be relatively inconsequential propositions if the completion probabilities for the two social classes were reasonably similar, as they were in the Swedish, but are not in the Australian, case.
It would clearly assist in resolving these questions if matched case studies were available of 'deviant' and 'normal' achievers among the lower classes, where deviant connotes a level of attainment in excess of the class norm. No Australian studies of this kind appear to be available. Overseas evidence suggests that the families of deviant and normal lower class achievers differ with respect to value orientation and choice of reference group. Strodtbeck (1961) investigated the value systems of third generation Jewish and Italian adolescent boys in America. He located two principal areas which differentiated clearly between under and over achievers independently of social class and ethnicity. These areas involved the value placed on man's ability to control his own destiny (versus fatalism), and willingness to leave the family to make one's way in the world. Comparing pupils matched for ability, Kahl (1961) found that parents of aspiring lower class children appeared to adopt the middle class as a reference group to a greater extent than did parents of under-aspiring children.

The mechanisms of socialisation which underlie these observed effects are obscure, but what has been discovered is sufficient to suggest that the gross influences attributable to variables such as race and class are mediated by more subtle nuances of social values and perception. As Swift (1965) puts it (in Weberian terms), 'the sociologist wishes to suggest that the vital aspect of the environment is its presence in the mind of the individual who imposes meaning on the world around him', (p341). The implication is that this aspect of the environment will indeed be hard to change, overlain as it is by the crust of socialisation. But the fact that a favourable environment in these terms is routinely inculcated in higher class families does not mean that in content it is higher class (Deutsch 1967), or that its incidence among lower class families must remain irreversibly low.
Clearly it is neither helpful nor sufficient to assert that dropping-out among able lower class children arises simply and primarily from lack of interest or motivation. Although this tends to be the fashionable 'explanation' in the Australian context, it has no more logical status or explanatory power than has the imputation of sloth in relation to poverty or greed in relation to wealth. Inevitably it raises more problems than it resolves and serves merely to displace criticism of 'the system' onto the individual. Rather than interest per se what is likely to be lacking in lower class families is 'an understanding of how instrumentally to make this operative for the child', (Deutsch 1967, p211).

The present study does not directly suggest ways in which a greater proportion of able lower class pupils who do continue with their secondary education might be brought to successful completion of it. But some measures suggest themselves: improved counselling about selection of subjects and careers; a wider choice of matriculation subjects, including more that are socially relevant; a student wage; easier opportunities to drop back in than presently exist; the creation of an organisational climate in the senior years which is more suited to the needs and values of advanced adolescents; family counselling in vulnerable cases to moderate the unreal pressures for success that parents may vicariously impose on their student children; the use of lower class university students as models (or 'mobility sponsors') for their secondary school class peers.

To return to the original question, it would be surprising if socio-cultural factors of the kind discussed above contributed only to

1. Lack of interest (and ability) was the reason given by the former Minister for Education and Science for the lower proportion of pupils staying on for matriculation, and succeeding, in Government as compared with independent non-Catholic schools.

2. Such a climate might arise in the context of matriculation colleges, as currently exist in Tasmania and as are planned for the ACT.

3. Merton (1949) notes that '...it is precisely those parents least able to provide free access to opportunity for their children ... who exert greatest pressure for high achievement', (p148).
the social class divergence in completion, and not transition, probabilities. To the extent that these factors contribute at both levels, then, after Wolff and Harnqvist, severe difficulties would attach to the mobilisation of any reserves. But this would be an intolerably despairing conclusion to reach in the context of a society ostensibly dedicated to the ideal of equality of opportunity.

In the absence of decisive evidence concerning which is the more valid, it is intended to calculate Australian reserves according to both the conservative and liberal assumptions. Since it may be 'impossible to attain an equality of opportunity which would mean that no one person would derive from his personal circumstances any material advantage over another in selecting and pursuing his educational goals', (Lieberman 1959, p84), the effectively mobilisable reserves will probably lie somewhere in between the two estimates obtained. However, the discrepancy between the two will be a measure of the extent of social change necessary to realise the egalitarian ideal in the Australian educational system.

Reserves of Ability: Size and Location

The relevant data from which the calculation of reserves can proceed are given in Table 10.

**Table 10**

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Ability Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IQ 100-109</td>
</tr>
<tr>
<td>Lower Class Frequency (n)</td>
<td>276</td>
</tr>
<tr>
<td>Higher Class Compound Prob (p)</td>
<td>.10</td>
</tr>
<tr>
<td>Lower Class Adjusted Compound Prob (p')</td>
<td>.04</td>
</tr>
</tbody>
</table>
The conservative estimate of lower class resources is obtained by multiplying the lower class frequency by the corresponding adjusted compound probability \( (p_1) \) and summing for the three ability groups:

\[
\begin{align*}
(276 \times 0.04) + (187 \times 0.18) + (125 \times 0.39) \\
11 + 34 + 49 &= 94
\end{align*}
\]

The actual number of lower class matriculants in the sample is 62. Thus, the conservative estimate is that the sample contains 32 matriculation 'reservists'.

In order to derive a conservative estimate of the number of matriculation reserves in the entire male age group two additional terms are required: the relevant population total, and a correction factor for the degree of under-representation of matriculants in the sample. With respect to the former, the entire male age group numbers 107,000 but since the assumption was made that matriculation reserves will be found only in the upper half of the ability distribution, the relevant population figure is 53,500.

The correction factor for the sampling deficiency was given earlier as \( 16/30 \). But the under-representation of matriculants in the sample also has the effect, noted previously, that the probabilities used in the calculation of reserves lack validity in the absolute sense, and are in fact spuriously low. (In other words, the compound probabilities for each category of social class and at each level of ability involved are certain to be higher in the unenlisted group of 20 year olds than in the enlisted group.) Not only, therefore, does the sample percentage of actual matriculants under-state the situation in the population at large, but the number of resources in the sample will also be under-stated by the use of these deflated probabilities. The use of a correction factor for the former deficiency without correcting also for the latter deficiency will in fact lead to an under-estimate of population reserves. Clearly, some 'composite' correction term is required. The difficulty is, however, that the real population probabilities are unknown and - given the limitations
of Australian educational data - unknowable.\(^1\) Hence the precise terms required to correct for both aspects of the sampling deficiency cannot be calculated.

It is intended to resolve this dilemma by dispensing altogether with a correction term, and by projecting population reserves directly from the sample figures. This may result in an over-statement of population reserves. The justification for this procedure is that the entire approach to this study has thus far been essentially a conservative one.\(^2\) In view of this prior emphasis, the degree to which population reserves are in fact over-stated by the use of the suggested procedure is unlikely to be marked.

The estimate of population reserves, according to Wolff and Harnqvist's conservative assumption, and in line with the above decision, is given as \(\frac{32}{731} \times 53500\), or 2342. According to this estimate, the mobilisable reserve of male matriculants, based on current academic standards, amounts to 2.2 per cent of the age group in question, or to 4.4 per cent of its upper ability sector. If the assumption is valid that the children of higher social classes were fully mobilised at the time, then, notwithstanding the fact that the reserve may have been over-estimated for the reasons given above, it would appear that the calculated reserve has been overtaken in 'newer' age groups. There was a net increase of 8\% in the number of 18 year old male secondary students between 1968 and 1970, and, by inference, a similar net increase in the number of actual matriculants.\(^3\)

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1. If they were known, of course, there would be no requirement for the present kind of study.

2. Reference here is intended to the use of developed ability measures, the exclusion or under-representation of ethnic minority groups, the specification of social class, the assumption of full mobilisation of higher class children and the use of the broad concept of reserves.

3. The eighteen year old enrolment rate is the appropriate basis of comparison here as increases in the length of secondary curriculums were consolidated during the period 1968-70. Compared with earlier periods, a smaller proportion of pupils would have been able to attempt matriculation in their seventeenth year.
On this basis it would appear that Australian educational practice currently epitomises Wolff and Harnqvist's notion of equality of opportunity, at least at the level of secondary schooling. The presentiment — supported by evidence of sizeable social class differentials in the present study — that serious inequalities continue to exist underscores the degree of conservatism in Wolff and Harnqvist's approach. Moreover, if any part of the inferred increase in matriculants in recent years has as its source pupils from higher social classes, or from the lower half of the ability distribution, it would follow that the real reserve may not in fact have been mobilised. (If either or both sources were involved, major assumptions in the design of the study would be vitiated, and its essentially conservative approach would be further accentuated).

When the computational procedure outlined above is used to calculate reserves according to the liberal assumption (with the higher class compound probabilities as multiplying terms) the resulting estimate is that the sample contains 102 'reservists', and the male age group 7465 in its upper ability range. The latter figure corresponds to 14 percent of this ability sector, or 7 percent of the entire male age group. The inference in this case is that reserves calculated according to the liberal assumption are still to be found among 'newer' age groups, the increase in matriculation enrolments being insufficient to absorb all the able and otherwise suitable members of the lower category of social class. Moreover, the relationship between ability group frequencies and compound probabilities is such that the greater part of the estimated reserve is to be found in the highest ability group; that is, in the top decile of the population. Since a relatively small proportion of the age group proceeds to matriculate in any case, this sectional talent loss assumes greater societal significance.

Using the ratio of male to female 17 and 18 year-old secondary enrolments for the period 1967-8, it is possible to derive estimates of reserves, calculated according to both the conservative and liberal
approaches, for the total age group. The ratio in question was 5:3. When this term is added to the original computation, the resulting estimate is that matriculation reserves in the upper half of the female age-group number 3903 according to the conservative assumption, and 12442 according to the liberal assumption. Combining the estimates for the two sexes the inference is that the 20 year old Australian age group in 1971 contained a total of 6245 (conservative) or 19907 (liberal) matriculation reserves in the upper half of its ability distribution. Since there are probably more grounds for doubting the initial assumption of full higher class mobilisation in the case of females than in the case of males, the likelihood again is that these are both relatively conservative figures. (The validity of this inference is naturally subject to the unknown net effect of the original sampling deficiency).

Further, the population estimates derived from this study can be extended, with caution, to wider age groups. It seems likely that the 20 to 24 year old age group in 1971 contained a total of about 30000 (conservative) or 100000 (liberal) matriculation reservists. These are likely to be lower bounds; the proportion of the age group engaged at the senior level of secondary schooling has steadily risen, so that the older age groups in this band are likely to contain greater numbers of reserves than the youngest age group, on which these projections are based. Granted the limitations arising from sampling problems in the present study, the conclusion is inescapable that Australia experienced a significant talent loss in the period of the middle 1960's.

Table 11 presents a summary of the various estimates of reserves derived in the course of the preceding discussion. The rounded percentages given in Table 11 are based on the upper ability half of each reference group.

1. The masculinity ratio for this age group is negligibly different from unity.

2. The quoted ratio itself would suggest this.
Table 11
Estimates of Reserves - Summary

<table>
<thead>
<tr>
<th>Group</th>
<th>Assumption</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conservative</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Sample Reserve</td>
<td></td>
<td>32 4%</td>
<td></td>
</tr>
<tr>
<td>20 Year old Males</td>
<td></td>
<td>2342 4%</td>
<td></td>
</tr>
<tr>
<td>20 year old Population(M&amp;F)</td>
<td></td>
<td>6245 6%</td>
<td></td>
</tr>
<tr>
<td>Population aged 20-24 (M&amp;F)</td>
<td></td>
<td>30000 6%</td>
<td></td>
</tr>
</tbody>
</table>

It is appropriate to consider now the data relating to the link between educational chances and social variables other than class, in the Australian context. The variables concerned are State and area of residence, school type, family size and order of birth. It is likely that there is an element of inter-relationship among some of these variables. For example, the data in Table 5 show that the proportion of the population resident in metropolitan areas differs from State to State. It is also evident that independent non-Catholic schools are to be found disproportionately in metropolitan areas; it is likely that the average size of the family to which pupils belong is highest in the case of pupils attending Catholic schools. Moreover it is possible that an association exists between the distributions of the sample in respect of measured ability and social class and its distribution on some of the variables in question.

The general problem involved here is that of multi-collinearity. Blalock (1970) points out that no satisfactory technique has yet been developed which will allow the variance in dependent variables to be decomposed into the discrete effects of each of several independent variables, when these are themselves inter-related. Fraser (1959) had encountered the same problem in her study of the relationship between ability, aspects
of the home environment and school achievement. Her approach to the problem was to argue that if any environmental factor is to add to ability as a predictor of school success it should be found to correlate more highly with the criterion than with ability level. It has already been seen that this holds in the present study for the variable of social class. In the case of the remaining variables in question, Table 12 shows the extent of their inter-relationship and the extent to which they appear to satisfy Fraser's test.

Table 12

<table>
<thead>
<tr>
<th>Variable</th>
<th>State</th>
<th>Area</th>
<th>School Type</th>
<th>Family Size</th>
<th>Order of Birth</th>
<th>Social Class</th>
<th>Ability</th>
<th>Attainment</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>.23**</td>
<td>.12</td>
<td>.14</td>
<td>.12</td>
<td>.10</td>
<td>.12</td>
<td>.34**</td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>.03</td>
<td>.19**</td>
<td>.10</td>
<td>.14**</td>
<td>.12**</td>
<td>.12**</td>
<td>.12**</td>
<td></td>
</tr>
<tr>
<td>School Type</td>
<td>.12*</td>
<td>.06</td>
<td>.31**</td>
<td>.08</td>
<td>.25**</td>
<td>.15**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Size</td>
<td>+</td>
<td>.12**</td>
<td>.07</td>
<td>.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Order of Birth</td>
<td>.04</td>
<td></td>
<td>.11</td>
<td>.12*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+ - not calculated in view of the disjunction between the two distributions

** - associated chi-squared significant at .005 level of probability

* - associated chi-squared significant at .05 level of probability.

Table 12 cannot legitimately be regarded as a matrix of correlations; rather it is a table of associations expressed in terms of contingency coefficients. Moreover, co-efficients involving State, Area and social class are not strictly comparable with the remaining values, since the former are based on frequency tables of different dimensions from those involving other variables.
Despite these limitations, the data in Table 12 suggest that there is a degree of association between State of residence and educational attainment which is not simply attributable to the effects of inter-State variation in measured ability and social class. On the other hand, although the variables of family size and school type are more strongly associated with attainment than with ability, the possibility clearly remains that at least some of this effect arises in turn from their relationships with the distribution of social class. The factors of Area and order of birth appear to be no more closely associated with educational attainment than with ability. They seem unlikely therefore to make any independent contribution to the variance in educational attainment observed with the present sample. However, the factor of Area may still be a point of anchorage for reserves of ability, in view of its relationship with social class.

These observations suggest that transition and completion probabilities (and hence reserves) are likely to vary more among States than among the categories in each of the remaining variables under consideration. The relevant probabilities for each of the different States, based on all categories of ability, are shown in Table 13. The bracketed figures refer to the size of the denominator from which probabilities are calculated.

<table>
<thead>
<tr>
<th>State</th>
<th>Transition Probability</th>
<th>Completion Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Higher Class Prob</td>
<td>Lower Class Prob</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>NSW (and ACT)</td>
<td>.80 (.45)</td>
<td>.34 (.193)</td>
</tr>
<tr>
<td>Vic</td>
<td>.87 (.46)</td>
<td>.65 (.167)</td>
</tr>
<tr>
<td>Q'land</td>
<td>.69 (.13)</td>
<td>.26 (.91)</td>
</tr>
<tr>
<td>WA</td>
<td>.64 (.22)</td>
<td>.23 (.60)</td>
</tr>
<tr>
<td>SA (and NT)</td>
<td>.86 (.14)</td>
<td>.56 (.54)</td>
</tr>
<tr>
<td>Tas</td>
<td>1.00 (.3)</td>
<td>.61 (.23)</td>
</tr>
</tbody>
</table>

1. The numbers in each ability category are generally too small to warrant separate treatment. This applies also in relation to the remaining factors to be considered. For this reason, the following analyses are not carried through to the estimation of reserves.
In view of the somewhat unrepresentative nature of the sample with respect to State of residence, and in view of the small denominators involved in the case of the less populous States, any generalisations from the above table must be made with caution.¹ Again, the probabilities shown cannot be interpreted in other than a purely relative way, in view of the under-representation of matriculants in the sample. However, it would seem that there is relatively wide variation between States in the extent to which members of the lower category of social class, especially, continue and successfully complete their secondary education.

Lower class transition probabilities are evidently higher in the case of Victoria and South Australia and Tasmania than in the remaining States. It is probable that this effect arises mainly from differences in the structure of secondary education between the various States. In the three States concerned, but not elsewhere, a form of Leaving Certificate examination was interposed between the Intermediate and Matriculation years.² (In Tasmania, also, the school leaving age was higher than in other States at the time and would itself have contributed to the observed effect).

Both higher and lower class completion probabilities appear to have been higher in Queensland than elsewhere, suggesting perhaps that the Intermediate examination in that State functioned as a more efficient and rigorous selection device than was the case in other States. The relative advantage which Victorian and South Australian pupils, both higher and lower class, appeared to enjoy in terms of transition probabilities was evidently not carried through to the point of matriculation itself. The implication here is that many continuing students in these States left

1. For generalisations to be made with confidence it would be necessary to demonstrate that the probabilities in this Table have the same relative order as those pertaining to actual matriculation success in each State system. With the exception of Victoria, these State statistics are unavailable.

2. It was possible in Victoria to attempt a Technical Leaving examination, success at which qualified the candidate for entry to technical Diploma courses.
school after the Leaving Certificate examination, and without proceeding to the matriculation year. For Victoria in 1968 the ratio of male enrolments in the Leaving and Matriculation forms was slightly greater than 2:1.¹

The relevant probabilities for Area of residence are shown in Table 14.

### Table 14

Transition and Completion Probabilities by Area of Residence

<table>
<thead>
<tr>
<th>Area of Residence</th>
<th>Transition Probability</th>
<th>Completion Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Higher Class</td>
<td>Lower Class</td>
</tr>
<tr>
<td></td>
<td>Prob n</td>
<td>Prob n</td>
</tr>
<tr>
<td>Metropolitan</td>
<td>.82 (105)</td>
<td>.47 (327)</td>
</tr>
<tr>
<td>Other</td>
<td>.74 (38)</td>
<td>.39 (261)</td>
</tr>
</tbody>
</table>

With one exception (that of lower class completion probabilities), there appears to be a differential, in respect of both categories of social class and at both stages of education, in favour of pupils in metropolitan compared with other areas. Some part of this effect is evidently attributable to differences in the distribution of measured ability between the two categories, (see Table 12). The social class differentials at both stages appear generally to be as marked in the case of metropolitan areas as they are in other areas.

The data relating to school type are presented in Table 15.

---

Table 15
Transition and Completion Probabilities by School Type

<table>
<thead>
<tr>
<th>School Type</th>
<th>Transition</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Higher Class</td>
<td>Lower Class</td>
</tr>
<tr>
<td></td>
<td>Prob n</td>
<td>Higher Class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prob n</td>
</tr>
<tr>
<td>Government</td>
<td>.74 (93)</td>
<td>.42 (485)</td>
</tr>
<tr>
<td>Catholic</td>
<td>.93 (15)</td>
<td>.45 (85)</td>
</tr>
<tr>
<td>Independent Non Catholic</td>
<td>.89 (35)</td>
<td>.67 (18)</td>
</tr>
</tbody>
</table>

The differentials in this case cannot simply be attributed to ability effects. There is in fact a range of only two points in the mean IQ's of sample members from the different types of school, and the standard deviations are practically identical. Further, although there is clearly an association between school type and social class, the organisation of the data virtually controls for this, making it possible to consider effects evidently associated with the school itself, (or with whatever complex of attitudes and values is subsumed under the rubric of school type).

The suggestion is that type of school attended (or the complex of family factors which lie at back of choice of school) makes a considerable difference to educational attainment in respect both of transition and completion chances. This appears to hold even among pupils of the same social class. However, the denominators involved in the case of Catholic and Independent Non Catholic categories are too small to allow these conclusions to be stated with much confidence. Tentatively, it seems that both higher and lower class pupils are more likely to continue, and successfully complete, their secondary education if they have attended non Government schools. Because of this, and because Government schools absorb the large majority of secondary school pupils, it is probable that

1. As one sign of this association, the data in Table 15 show that only in the case of the Independent Non Catholic school is the actual number of higher class pupils greater than the number of lower class pupils.
the great bulk of Australian reserves are to be found in this sector of education.

Finally, data relating to the factors of family size and order of birth are presented together in Table 16.

Table 16
Transition and Completion Probabilities by Family Size and Order of Birth

<table>
<thead>
<tr>
<th>Family Variables</th>
<th>Transition Probability</th>
<th>Completion Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Higher Class Prob n</td>
<td>Higher Class Prob n</td>
</tr>
<tr>
<td>Size 1-2</td>
<td>.77 (43)</td>
<td>.55 (33)</td>
</tr>
<tr>
<td>Size 3-4</td>
<td>.83 (77)</td>
<td>.42 (64)</td>
</tr>
<tr>
<td>Size 5 and over</td>
<td>.74 (23)</td>
<td>.53 (17)</td>
</tr>
<tr>
<td>First Born</td>
<td>.79 (53)</td>
<td>.50 (42)</td>
</tr>
<tr>
<td>Last Born</td>
<td>.90 (30)</td>
<td>.44 (27)</td>
</tr>
<tr>
<td>Other</td>
<td>.75 (60)</td>
<td>.47 (45)</td>
</tr>
</tbody>
</table>

The data with respect to family size suggest that the relative educational disadvantage believed to be associated with larger sized families is contingent on their social class. Family size appears to have no systematic connection with either transition or completion prospects in the case of higher class children. Among lower class members of the sample, however, there is a discernible gradient of decreasing probability, in respect both of transition and completion prospects, as the data is traversed from smaller to larger sized families. The data in Table 8 suggest that relatively little of this contingency effect can be ascribed to differences in the distribution of ability between various sized families. (In fact, the various categories of family size contain almost identical proportions of members in the highest ability group).
A contingency effect again appears to operate, though in a weaker fashion, where order of birth is concerned. The data suggest that last born members of both social classes enjoy relatively higher chances of continuing their secondary education than do their class peers in other birth order positions. On the other hand, first born (and only) children, appear from the data to experience a higher rate of completion than do children occupying other positions in the family structure. The data in Table 12 suggest that some part of these observed effects may be due to underlying ability differences. (The first born category has in fact the lowest proportion of members in the lowest ability group, but it has about the same proportion as other categories of members in the highest ability group). It is pertinent also that the 'other' group is necessarily drawn from families of at least three children.

In general, the above analyses suggest that lower class wastage at the transition stage is relatively higher in the States of New South Wales, Queensland and Western Australia, in non-metropolitan areas, in the government school sector, and in larger sized families, than it is in the other locations considered. As the data in Table 12 suggest, however, some of these social locations of wastage tend to overlap. Lower class talent loss at subsequent stages of secondary education appears to be associated principally with the States of Victoria, Western Australia, South Australia and Tasmania, with other than first born children and once more with the government school sector and larger sized families. Again, the possibility of overlap cannot be discounted. The inference is, however, that reserves will be disproportionately high in those social locations (especially government schools and large size families) in which both transition and completion probabilities among lower classes tend to be smaller than is the case elsewhere.

1. It must be borne in mind that the sample contains few (if any) children from the same family. The data therefore allow no direct inferences to be made about likely position effects within any one family. Clearly, considerations of spacing, overall family size, and change in parental values and economic circumstances would have to be taken into account in studies of the latter kind.
Chapter 6

SUMMARY AND CONCLUSION

Despite their limitations, the data of this study are sufficient to suggest that a considerable loss of relatively scarce talent was occurring at the senior secondary stage of education in Australia during the middle to late 1960's. This loss is most clearly evidenced by the social class differential in educational attainment among intellectual peers in the higher range of the ability distribution.

The design of the study was such as to confine the search for reserves to the area of the lower social classes. However, this approach to the study did not preclude the possibility of its finding that no social class differentials, and therefore no reserves of ability, existed. The clear extent of their existence suggests that ascribed qualities continued, directly or indirectly, to exert an influence on the educational performance of Australian pupils during the period concerned.

The implications of the findings vis-à-vis the claims of efficiency and equality of opportunity in Australian education are equally plain. Only if these terms are taken simply and superficially to mean that facilities were provided for students to engage in education at all levels can Australian education be said to have been characterised by efficiency and equality of opportunity in the last decade. The impression often gained is that the existence of agencies such as correspondence schools is indeed regarded as proof sufficient of the provision of equality of educational opportunity. The criterion favoured in this study, however, is that children of the same apparent abilities (and of the same assumed temperament) emerge with the same chances of successfully completing a given course of education.\(^1\) By this criterion, Australian education in the period concerned was not notably efficient in providing equality of opportunity. It would clearly be unfair, however, to charge the educational system with sole

\(^1\) Again the right of pupils to reject such opportunity should not be overlooked.
responsibility for this situation; the problem is a societal rather than institutional one. Whilst changes can be envisaged at the latter level which will promote progress towards the attainment of effective equality of opportunity, the responsibility to ensure that potential human creativity and skill are converted into achievement is fundamentally a societal one.

Taken at its highest level, the mobilisable reserve of matriculants in the upper ability half of the current 21 year old male age group was estimated to number about 7500, (or 14\% of that group). These figures were projected from the number of lower social class members of the sample who had not attempted, or who had failed, to matriculate but who have been assessed as capable (in a 'broad' sense) of successfully completing matriculation requirements. The matriculation reserve for the entire age group - male and female - was estimated to be about 20,000, (or 19\% of its upper ability membership).

The classification of these reserves as mobilisable entails the assumption that the rate of matriculation among lower class pupils of at least average ability can be brought to the level attained by pupils of the same range of ability in the higher social classes. If the weaker assumption is entertained that this kind of convergence is possible only in respect of transfer from the junior to senior stages of secondary education (and not in respect also of successful completion of the latter stage), the mobilisable reserve of matriculants is estimated to number about 2350, or 4.4\% of the referenced male population. The corresponding figures for the age group generally are about 6250, or 6\% of its upper ability sector.

Both the higher and lower estimates of reserves are subject to common peculiarities arising from problems of sampling and measurement, and from the uncertain validity of the central assumption involved in the method of calculating reserves. In this regard, the single most severe limitation attaches to the degree of under-representation of matriculants in
the sample. Given the method of calculating reserves used here, this kind of limitation may generally give rise to two mutually opposite effects: the number of reserves in the deficient sample itself is likely to be under-estimated, and the estimate of population reserves projected from the deficient sample may be inflated.

The decision taken in the present case to regard these possible effects as self-cancelling cannot be verified. However, if this decision is held to have exerted a liberal net effect on the estimate of population reserves, it is clear that each of the remaining peculiarities would tend to operate in a conservative direction. The use of a cross sectional design involving measures of developed ability has the effect of excluding from reserves those individuals who have been denied the opportunity to achieve an intellectual growth commensurate with their potential. Again, the use of a general ability test may exclude from consideration some individuals with highly specific talents and aptitudes. (Given the presently mixed nature of most matriculation courses, however, this cannot be considered a major 'conservative' limitation). To the extent that it does not accurately depict the situation in the 1960's, the central assumption that children of higher social classes receive all of the education that their abilities, interests and temperament allow will also have led to an under-estimate of reserves. If this assumption were at all inaccurate not only would the number of lower class reserves be under-estimated as a consequence, but it would be necessary also to take account of higher class reserves. Further, the exclusion from the sample of aboriginals and recent migrants, and the allocation of the occupational categories of shop proprietors and graziers to the lower social class group, might also be expected to have had conservative effects on the estimate of reserves.

There are two more general considerations which are relevant in this context. Firstly, of the various approaches available for the
calculation of reserves, the one followed here - that is, the 'broad-actual' approach - is the most conservative in nature. Secondly, the obtained estimate of reserves is contingent on prevailing standards of education in Australia, and these standards are such that only about 15% of the male age group and 66% of actual candidates succeed in meeting matriculation requirements. Judged by some other countries - the United States especially - these are markedly austere standards. To the extent that they prove capable of moderation, a greater reserve of potential matriculants can be said to exist in the surveyed age group than is indicated by the present findings.

Given the problems canvassed above, together with other sampling peculiarities (eg. its alphabetical basis and the uneven representation of States), the projected population estimates must be treated with caution. At the very least, the study can be said to reveal the presence of strong social class differentials in the educational attainment of intellectual peers in an Australia wide sample of 731 members whose surnames commence with the letters A to C. The first level of generalisation would be to claim that reliable estimates of reserves have been obtained for the corresponding alphabetical sector in the male age group generally. At a further remove, the findings might be said to represent the situation in the entire male age group, and at the highest level of generalisation this might be claimed in relation to the general age group. Successively greater caution, and less confidence, attaches to each ascending level on this scale of generalisation.

The fact that matriculation reserves have been uncovered at a time when universities in Australia are turning away increasing numbers of applicants does not detract from the findings of the study. The mobilisation of these reserves need not be seen solely as implying an undesirable intensification of the competition for scarce privileges, (Jencks, 1968). If the size of the tertiary pie is not increased the mobilisation of reserves could also be seen as going some way towards ensuring that the
scarce privileges of tertiary education go to the most competent. However, judged by some external standards again, there appears to be ample room to increase the size of the tertiary pie, and the Martin Report suggested that, by the middle of the present decade, one quarter of each male age group will undertake some form of tertiary education, (Martin, 1964).

For the present, there is clearly enough reserve for more to proceed without depleting the technical trades and sub-professions of intelligent recruits, (especially as some able pupils will continue to prefer that kind of training to further academic education). It is also likely, as matriculation becomes a more common level of attainment, that employers in these fields will raise educational entry standards to ensure that their recruits will continue to be drawn from the same intellectual strata. Moreover, at the beginning of an era in which the periodic retraining of the work force will become increasingly necessary, it will clearly be advantageous if the point of initial departure from formal schooling is as advanced as possible.

The fact that intellectual measurements have been employed in this study is not intended to suggest their adoption as selection devices in individual cases. Rather, the use of ability measures in this kind of research must be interpreted in a purely statistical sense, (Wolff and Harnqvist, 1962). Indeed, the data suggest that, if individual selection is contemplated, measures of social class and other background factors should be added to the prediction equation. Further, as Wolff and Harnqvist also point out, reserve measurements cannot replace the forecasting of manpower needs in various employment categories. But they can supplement and guide this by giving an indication of the potential human resources available in relation to certain well defined levels of training. More generally, and more importantly perhaps, the measurement of reserves gives an indication of the degree of social change necessary to achieve the ideal of equal opportunity as it relates to one crucial area of human performance.
This study points to no particular strategy of social intervention designed to achieve effective equality of educational opportunity; it merely suggests some likely starting points for any such campaign. Essentially the study is an exploratory one; it has demonstrated the general applicability of Wolff and Harnqvist's basic approach, and it has provided hitherto unavailable estimates of the extent of reserves of ability associated with secondary education in Australia in recent years.
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