2. Robert Bell and Nigel Grant, *A Mythology of British Education: a thorough examination of a choking system*, Granada, London, 1974, p. 48, for vagueness of phrase.
3. Paul Goodman, *Compulsory Miseducation and the Community of Scholars*, Vintage, Toronto, 1964, pp. 268-70, sees staff mobility and the publish or perish race for tenure as important obstacles to genuine academic community.
4. Anthony Arblaster, *Academic Freedom*, Penguin, Harmondsworth, 1974, p. 132, argues that 'the fiercest and most direct attacks' on the freedom of the individual teacher 'have been those launched and sustained by the academic authorities themselves'.
5. Bell and Grant, p. 101, demonstrate that only the intervention of parliament was able to raise the standards of 19th century English universities. It was, moreover, 'the worst and not the best academics' in the 19th century who feared state interference (p. 97). For unexamined words, p. 26.
6. C. Northcote Parkinson, *The Law of Delay*, Murray, London, 1970, p. 92, laments that while universities are dedicated to facts 'established by inquiry rather than assertion' they do not apply such scientific principles to their own organisation. Bell and Grant make the same point, p. 142.
7. According to J. M. Keynes, *Essays in Biography*, Mercury, London, 1961, p. 311, 'Newton was not the first of the age of reason. He was the last of the magicians'.
8. Bell and Grant, p. 139, examine the myth of the all-competent professor which derives from the period when most university teachers were professors.
9. As Senator John Button, former ALP spokesman on education, says, some Australian vice-chancellors are in an almost 'divine right' position. *The Australian*, 20 February 1980.
10. Milton, *Areopagitica*, Oxford University Press, 1949, pp. 51-2. As Arblaster, p. 134, puts it, education requires 'a climate of openness and unfettered argument and controversy'.
11. D. D. Dorfman in *Science*, 201, 4362, quoted by *New Statesman*, 24 November 1978. Moreover, as John Searle, *The Campus War*, Penguin, Harmondsworth, 1972, p. 19, points out, 'The average large university commits literally dozens of injustices a month'. Kingsley Amis, *Lucky Jim*, Penguin, Harmondsworth, 1965, p. 229.
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13. Drummond Rennie, one of the few academic editors to openly discuss his work, while arguing in favour of the status quo admits that editors have to prevent 'irrelevant, wounding, hostile, trivial or obscene comments' from reaching the author. He even suspects that some referees plagiarise the very articles they are supposed to review. See 'The Ethics of Medical Publication', *The Medical Journal of Australia*, 20 October 1979, p. 411.
14. S. Lovas, 'Higher degree examination procedures in Australian universities', *Vestes*, 23, 1, 1980, pp. 9-13.
15. C. Wright Mills, *The Sociological Imagination*, Penguin, Harmondsworth, 1978, p. 126, demonstrates how easy it is for anyone to debunk any book in a two- or three-column review, and how impossible it is to answer it. David Tribe, *The Australian Author*, 12, 2, April 1980, p. 7, points out that public reviews, unlike anonymous readers' reports, are refutable.
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17. Keynes, pp. 320-322.
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22. Parkinson, pp. 118-125.
23. Henry Taylor, *The Statesman*, [1836], Mentor, 1958, p. 67.
24. According to E. L. Wheelwright, *Capitalism, Socialism or Barbarism: the Australian Predicament*, Australia and New Zealand Book Company: Sydney, 1978, p. 90, 'careerism is a cancer destroying the academy'.
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AGE DISTRIBUTION OF AUSTRALIAN ACADEMICS

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The number of universities in Australia increased from nine in 1956, to 13 in 1966, to 19 in 1976. Student enrolments rose over this same period from 34,406 (1956), to 91,291 (1966), to 153,464 (1976), while teaching staff increased in number from 2,295 in 1956, to 7,275 in 1966, to 11,401 in 1976.[1] However, the Australian university system is now virtually at steady state. Enrolments rose by 5.9 percent between 1976 and 1980 (to 162,484), while the number of teaching staff increased by only 3.3 percent (to 11,782). In fact, there was a decrease of 0.8 percent between 1978 and 1980 in academic posts. For various reasons [2,3] it is unlikely that there will be marked growth within the Australian university system during the 1980s, or even over a more extended period of time.

Academics who were recruited during the period of marked university expansion were mostly young and recently qualified. In 1976 the Universities Commission,[4] as well as noting a drop in resignations, estimated that fewer than 0.5 percent of all academics then holding an appointment would reach the normal retirement age of 65 years before 1982. Low exit rates coupled with static recruitment mean that there will be cumulatively more elderly academics, in both absolute and relative terms, in Australian universities over the next 10 or 20 years. In fact, the age distribution of faculty probably has already shifted markedly in the older universities which attained their ceiling in enrolment some years ago. The greying of Australian universities that seems certain to occur over the next 20 years may well affect the performance of academics in many of their traditional role functions. In considering this possibility, it can be asked whether Australian universities will in the future be confronted with a gerontological crisis.

Age Distribution of Academics

Table 1, which is taken from the recent report of the Tertiary Education Commission,[5] shows the age distribution of academics in Australian universities in 1979. The median age of professors across all disciplines was 49 years, readers and associate professors 48 years, senior lecturers 42 years, and lecturers 34 years. In the short term, clearly there will be limited turnover in university staff through retirement. The academics holding an appointment at lecturer level or above in 1979 included only 10.7 percent who were within 10 years of the normal age for retirement. In all, only 37.0 percent of the group will reach the age of 65 years this century. If new staff members are recruited solely to replace those who retire, the modal age of academics in Australian universities will shift from 30-40 years in the 1970s, to 40-50 years in the 1980s, to 50-60 years in the 1990s. Replacement at a rate exceeding two percent per annum would not occur until the 1990s. However, marked turnover due to retirement can be expected to occur in the first decade of next century, when 40.6 percent of all academics who were holding an appointment in 1979 will reach 65 years of age.

Table 1
Percentage Frequency of Academic Staff (Lecturer and Above) in Australian Universities in 1979 in Different Age Ranges

Age Ranges	Professor	Associate Professor/ Reader	Senior Lecturer	Lecturer
25-29	0·1	0·1	0·2	11·5
30-34	1·7	1·5	10·1	38·8
35-39	7·9	11·9	28·0	26·6
40-44	16·7	21·2	24·2	10·8
45-49	22·0	26·0	16·6	5·6
50-54	23·8	20·5	11·8	3·7
55-59	17·6	13·1	7·2	2·0
60-64	9·6	5·6	1·8	0·8
65+	0·6	0·1	0·1	0·0

Table 2 shows the age distribution of academic staff (lecturer and above) at the University of Queensland in 1962, 1967, 1972, and 1977. In 1962 72.9 percent of academic staff were under 45 years of age, and 38.9 percent were under 35 years. The respective values in 1977 were 60.1 percent and 21.2 percent. Although the age distribution shifted over the 15-year period, only 12.3 percent of the academic staff in 1977 (in absolute terms, 110 of 896 people) were within 10 years of retirement. Age distributions will undoubtedly differ between the Australian universities, and 'mature' institutions probably already have skewed age distributions relative to universities that were founded in the 1960s and 1970s.

Table 2
Percentage Frequency of Academic Staff (Lecturer and Above) at the University of Queensland in Different Age Ranges

	Year			
Age Ranges	1962	1966	1971	1976
25-29	16·5	15·2	11·7	5·7
30-34	22·4	20·9	19·1	15·0
35-39	19·7	21·6	19·9	21·4
40-44	14·3	14·5	17·7	17·0
45-49	9·9	11·8	13·5	13·6
50-54	7·1	6·7	8·0	11·8
55-59	5·7	5·6	5·4	7·8
60-64	2·7	3·2	3·9	3·8
65-69	1·7	0·5	0·8	0·6
N	406	595	724	906

In my own discipline, psychology, the number of positions at lecturer level and above increased from 46 in 1957 to 234 in 1979 across all Australian universities. The annual rate of increase averaged 14.2 percent in 1957-1961, 9.1 percent 1961-1965, 10.1 percent 1965-1973, and 8.0 percent 1972-1977. However, there was no expansion between 1977 and 1979. In 1980 the median age of lecturers in psychology was 38 years, senior lecturers 45 years, readers and associate professors 51 years, and professors 55 years. About one in five current professors, one in four readers, six in ten senior lecturers, and eight in 10 lecturers will still be below the normal retirement age at the end of this century. However, 51.9 percent of those now holding appointments in psychology departments reach retirement age between 2001 and 2010.

Career Advancement

Individuals have greater opportunities for career advancement within a system that is undergoing expansion. Promotion will be more competitive under steady state conditions, and there are fewer options for advancement by movement between universities. In the 1980s and 1990s younger academics will be less likely to attain senior positions than their counterparts in the 1960s and 1970s. The number of positions at the level of professor, reader, and associate professor changed only marginally between 1975 and 1980 (from 18.1 percent of all academic appointments to 20.0 percent). In 1979, 46.2 percent of all lecturers and 57.4 percent of all senior lecturers in Australian universities had reached the top of their respective salary ranges.[5]

The reduction in demand for academics has coincided with a large increase in the pool of qualified personnel in most disciplines. The number of doctorates awarded by all Australian universities increased from 92 in 1958 to 843 in 1978, while the increase for masters degrees was from 210 to 2,070. In 1980 there were 5,986 doctoral candidates in Australian universities, and 14,435 masters candidates. Some time ago PhD graduates had excellent prospects of obtaining an appointment in universities or advanced colleges. For example, a survey undertaken in 1970 showed that 94 percent of all graduates in Australia with a PhD in psychology were employed in the tertiary education sector.[6] However, few of the 30 to 40 PhDs in psychology who now graduate each year have any likelihood of a career in academia. Changes in employment prospects for graduates may eventually influence not only the choice of research topics by postgraduate students, but the decision that has to be made as to whether to enter a PhD programme. Since selection is only partly subject to external control, there could in time be a shortage of highly skilled graduates in at least some disciplines.

Innovation

Disciplines change in character over time. Since there will be limited turnover of staff within Australian universities over the next 20 years, the responsibilities for innovation will fall primarily on those now holding appointments. Obsolescence, rigidity, and inflexibility may become very real problems if the knowledge, skills, interests, and values of academics are relatively immune to change during mid or late career. Disciplines will be represented within universities not only by older people than is now the case, but by academics who trained in a given historical period. For example, at present there is heavy representation of experimental psychology within the Australian university system, but applied psychology is poorly represented. Psychology departments may therefore be ill-equipped to cope with the changes in the demand for psychology graduates that seem certain to occur over the next 10 to 20 years.[7]

Aging and Role Functions

In the classical study of age specificity in scholarly achievement, Lehman[8] found that the modal age ranges in which scientists completed research of highest quality were 26-30 years for chemistry, 30-34 years for botany, mathematics and physics, 35-39 years for geology, medicine, and physiology, and 30-39 years for genetics and psychology. Although the methodology used by Lehman has been criticized,[9,10] his claims that intellectual achievement is correlated with age has been supported by other analyses. For example, Cole [10] found a curvilinear relationship between, on the one hand, the age of chemists, geologists, physicists, sociologists, and psychologists holding appointments at leading American universities and, on the other hand, the number of papers they published and the rate at which these papers attracted citations in the research literature. Research productivity and impact peaked around the late thirties and early forties.

It needs to be stressed that the above values are averages, and that many scientists in the surveys undertaken by Lehman and Cole remained productive in research throughout their career. The prospects are not as grim as P.A.M. Dirac, a Fellow of the Royal Society at the age of 28 and a Nobel laureate at 31, has suggested:

Age is, of course, a fever chill
That every physicist must fear.
He's better dead than living still
When once he's past his thirtieth year.

In fact, the correlation between age and achievement may reflect obsolescence in skills with the passage of time rather than inevitable and irreversible deterioration in intellectual competence due to aging.[11] Younger scientists may be more productive and have greater impact primarily through the recency of their training and the associated likelihood that they will have access to current knowledge, techniques, and facilities. Unless counterbalancing forces operate, aging may lead individuals to shift their major involvement from research to other roles that are appropriate to the academic, such as teaching, administration and professional activity.

Implications

There is urgent need for detailed statistics to be collected so that age patterns and trends in Australian universities can be monitored. The disciplines that showed highest rates of growth during the period of marked university expansion probably have the most skewed age distributions. Biology and geology, where the number of graduates almost doubled between 1968 and 1976, possibly are much like psychology in terms of the age distribution of staff, while chemistry and physics achieved a steady state in most universities in an earlier period.[12] Non-uniformities between universities as well as between disciplines make it difficult to propose general solutions to the problems identified above.

Although there are organizational changes that could avoid or minimize problems associated with steady state, any form of intervention also has disadvantages and costs. For example, setting the retirement age for academics at 60 years or younger would affect the age distribution of staff within universities, allow recent graduates to be recruited in larger numbers, and improve career opportunities for those who retain appointments. However, a drop in retirement age would have little immediate effect in many universities or disciplines, since the bulge is in the group of academics now aged 35-50 years. Further, why should older academics, some of whom are distinguished by multiple criteria, suffer the considerable economic and personal costs of compulsory early retirement? Even if it were agreed that the present over-representation of academics in the age range of 35 to 50 years constitutes the major problem, there is no readily equitable basis for the displacement of individuals. Further, if such displacement were to occur, the objective of improving career prospects for Australian graduates could be met only by stringent imposition of protectionist quotas when replacements are being made.[13]

If it is accepted that most current academics will continue in university appointments until retirement at the age of 65 years, the focus must shift to strategies that will prevent and overcome personal and institutional rigidity and obsolescence. Systematic attention needs to be given to the effects of aging on the role functions of academics in Australian universities. Role attrition may turn out to be less a product of age than of factors that are correlated with aging.[11] Cole[10] noted, for example, that older scientists are more likely to remain productive in research if they operate in supportive physical and motivational environments. Attempts should be made to identify factors within the Australian university system that inhibit or facilitate productivity in research and other academic roles. Morale, incentive, and opportunity may differ for younger and older academics, and the financial restrictions associated with steady state may have different impact on the two groups.

Depending on future recruitment practices and policies, the shift in the age distribution of Australian academics that is occuring at the present time may be relatively short-lived. The pool of qualified personnel that will be available to universities in the future will almost certainly be much larger and more diverse than has been the case in the past. However, it would be ironic if the reduced opportunities for careers within Australian universities in the 1980s and 1990s indirectly lead to shortages in highly skilled manpower when the many academics who will reach retirement age in 20 to 30 years time need to be replaced.

Whether the Australian universities are facing a gerontological crisis depends on one's definition of crisis. It seems certain that over the next 20 years there will be a shift in the age distribution of academics, but the change will not be uniform across universities or disciplines. Many young graduates will be denied any opportunity of an academic career. An increasing number of academics will be middle-aged or elderly. Apart from the likelihood that the young will be disadvantaged, aging may not in itself constitute a problem. The issue of crisis is related to the prospect of obsolescence, rigidity, and inflexibility. In order to prevent or minimize a crisis, we need to know much more about societal, institutional, and personal factors that affect various aspects of the performance of academics as they grow older. Although many implications of the end to expansion within the Australian university system have been recognized, it is disappointing that there has not yet been any empirical investigation of the consequences of a shift in the age distribution of academics.

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