

THE BIOLOGICAL SIGNIFICANCE OF GRANDMOTHERS

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About 25 years ago the President of this Association was Mrs Rose Bould. Although she would have hated to hear me say it, she was a living classic of her kind and generation. After training as a registered general nurse at Royal Adelaide Hospital half a century ago, in due course she and her husband became the owners and operators of a small nursing home at Clapham. It was an old house, with some simple alterations and additions. Val Bould mowed the lawns, looked after the premises and did the paperwork. Rose cared for what started as her patients, and soon became residents and friends. With no special training, she intuitively developed a teaching program for her registered nurses and nurse attendants. She truly understood and set out to meet the needs of her residents — physical, mental, social, and spiritual. She fought the bureaucrats who objected to her old ladies cutting up vegetables in the kitchen, while Val led the old men to help in the garden. Rose and her nursing home are long since gone, but I shall always treasure her memory. I know how much she would have enjoyed today and would have rejoiced in the development of this Association since those early years.

Those of you who take *The Weekend Australian* might have noticed in the most recent issue a book review by Jonathan Sumption, originally published in the English periodical *The Spectator*. The book is by Matt Ridley and is entitled *Nature via Nurture: Genes, Experience and What Makes Us Human*, published by Fourth Estate at a price of \$55. According to the review, the author follows the current fashion of coming down heavily on the side of Nature, while conceding that Nurture is crucial in determining final outcome.

It's a very old dispute, dating to the Ancient Greeks, and very likely long before that. Repeatedly we have argued about what makes us what we are — is it Nature? Or is it Nurture?

Do our genes program us in such a way that they determine our behaviour? Consider homosexuality; or aggression on the roads; or self-sacrificing bravery in battle; or a man who assaults or even murders a little baby fathered by another man; or almost anything we do, good and bad. Are we driven by innate patterns of conduct, determined by our genes?

That is what the extreme ethobiologists might declare. They have written of a gene for altruism, but they seem not to be able to say on which chromosome it resides — if indeed it exists.

By contrast, do we start our lives with a *tabula rasa*, a blank slate on which those who bring us up can sketch the outline of our future according to their desires?

A Jesuit was reported as saying, 'Give me a boy until he is seven years old, and he is mine for life.' Do we believe that?

Can pedophiles be cured of their behaviour by psychological methods, or are they the helpless victims of their genetic endowment?

Most women have two X chromosomes, where men have an X and a Y. Some short, infertile and physically subtly abnormal women are born with Turner's syndrome. They have only a single X gene, expressed as XO.

I have been many things during my medical career. At one stage I had administrative direction of the Prison Medical Service and had to undertake the sick parades when one of the salaried doctors was not available. It was a challenging way to practice medicine, never permitted to be alone with a patient.

Yatala Labor Prison held a tall and robust rapist, a strong, intelligent and very violent man with uncontrollable urges to attack women. He had an extra chromosome, expressed as XYY. Did this accident of genetics direct his behaviour? If so, was his criminal responsibility thereby diminished or even abolished on the grounds that he could not be held to account for what his genes did to him? Could any form of therapy reduce his dangerous urges, allowing that he could well produce verbal conformity with what he thought was required to achieve parole and release? Should we investigate his sons to see if they had the same abnormality, and what should be done if they did? Experts were deeply divided on these questions.

So you see that the Nature versus Nurture argument can have important and practical consequences, reaching to the field of criminal law.

In 1859 Charles Darwin published what may well be the most influential book since the early printed Bibles. He called it *The Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. This was followed in 1871 by *The Descent of Man and Selection in Relation to Sex*, which was even more challenging. I found both of them compelling reading, with an awesome display of erudition on matters biological.

I am fully persuaded by all that I have read, that Darwin was correct in his essential conclusion. What determines survival of an individual also determines the qualities transmitted to his or her progeny. Those who are the fittest will be selected to breed, and those that aren't won't.

At this point, and hoping not to cause offence, I will say a few words about words. I shall follow Darwin in using the word *man* to denote a member of the genus *Homo*, regardless of the chromosomal configuration determining male or female. In the same way, being very old-fashioned, I shall not again use the cumbersome circumlocution *he or she* and will mostly speak in the masculine gender — using that last word as a technical grammatical term and not, as has become frequent these days, with social or cultural connotations. I assure the ladies that I intend no disrespect to you, but this is what comes easiest to me. I hope you don't mind.

If a quality has survival value, it will persist, and if it doesn't it, together with those carrying it will vanish into historical oblivion, as happened to Neanderthal man. He is a dead branch on TH Huxley's Tree of Life, whereas ours is so very much alive that there is a danger that our world may be overwhelmed by the sheer mass of numbers of people competing for ever diminishing and degraded resources.

Richard Dawkins is an articulate and persuasive writer on these topics, in my view unfortunately too disposed to theocidal zealotry. He extended the concept of Darwinian evolution, while simultaneously narrowing it. He declared that the pressure to survive rests with the genetic material — the DNA making us what we are.

As he famously expressed it, we are survival capsules for the DNA we inherited, and the sole function we discharge during our existence is to perpetuate and multiply that DNA. All biological drives are directed to that end, and there is no other.

So far as our physical evolution is concerned, we have many features in common with other members on the large branch on the Tree of Life comprising the primates. That closest to *Homo* is *Pan* — the chimpanzee. Our DNA is more than 98% the same as a chimp's, so much so that recently some primatologists have argued that the two species should be merged into a common entity. So far as I know, however, nobody has successfully mated *Homo* with *Pan* to produce a hybrid — a sort of primate version of a mule, which is created by breeding an ass with a mare. Incidentally, for those who like words, the offspring of a she-ass and a stallion is called a hinny. Mules and hinnies are always sterile and in spite of folklore are not unduly stubborn.

There are some crucial biological differences between *Homo* and *Pan* — the opposing thumb of *Homo*; the structure of the larynx, which forbids the chimp the power of spoken speech; and we cannot be transfused with his blood or be transplanted with his organs.

From our homocentric perspective, the lowest twig on the branch of primates is the lemur. As representative examples, we can progress to the macaque monkey, the gibbon, the chimpanzee and finally man. The period of gestation rises from 18 weeks in the lemur, to 30 in the gibbon, 34 in the chimp and 38 in man — or, rather I should say woman.

After birth there is a period of juvenile dependency, during which the infant cannot survive alone. This increases from a year in the lemur to three years in chimps and perhaps five years in our children.

All post-pubertal primates have an indefinite male reproductive tenure. If we accept the arguments of Richard Dawkins, we can see how the males of *Homo sapiens* will strive to scatter their DNA as widely as possible and for as long as possible. Men over eighty can produce motile and fertile spermatozoa. Accordingly, monogamy is pathological and we should encourage widespread adultery. That simplistic logic certainly doesn't convince me, and I for one would regard such a society with dismay.

I must admit, however, that it has the sanction of Holy Writ. In the eleventh chapter of the Second Book of Chronicles, it is recorded that King Rehoboam of Judah took eighteen wives, and threescore concubines; and begat twenty and eight sons, and threescore daughters. His son Abijah married fourteen wives, and begat twenty and two sons, and sixteen daughters. Well could they be called the fathers of their country.

Females are different. Some societies and religions practice polygamy, which we prohibit by law, just as we do incest. Very few practice polyandry, where one wife has many husbands. Overall though, *Homo sapiens* seems to prefer that his females don't roam from their spouses, whatever the men may do.

In all species females can outlive males. This may be because of something as simple as the fact that they have two X chromosomes, whereas we men have a much shorter Y, carrying less genetic material.

In female primates there is a fairly fixed period of reproductive potential, rising from 18 years in the lemur to 35 years in chimps and much the same in women, although in our species it seems to have been extending over the last century or so.

How long after that can a female expect to survive? In lemurs, macaques and gibbons, this is less than three years, and chimps hardly do any better. The most pampered chimp in the best environment does not live much more than forty years, after a menopause setting in at about 35.

On the other hand, a non-smoking South Australian woman who has her menopause before the age of fifty has a good prospect of living well into her nineties. Steadily more old people receive a telegram from Her Gracious Majesty the Queen to commemorate reaching a century. There are many more women than men who do so. Most will have spent more than half their post-pubertal lives unable to breed.

We are the only species like that, and it is timely to ask what is the survival value for our DNA that old women can live on for so long.

If Nature versus Nurture is a long-standing dispute, the modern neo-Darwinists seem to have quite demolished Lamarckism. Jean-Baptiste Lamarck lived from 1744 to 1829, and he has had an unjustified bad press for postulating that acquired characters can be inherited. His example was the giraffe. In grazing on the tops of trees, it reaches higher and higher, thereby stretching its neck. That quality would be passed on to its progeny, as succeeding generations stretched more and more.

To a modern biologist that is nonsense, but Lamarck has been rehabilitated as we have come to a better understanding of what is called kin selection. This is the concept that DNA is shared between offspring and cousins, so that all have a vested interest in the survival of the group, even if they don't personally pass their DNA on. A key aspect of this is behaviour, which is inherited in a Lamarckian fashion and not Darwinian.

Ever since Abram became Abraham, Jews have been practising Rabbinical circumcision on the eighth day. Obstinate their sons continue to be born as God made them. The foreskin is inherited by Darwinian mechanisms.

On the other hand, long-standing behaviours of great antiquity can be abolished in a generation, as was chillingly shown in the China of Mao Tse Tung. They are acquired and are Lamarckian in the fashion whereby they pass from one generation to the next.

One thing that can be said of the species *Homo sapiens* is that we show huge varieties of physical and behavioural features.

Some species are quite different and are virtually uniform. Consider the behaviour of *Puffinus tenuirostris*, which follow the most rigidly ordered and complicated lives of any species I know of. They are the short-tailed shearwaters or mutton birds. Right now millions of them are somewhere in the high Pacific, probably south of Japan. From there they will pass up to the Bering Straits, then down the west coast of North America, never touching land. They sweep west and south to the islands of Bass Strait, South Australia and as far west as Nuyts Archipelago. I was once aboard a yacht near Gabo Island in the middle of the mutton bird migration. It was fascinating to see multitudes of them at much closer quarters than is possible during our summer cruising season.

At each destination they arrive on the same day every year. They pair, mate, lay a solitary egg and go to sea for two weeks. During the 53 to 55 days of incubation, males and females take turns to sit on the eggs for spells of twelve to fourteen days. In the Bass Strait islands, eggs hatch every year between 12 and 14 January. The chicks are fed each evening in the last of the light, and at dawn the adults leave in spectacular flocks of uncounted thousands of birds, in order to obtain fish for their offspring.

When the fledglings are nice and plump, their parents depart on the way north. After two or three weeks, the young birds start to get pretty hungry. With no parental guidance, they teach themselves to fly and to fish before they set off on the same route, remaining at sea for nine months until they return to perpetuate the cycle.

To use modern jargon, we can say that this extraordinary pattern of behaviour is hard-wired into the nervous system of the mutton bird. In the endless disputes as to what part of behaviour is nature and what part is nurture, there is no doubt that mutton birds act as they do exclusively by nature. They cannot be taught to do anything different. In that sense, nurture has nothing to do with how they behave. They are biological automata, living robots.

To what degree are primates like that? How much of our behaviour is hard-wired? Some generalisations can be made, only to find many exceptions. For example, like most members of the Primate Order, man is a social animal. Nearly all of us like to live in groups, and I shall return to how big a group we feel comfortable with. Of course there are deviants, those who become hermits, tramps and follow lives in isolation, but most people see them as distinctly odd.

A grumpy old dog snaps at something that disturbs it, but the same animal may tolerate a frisky puppy, anxious to play. In the same way, a cantankerous old man or woman may respond cheerfully to meeting little children. That works both ways.

I was once taken to what the Americans called a demonstration project at the Maimonides Hospital in Brooklyn, which boasted that it had the best organised aged care service in New York City. A classical group of old people sat round the sides of a large room, heads slumped, taking no notice of a big television set. A group of children arrived from a nearby kindergarten, and in a moment all was changed. The old people woke up, with broad smiles of invitation, reaching for the children, who willingly joined them. The psychologist in charge had written her PhD in anthropology. She was now studying the dynamics of transactions between residents, staff and with the children. She emphasised how beneficial the program was for unhappy children from broken homes, as they reached out for surrogate grandparents.

Speaking as a parent and grandparent, I can say that within our emotionally close family, which includes ten grandchildren, we have seen again and again how much better children can behave for their grandparents than for their parents. I am sure that this component of transmission of behaviour by association, example and teaching is of key significance in the evolution of *Homo sapiens*. I believe that it accounts for the apparently paradoxical undue survival of old women, and that there is much more to us than merely perpetuating our DNA for the sake of doing so.

The unit of our natural social organisation is the family, extending to the clan, and there seem to sound biological reasons why we tend to cling to these relationships, expressed in the concept of kin selection. In doing so, it is the grandparents who achieve the social cohesion to provide the basis of a sound community.

In that community how large is the group with which we can identify?

It can be huge. The Melbourne Cricket Ground holds about 100,000 people. At an AFL Grand Final they will be united but divided in their passionate adherence to their chosen teams. They are two large groups, each of about 50,000 people.

Sometimes that unity is not divided but is coherent. I have vivid memories of the closing ceremony for the Olympic Games of 1956. It was a time of great international tension, only weeks after the Soviet destruction of free Hungary. At the water polo match between them, so intense was the passion that there seemed a genuine risk that one team might try to drown the other. Members of the Australian team were placed round the pool, ready to leap in if necessary, to break up under-water fights.

At the conclusion of the 1956 Olympics, for the first time the athletes mingled together as they came into the arena, with no distinction of country of origin. When the capacity crowd rose to sing *Waltzing Matilda* I howled like a little boy. All of sudden I saw how Hitler and Albert Speer produced the drama of the great Nazi Nuremberg rallies, which contributed so much to German unity on the march to the Second World War. The group cohesion was intense and unforgettable, and never have I felt more proudly Australian.

There have been later occasions, like the wedding of Prince Charles and Lady Diana Spencer, when the television audience amounted to uncountable millions. It extended throughout the world, as it had done for the funeral of John F Kennedy, briefly uniting what seemed like the whole of mankind.

Those are brief experiences, notable at the time, but rapidly subsiding into snatches of memory, distorted by later revelations. Diana is no longer a fairy princess, any more than JFK was a Prince Charming.

In ordinary daily life, we prefer much smaller congregations. Nearly thirty years ago I set out to answer the question, 'What is the best size for a nursing home?' At that time the Home for Incurables had a notional total of 826 beds, and it was obviously vastly too large. There was a tiny nursing home for retired nuns, with never as many as ten beds. Equally obviously that was far too small.

What was just right?

Without going into detail, but whether we considered the economics of night surveillance, the observed clustering of residents and their advocates, the maintenance of professional standards, and other relevant factors, we came back again and again to the generalisation of about fifty beds. Matron Schiller of the Barossa Nursing Home, a truly remarkable lady of her generation, contended that a night supervisor must carry in her head the names of her patients. 'I have a good memory,' she said, 'So I can manage sixty or seventy, but the average nurse' — she paused to consider — 'She could not manage more than fifty. No nursing home should be bigger than that.'

The figure of about fifty has a wider application. According to Marshall Sahlins, that was towards the upper limits of groups in hunter-gatherer cultures, ranging from Australian Aborigines to the Inuit of frozen Canada and the Congolese pygmies in their sweaty jungle.

It's plausible to think we have brought that approximate number from our Neolithic past, before the Agricultural Revolution, which is only 15,000 years ago. There was a long time before that for behavioural factors with survival value to be encoded on the genes of *Homo sapiens*.

You don't need me to say that there are aspects of our society to show how potentially vulnerable we are. Increased aggression, on the roads and elsewhere, is only one example. It's easy to take a gloomy view of our future.

What happens when an established society actually disintegrates? Colin Turnbull's *The Mountain People* was published in 1973. He described the fate of a tribe called the Ik. They were isolated in the mountains separating northern Uganda, Sudan and Kenya. For centuries they had roamed in nomadic bands according to the season, until the creation of post-colonial independent and bickering countries. The Ik became entrapped in what had been a resting place on their perpetual journeys, where they used to hunt animals migrating like themselves. Mobility is essential to such a way of life, and they were forced to become instant and unsuccessful subsistence farmers. Paradoxically, their disaster was precipitated by the creation of a National Park, from which they were excluded.

Very rapidly they faced starvation and they could not cope with the loss of the intricate patterns of their former life. They degenerated into ghastly anarchy. Parents denied food to their children, brothers to sisters. Old people were turned out to die. The horrified anthropologists were helpless as they saw a once proud group of people disintegrate, apparently doomed to follow the fate of the Dodo.

At the end of his chilling account, Colin Turnbull summarised what he experienced.

‘The Ik teach us that our much vaunted human values are not inherent in humanity at all. They are only associated with a particular form of survival called society, and that all, even society itself, are luxuries that can be dispensed with... The Ik have relinquished all luxury in the name of individual survival. The result is that they live on as a people without life, without passion, beyond humanity. We pursue trivial and idiotic technological encumbrances and imagine *them* to be the luxuries that make life worth living. All the time we are losing our potential for social rather than individual survival, which is what makes us truly human.’

There is no doubt of the benefits of crossing generations to allow easy mixing of young and old, reinforcing traditions and folklore, binding the group into a cohesive entity.

I believe that we are stupid to deny this in the way we set up programs intended to produce exclusions based on age. We have retirement villages to which children come as welcome visitors, but they can't live there with day-to-day mingling of the generations. In the account of the Horn Expedition of 1894, Sir Edward Stirling described what he called the Aranda people near Alice Springs. Children from a young age were the sentries, set to call sightings of prey or strangers. That made them feel important and needed. They called their warnings to the old people, for the young adults were out hunting and gathering. Associations like that are emotionally symbiotic, and yet we deliberately eliminate them.

I have long advocated that in providing housing at public expense, we should mix generations more. Consider those most exhausting old people, the wanderers. It should be easy to devise mixed generation housing. Families with young children would be concentrated at the entrance to the enclave and the oldest and most vulnerable at the back. In this way, the wanderers would have further to go before they escaped from informal surveillance, and the youngsters at the entrance could help to steer them back to where they should be. Of course it's not a complete solution to a difficult problem, but I think it would help.

Furthermore, in day-to-day life there would be easy mixing of people of all ages. Some colleagues from the Housing Trust were interested in such an experiment, but it foundered on eligibility for subsidy under the Aged and Disabled Persons Homes Act. At that time it could not be combined with a program funded 100% by the State through the Housing Trust in order to produce a consolidated functional entity.

Incidentally, similar problems arose with organisations providing a hostel and a nursing home on the same site adjacent to a hospital in a country town. They were required to be distinctly different, separately administered and staffed, officially with nothing in common beyond purchase of food and linen. That rigidity lay in the laws, not in those administering them, although perceptions of departmental territory were relevant.

In the same way Dr Lesley McLeay's fascinating experiment at Hillcrest Primary School collapsed when the auditors demanded that Meals on Wheels must follow the statutory requirements of the Delivered Meals Subsidy Act. The service must be delivered in the recipient's home. What Americans called congregate eating was all very well, but not at Commonwealth expense. Local old people could no longer take a group midday meal with schoolchildren, although Lesley did succeed in having a septuagenarian playing the trombone in the school drum and fife band.

Please don't blame the bureaucrats. Parliament passed the laws, and it was their job to apply them, as we say, 'without fear or favour.' We failed to interest ministers in amending the acts to allow for more flexible programs.

One of the greatest human drives is meeting the need to be needed. Closely mixing generations helps both. Old people help to care for the young, and children lift the spirits of the old ones. This symbiotic process has brought *Homo sapiens* to where we are, and we should exploit it as we head into our time of troubles. Old people need to feel important to those who are young, and the young need to feel the same for the old. The survival value of these transactions created the longevity of our womenfolk, explaining and justifying the biological significance of grandmothers. My wife is fully persuaded by this argument, and I hope you are too.