MAN

Man has been with the earth for several millions of years. Perhaps five, perhaps two, or perhaps less, depending on how the difference between man and a man-like ape is defined. At all events it is quite a long time in human terms; long enough for the ice-sheets to have ground their way several times across our northern latitudes and disappeared again towards the pole.

In very general terms man has, in fact, been around during the same period as that in which the earth has been undergoing its succession of glaciations and de-glaciations. No one knows for sure how many glaciations and de-glaciations there have been. Until recently it was thought four or five, but in many places on land there is no real proof of more than two, although evidence from the sea is now suggesting a dozen or so cold periods.

Whether there were two or five or fifteen cold periods, men rode them out patiently for a couple of million years as best he could, leaving little trace of anything that can be called higher social organisation or civilisation of any sort. As the climatic belts migrated slowly too and fro and countless generations succeeded each other he moved around in small groups into the most favourable locations, well to the south during the periods of extreme cold. He must have been quite few in numbers and he must have lived in balance with the natural environment of which he was not the master, but a competing part.

This man was us; the roots of each of us reach back to every single individual whose line reproduced itself. It took us one hundred thousand generations to get through the Ice Age and we scarcely changed our habits - we never wrote, never discovered the wheel, never took up farming; even though at birth we were all the time not so very different from the individuals we now are in the Golden Age.

We certainly used crude tools, which we improved as time passed, and we learnt the use of fire. We must have kept burning down great swathes of forest. We could communicate with one another better than other higher land animals, and

languages grew, changed and were absorbed as we clawed our way through the dangerous world of pre-history.

There was no birth control; therefore each fecund female must have produced frequent children until her strength gave out; the population was more or less static, therefore most of the children must have died. Our ancestors appear to have been well used to death in its various forms. The women were tied to their children and their homes. It was advantageous to the individual female to become plump, to decrease in sexual attraction once a mate was acquired, and to be able to accept the routine of the domestic round.

From our ape-days we were always social animals and in the first place this meant working and living together with a degree of mutual tolerance. Higher social animals learn the hard way that efficiency is improved by group loyalty and by the protection of those from whom the group stands to benefit, including the elders, the children, the females and the fighters. Loyalty means self-sacrifice to the group; affection, compassion and sorrow for or comrades when things go wrong. Those of us in whom these qualities were well developed acted more cohesively and, over the millennia, tended to eliminate our competitors. These qualities came to be regarded as 'good', as things for which to strive.

Most higher animals are territorial and apes are no exception. Groups able to acquire and retain a premium territory held an advantage over other groups, and therefore fighting groups held an advantage over peaceful groups. They displaced them, assassinated them or absorbed them and the next time round the fighters and their children again had the best chance. There was a premium on groups producing bands of warriors, young men raring to prove themselves in combat.

After the most recent cold period, for some reason unknown, man suddenly began to realise the latent potentials that had lain dormant for so long. Perhaps the slow advance had simply brought the situation to a stage where it went critical. At all events there was a build-up of fundamental discoveries. The most important was the discovery of agriculture, and it was presumably no accident that this appears

to have occurred in the fertile subtropical river valleys where agriculture was most easy. The fact that each and every man did not have a difficult time merely to scrape together the wherewithal to keep his family going quickly permitted a division of labour and a population increase. This led directly to the founding of cities, which are synonymous with civilisation. In the cities specialists were able to exchange ideas, and inventions prolife rated, resulting in greater efficiency and larger populations.

With various ups and downs this development led up to the present day. Improvements in technology meant that the less easy temperate areas were opened up to population growth. When the industrial era began, the quarrelsome climate-toughened people of the temperate seaboards had a competitive advantage over the more conservative and overcrowded inhabitants of the sub-tropical valleys.

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Despite the big advances due to tile discovery of fire, agriculture and the wheel, technology as a whole seems to have progressed by an approximation to an exponential curve. For long periods there was little change, and local regression when the outer tribes broke in, but then in the eighteenth century the exponential curve started to assert itself. Despite local difficulties of adjustment to changing circumstances, exponential curves of technology and resource-use are by and large fairly comfortable to live with when they are on the way up. Here in the upper reaches of the Golden Age we are still essentially staggering upwards but we have reached the stage when the exponential curves have begun to reveal that they cannot go on forever, and indeed are not truly exponential. One of the pre-occupations of the Golden Age is to predict the real nature of the many curves, which together total our technological movement.

If we wish to speculate on the physical condition of man in one hundred, one

thousand or ten thousand years it needs to be on the basis that human physical evolution has ended, since there is no more effective natural selection; that concentrated supplies of low technology resources are limited but there is an abundance of high-technology energy and disseminated resources; and that there is in the long run a distinct possibility of some sort of accidental or quasi-accidental, major or minor, nuclear holocaust.

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In the meantime there are a fairly clear signs that as the global village establishes its priorities it will be able to keep two initially difficult problems under control.

Environmental pollution will be kept at an acceptable level for the same reasons as in any other village. The problems of population growth will be more or less coped with sociobiologically, by containment of proliferating groups within restricted areas and by reduction in the urge to procreate in the more affluent groups. These mechanisms are already operating. It is clearly painful for those who are contained, but it is as necessary for the village as it was for the former isolation of households stricken with plague. The village conscience includes an inbuilt mechanism whereby limits are placed on it where matters of group survival are concerned. Concepts of human rights, for example, stop short of inviting several hundreds of millions of impoverished Asians to join us in the abundance of Europe.

However much we use them, earth's elements do not vanish - they disseminate into the oceans in a form from which they can be recovered by the use of energy. The earth is bathed in a great flood of nuclear-derived energy from the sun, and we are well aware that matter and energy are one and the same thing anyhow. If we can evolve the technology to tap all this energy, or the internal nuclear energy of earth, we can keep recycling the limited supply of elements, and the signs are that this will be possible. It will be a high technology situation, precariously dependant on the continuation of high technology without a break.

A nuclear holocaust could end all of this under a layer of radioactive ash from which another species would in the long run have to make a totally new start. Alternatively, a
nuclear sub-holocaust could break the technological continuity and leave human survivors who would have to start again lower down the ladder.

In either case it would be found that the raw materials for a low technology industrial civilisation no longer existed. As this is the essential stepping-stone to high technology it would appear that a pre-industrial type of civilisation might be the acme of what could then be achieved. Species survival in these circumstances would however be much better assured, in lesser comfort, than in an unstable high technology state. It could be argued that a nuclear sub-holocaust in about a hundred years time, when readily accessible concentrations of 'non-renewable' raw materials have been used up, might be the best hope for the survival of Homo sapiens.

Peering into the more distant future we first see the ice sheets returning in a few tens of thousands of years. A high technology civilisation would be able to restrain them, but it is probably too precarious to last so long. Sooner or later man, or whatever post-holocaust life forms remain, will again have to survive ice ages by contraction into the warmer equatorial areas.

Much further ahead we can see the raw materials regenerating themselves. Within fifty million years significant new coalfields and oilfields will have formed, within a few hundreds of millions of years continents will have collided, metamorphisms have occurred at depth and the resultant rocks been brought to the surface, and veins of minerals will have separated out for intrusion into accessible surface positions.

At this stage the whole species lifecycle of an animal similar to man could repeat itself. It would probably be as well to wait for about five hundred million years if it is desired to be sure of adequate concentration of mineral ores to give low

technology the strength to evolve into the high technology of which we are capable in the Golden Age.

All this may sound fanciful, but one thing for sure is that a day five hundred million years from today will eventually dawn. At that time it seems the safest bet that the 20th/21st Century will be represented by a thin and rather weak radioactive marker band contorted in the orogenic zones and gently faulted and flexed in some of the shield areas. It will be missing from the oceans, which will be formed of new crust; and from many positive areas it will have been removed by erosion. Nevertheless it will form a useful marker band for elucidation of geological structure and long-range stratigraphical correlation.

The difficulty about high technology is not only that it is inherently unstable, but also that it has to be operated by an animal not evolved to operate it, since physical evolution ceases before the global village establishes itself. The intelligent animal is highly adaptable and by cultural evolution can take profound changes of function and environment in its stride. Is its capacity to adapt to change limitless? More insidiously, does it carry within itself the seeds of its own destruction?

Might it for example take a logical decision not to bother to reproduce itself in the light of the cold factual situation now revealed? Might it, by tolerance based on understanding of the problems of deviants, so encourage their practices that the supply of children fades away? Might its young males in their frustration tear the species apart from within? The answer is almost certainly no to all of these queries. Might mental or organic degeneration occur relatively rapidly in a species that has evolved relatively rapidly, particularly now that medical science is able to preserve the weaker individuals? Probably yes, but not for a few hundreds of thousands of years, if we get our time scale right. None of these possibilities though, encourages confidence in the long-term continuation of an unstable high technology.

If one has convinced oneself of the general inevitability of broad historical trends it is rather distressing to have to admit to being unsure whether or not nuclear total

holocaust will occur, as it would certainly be an historical event of significance. In the moral climate of the global village, however, such a one-off event seems unlikely, and a more probable scenario would be a disapproving staggering from one nuclear sub-holocaust to the next, until eventually either a total holocaust occurs or else the high technology chain is broken, the global village disintegrates and a pre-industrial type of civilisation supervenes. One might expect then a succession of Romes and barbarian resurgences stretching over the millennia until they are squeezed southwards by the advancing ice. The final curtain on Homo sapiens might fall when species degeneration sets in a few ice ages later – perhaps in about a million years?

The rat could provide the basic stock for the next pre-industrial type of civilisation about fifteen million years hence. Seen in this sort of context it is perhaps not too significant whether the golden Age ends in a bang or a whimper.

The basic conclusion is that any hope that we are progressing towards a totally well ordered world has to be an illusion. The biological facts are such that individual biological evolution has to stop at a stage that lies at a time when the animal is not able to adequately control the power it is capable of unleashing. This means that no intelligent animal can ever exist that can bring about a stable high technology, either on this earth or any other planet.

Nevertheless intelligence has been proved to be a most useful attribute for an animal to possess. Despite the insects and bacteria, man is pretty well master just now - he has hit the jackpot. That is what evolution is all about and there are bound to be others who will climb on the bandwagon. Just look at the family cat smouldering with internal resentment because it gets swept out of granddad's chair. It is saying that if it could compete on equal terms granddad would have to look out!

We are at the threshold of a great new era - the Era of Intelligent Life - which seems set fair to last more than four hundred million years of the Palaeozoic. Intelligent life forms will not tolerate contemporary competition and therefore

there will have to be longish gaps between the demise of one form and the rise of the next; gaps for evolution of successor forms and for global recuperation.

It has been remarked that it is curious that the biological necessities imposed by the small group-in-the-jungle lifestyle did in fact succeed in evolving an animal with the sophisticated cultural and technological capabilities of man. What conceivable evolutionary advantages can he have drawn from a capability to later produce a Bach, Beethoven or an Einstein, when all he really needed to overcome the opposition was the skill to wield a battleaxe adroitly? Do not lower apes use simple tools and wolves employ co-ordinated hunting tactics? All man needed in the first place to give him an edge over the others was a fairly simple ability to grasp concepts and think them through. He made a bigger stride than the circumstances required, hence the legend of the missing link. Why?

It seems to be the nature of evolution that at all times it takes off in a particular direction with a sort of impetus of its own, quickly progressing through the primitive stages of a new feature or even skipping them altogether. Natural selection produces a species with an ultimately fatal tendency to change in a particular direction. This periodical evolutionary impetus has been of clear species benefit - for example the ammonites were determined to get more and more complex septae, the dinosaurs to get larger and larger, the bee to get its sting. The fact that the ammonites and dinosaurs finally overdid it and became extinct is not relevant - they were initially very successful and they lasted longer than Homo sapiens seems likely to do. In the case of man it was his brain that was determined to develop, not merely minimally, to give a slight advantage, but considerably. Is it possible that the human brain is still developing?

We should however not be too modest about this. Man seems to have crossed a threshold in that his intelligence evolved to a point where it was able to link up effectively with forces outside himself and outside his direct biological needs. He is able to perceive and act with forces tending to order and opposite forces tending to disorder. He became able to recognise a link to the cosmos in anthropomorphic terms that he chose to call 'God'.

This topic is discussed under the heading of religion. The point that should be made here is that any animal reaching this threshold of intelligence will almost certainly have the same cataclysmic experiences of ecstasy in the face of contact with the universal life forces which may be inferred to pervade all things. All our successor intelligent animals will invent Gods and Devils, and music and art. Watch that family cat again - enjoying the sunshine.

It may be noted that man is already sharing the globe with another group of intelligent animals of an entirely different nature to himself - the whales and dolphins. Their large brains have developed in bodies that, unlike ours, are so highly specialised that they cannot adapt out of their element and nor can they manipulate tools in any significant sense. Man has consequently never been threatened by them and has attacked them only as a convenient source of food. They have developed in an environment so different to that of man that no real comparison is possible, and because of their inaccessibility much study remains to be done before they can be properly understood.

However, this group of marine mammals cannot be excluded from the consideration solely on the grounds of our ignorance. We appear to see here animals of high intelligence that are endowed with many virtues. Like man they are carnivores, but like most animals other than man, they do not seem to engage in massive episodes of internecine strife. They have family and group loyalties like man. They are apt to show actively their joy of living. Dolphins racing below a ship's bow are reminiscent of surfers or skiers, and all are demonstrating an ecstasy of communion with their environment.

Curiously they are well disposed to man; not only are tame dolphins and whales gentle and friendly, but wild dolphins will help swimmers in distress. Considering that they are likely to have a sophisticated communication system akin to speech, one might have expected at best a sullen non-cooperation in view of the way that man has treated them. They appear to be willing to turn the other cheek, as indeed man does to his predators when no danger is involved.

Like most animals other than man their reproduction rate appears to be related to their food supply, so there is no crippling population explosion. Many had no enemies until the arrival of man, and in these circumstances an inbuilt system of birth control is a species advantage.

Why has this group of animals come into being and what is its future?
Mammals have advantages over cold-blooded vertebrates in that they are less dependent on their environment. A higher degree of activity is most effective when combined with a higher level of directing intelligence. In order to range widely yet get back to the surface to breathe, marine mammals need to be largish, streamlined and generally highly specialised.

It may well be that the brains of whales and dolphins will become further developed by natural selection - possibly man is helping by culling the marginally less alert. A race akin to man, living in the sea and with no possibility of civilisation in the sense that we know it – gentle innocents of peace, and delighting in what they find. Perhaps this alternative is the acme of biological development?

These animals can, though, never reach out beyond the stars and begin to understand what it is all about. That privilege has been reserved to a bloodstained restless species unable to quietly settle in a routine of contentment; and with the physical structure to be able to convert its restlessness into action.

If man does not accidentally poison them, the whales and dolphins will probably recover from his present assault on them, perhaps minus some of the existing species. They will then continue their idyllic life, until in fifteen million years the members of our successor low technology civilisation will again find them an attractive form of food. Again there will be contact but very little understanding.

Is it possible that man, by means of cultural evolution replacing the lost individual evolution, could so far alter course as to combine his drive and adaptability with something akin to the gentleness of the whales and dolphins? This is the dream of

all men of peace. In smallish groups it can be done, it is being done - for a while. If it could be done by the species as a whole it would make nonsense of the predications attempted here. A even greater Golden Age would be still to come, with most of the fruits of science still to be plucked.

Cultural evolution is a potent factor. If we are born the same man as our interglacial ancestor we are externally certainly not the same man by the age of twenty. We have adopted different codes of conduct, but more importantly we have become aware of a much wider horizon. We may have visited Australia and we have seen the space-probe photographs of Mars. As a result of experience we have agreed that major wars and General Strikes are not permissible. We have developed far more complex, though still tribal, loyalties. There is nuance upon nuance in our interactions. If we were to change places with this remote ancestor, both of us, as individuals, would probably be able to adapt, albeit with some difficulty. The raw material is the same, but the group as a whole could be on a different planet. Striking firemen may still resemble the mob in some Shakespearian play about the Dark Ages, but at the other end of the cultural scale a team of scientists can play and execute schemes for exploration of the cosmos and the interior of the atom.

Cultural evolution is important. It has brought us our Golden Age and it promises better things, if only……! The whole cultural edifice, the structure of society is, however an eggshell thin facade. Give a cultured man a toothache and he is back on a par with a caveman with toothache. Put half a dozen high-powered scientists in a boat with fishing tackle off the Barrier Reef and within thirty minutes you have a bloodstained hunting party straight from pre-history, lusting for their prey.

Does cultural evolution have any chance of continuing its course, or even of holding its gains, as the twentieth century rolls into the twenty-first and twenty-second? This will depend not on an intellectual assessment that it would be advantageous and noble to do so, but on factors over which the intellectual can have little control - nuclear accident, population explosion, and the expectation budget of all those people both in terms of standard of living and quality of life. On

the one hand their expectations; on the other the ability of the total environment to meet them.

When the vital interests of our group are at stake that eggshell thin layer of evolved culture will crack in some places, and in others bend to mould itself round our requirements.