

Exponential Progress (excerpt from Thoughts on a Quiet Crisis – book in progress)

The critique predominant in circles of power tells us that the rate of our technological advance is exponential. It tells us that, having started off very slowly, we have now reached the point where we are accelerating so quickly that there will soon be few difficulties we cannot overcome. This of course seems like a good thing - until, that is, we realise that every advance is a step into the unknown. Each time we open a new door we are never wholly certain what lies beyond. Often we find, and should therefore anticipate, consequences that are both unexpected and unforeseeable. As one very simple example, when transport technologies were being developed no-one foresaw their potential contribution to global warming and no-one could possibly have foreseen their potential for transporting rabbits to Australia and their impact on its fragile ecology.

However within the exponential progress critique such concerns are considered invalid. It is imagined that, with exponentially increasing technological progress and the expertise that comes with it, we will soon be able to leave all these worries behind. We imagine that the answers to all problems will soon be within our grasp. However, attractive as this may seem, it is simply a beguiling illusion. It is wholly unfounded. We can for instance recognise that, when we look back into recent history, it isn't at all uncommon to find that our well-intentioned technological cures creating worse problems than the original disasters; Australia's deliberate introduction of the cane toad to control the cane beetle provides one such example. And because technology increases information without increasing the wisdom needed to go with it our decisions are, and will remain, fallible.

But also, and more worryingly, we find that the cures to the problems that technology creates are almost always retrospective, they are almost always researched and developed after the event. They follow, and are often many steps behind, the original disasters. This doesn't perhaps seem too concerning until we realise that, if our capacity for creating disaster increases in line with our technological understanding, which is increasing exponentially, then the potential consequences of the disasters themselves must also be increasing exponentially. This matters for the simple reason that, if we start with disaster risks that are increasing exponentially, that are then followed by a step gap before our exponentially increasing technology finds a cure, then the mathematical difference between the two, if they are increasing at the same exponential rate, increases exponentially. So not only is our technological ability advancing exponentially but so also is the potential for disaster that must result from it.

This perhaps needs repeating. With exponentially advancing technological progress the potential for disasters to result from it doesn't reduce but increases exponentially. And as all technological advance incurs risks that cannot be foreseen, and so cannot be controlled, such disasters will occur. This means that any finite system must at some point be overwhelmed. (A similar conclusion follows if, instead of progress being exponential it is seen to follow a power law relationship).

Three particular elements can be identified as contributors to this effect¹. First there is the nature of technological advance. It is now common for modern technologies to manipulate the basic fabrics of our physical and biological world, using nuclear science, genetics, information processing, nano science and intelligence, the unknowing misuse, or deliberate abuse of which have a potential for causing calamity on a scale far beyond any previous human capacity. Offensive computer virus and germ warfare proficiencies provide two very simple examples of technologies having such catastrophic potential. But secondly the intellectual and financial thresholds for utilising these technologies constantly reduce. As a result they become increasingly accessible to a wide range of individuals and groups who may be drawn to experiment with them for many different reasons without necessarily understanding the significance of their actions. These technologies are therefore increasingly open and vulnerable to misuse and abuse. The "garage GM" movement is an object for just such concern. But these risks are then further compounded by the ever increasing speed and automation of our global connections, and by the shrinking of natural barriers. In the past these have provided blocks to the transfer of contagion, or at least delayed their transmission, providing valuable time for responses to be prepared. No more. Such contagion, whether it is transmitted through vectors of

1 Martin Rees, "Our Final Century", 2003, Arrow Books

disease, electronic transmission, weapons of war, commercial profit-seeking or human greed now circle the globe instantly and virtually unhindered. Together these make us as a global species highly vulnerable to “unexpected events”.

But we should also recognise that, while technological progress is achieved through increasing the productivity of assets, disasters don't simply destroy this productivity they destroy the asset base itself. The fertility of the Fertile Crescent, for instance, destroyed by irrigation-provoked salinity, is, three thousand years later, still not restored. And nor have we extricated the rabbits from Australia's damaged ecology. These very simple damages defy restitution, despite the amazing technological advances we have since achieved. These then are the basic realities. They demonstrate that whilst our technologies have an amazing potential for unintended destruction their restorative abilities are weak and are very many steps behind the disasters they cause. In the light of such obvious and blunt truths, and in the light of the escalating scale of unintended, but expected disasters, our contempt for precaution is stunning. We are, without any doubt, heading for self-destruct. On this trajectory the time will come when our entire planet is engulfed by a disaster of our creation. Then even the most magical of exponential technologies will have difficulty producing something out of nothing.

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