TECHNOLOGY AND NATURE
Part One

The Unquenchable Thirst to Live in Gratitude: Digital Technology and the Afflicted Soul of the Earth

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Secular Culture and the Exclusion of Gratitude

I have recently taken to drinking sage tea. I have noticed that each time I go to the sage bush and pluck its leaves, I quite spontaneously feel an impulse of gratitude to the plant, and murmur a word of thanks before walking away. In earlier times, when people lived more closely with the plants and animals on which they depended, it must have been a great deal easier for such feelings to have permeated their relationship to the natural world than it is for us today. For in such a direct encounter it is hard to ignore that what one takes for oneself really belongs to another. The word of thanks follows that recognition.

In a lecture given in September 1906, Rudolf Steiner spoke of the significance of the practice of gratitude towards those beings lower on the scale of nature than we are. This practice belongs to the very first stage of the esoteric Christian path of inner development – the Washing of the Feet – in which we incline ourselves in humility towards these beings because it is precisely upon them that we depend:

> "This humility towards those who are lower than we are, and at whose expense we have been able to rise, must be present everywhere in the world. If a plant were able to think, it would thank the minerals for giving it the ground on which it can lead a higher form of life, and the animal would have to bow down before the plant and say: 'To you I owe the possibility of my own existence.' In

> the same way human beings should recognise what they owe to all the rest of nature."[1]

To live in such a way, with this awareness and with this disposition of gratitude to the world around us, is at the kernel of the religious attitude towards life. Gratefulness, according to a renowned contemporary monk, lies at the very heart of prayer.[2]

By contrast, the secular attitude is one that excludes gratefulness towards nature. It took root during the industrial revolution, through which human ingenuity and mechanical power wrested from nature the credit for the new manufactured goods that came into people's lives. Thanks were no longer due to nature, for industrial products were too many stages removed from the "raw materials" from which they originated to warrant such reverential feelings. Nature's raw materials (metals, coal, gas, oil) were now regarded simply as "resources" for us to plunder and utilise. Within such a viewpoint, gratitude had no place. It became a vagrant, ejected from the secular framework of production and consumption whose medium is the exchange of money, the modern means of alleviating indebtedness.

Industrialisation and the massive growth of urban living, gave rise to the illusion that nature was a peripheral factor of life, and was even superseded by our technological prowess. In the twentieth century, novel synthetic products, such as thermoplastics, began to appear that could not be found anywhere in the natural world. The driving force behind industrialisation was such that it set about creating a domain that was

apparently independent of nature, into which humanity was enticed. Thus the world of manufactured artefacts increasingly came to rival the natural world in its ability to attract our desire and harness our loyalty. Human beings came increasingly to feel at home in artificial environments, cocooned by the products of industry and technology.

The divorce from nature and the triumph of the secular industrial society are the background to, and precondition of, the digital revolution and new wave of wireless technologies that flood our lives today. These are but the latest and clearest manifestation of a process that was set in motion in the sixteenth and seventeenth centuries. Interestingly, they scarcely seem to belong to the *natural* world. The provenance of mobile phones, smart phones, tablets and so on seems to be a world of *pure technology*, as if no part of them retains any recognisable connection with nature.

If the industrial revolution brought secularisation in its wake, then the agenda of the digital revolution is more radical still. It is systematically to replace the natural with the virtual world as the primary point of orientation in our day-to-day existence. Nature is increasingly squeezed to the margins, to the periphery of our lives, while our electronic devices become the principal mediators of reality. The next stage, which is already under way, is to regard the living organisms on which we depend for our daily sustenance as versions of our electronic gadgets. According to Richard Dawkins, life itself may be redefined as information technology.[3] Such is the

atmosphere of scientific-technological hegemony today that we must exert an enormous moral and imaginative effort to extricate ourselves from the hardness of heart in which it embroils us. For just as it drives out the spontaneous impulse of gratitude to nature, so also does it suppress the voice of conscience within us when, enamoured with the latest seductive digital gadget on offer, we fail to consider not only the damage that its manufacture has wrought on the environment but also the human suffering that is part of its production cost.

The Hidden Wounds of the Earth

I have to admit to having unconsciously succumbed to the collective illusion that our digital technologies bear no relationship to nature. It simply did not occur to me that they are not as they seem to be – "pure technology". Mobiles, smart phones and so on convey this illusion partly through their extraordinarily compact and "glossy" design, utilising aluminium and plastic - neither of which are found in nature - to give them that space age feel. Aluminium has the double virtue of being both light and shiny, qualities that add to the allure of these devices. Significantly, the production process of aluminium requires passing a huge current of electricity through alumina, which is in the form of a powder, in order to fuse it into metal. Aluminium's dependence on electricity marks it out as a metal whose very existence depends on our modern ability to harness the forces of sub-nature. Nevertheless, like all metals, it originates in the ground as bauxite, found often on the upper reaches of densely forested mountains. In India, such mountain summits are

blasted out and dug to a depth of between thirty and a hundred feet, stripping away the covering forest and destroying the springs that are the natural water sources for the streams and rivers that flow into the valleys below.

Every stage of the production of aluminium involves ecological devastation, that is to say *sorrow to the earth*. The destructive mining of the bauxite; the refining of the alumina that produces large amounts of toxic "red mud" as waste; then the smelting of the alumina to fuse it into metal, which requires so much electricity that the industry has actually evolved side by side with the building of environmentally destructive big dams (for hydro-electricity). Alongside the ecological devastation, whole communities are often displaced both by the mining and by the building of these mega-dams, while those left behind have to eke out a living in a wasteland where streams and rivers have dried up, the topsoil is eroded and the earth and atmosphere are polluted.[4]

The plastic in which our digital technologies are encased is similar to aluminium in that it, too, is an industrial product, one step removed from nature; and it too belongs to the modern age, having only come into existence in roughly the last hundred years, as a result of our exploitation of crude oil, from which plastics ultimately derive. Notwithstanding the complex chemical processes involved in the manufacture of plastics, they would not exist if we did not extract crude oil and natural gas from the depths of the earth. This extraction process is mostly invisible to us because it is out of sight, save

when there is a disastrous oil spill or a desert war. But the oil industry has been, and remains, a prime example of the relentless and ungracious plundering of nature regarded as no more than a resource, and made possible by the exclusion of any feelings of reverence for, or indebtedness to, the soul of the earth.

Inside the plastic and aluminium casing, almost a third of the components of our wireless devices are made of metals that also have to be taken out of the ground. Mostly copper, the components of mobiles, smart phones, laptops and tablets also include tin, silver and gold and less well-known metals such as cobalt, tantalum, palladium and platinum. The copper is an essential component of the printed circuit board, as the actual circuits through which the electricity flows are made of copper. While the amount of copper in each mobile device may not seem great – roughly sixteen grams - multiply that by the hundreds of millions of mobile and smart phones manufactured each year and it becomes a sizable amount.[5] In the mining of copper, an ugly sore is created on the earth's surface that can reach hundreds of feet down, forming a large crater surrounded by barren terraces dominated by the bulldozer and the dumper truck (Figure 1).

One of the bi-products of copper mining is the much more rare cobalt, which happens also to be an important component of wireless technology. It is in fact a key component of all high-tech devices with rechargeable lithium ion batteries, like MP3 players, digital cameras, and laptops, as well as mobiles, smart phones and tablets.

It is sobering to reflect that the copper mine depicted in Figure 1 is just one of many similar wounds that we have inflicted on the earth for the sake of our love affair with digital technology. Its true cost goes far beyond the credit card transaction that we make in the shop or on the Internet. Such transactions are painless to us, but they are not painless to the earth.

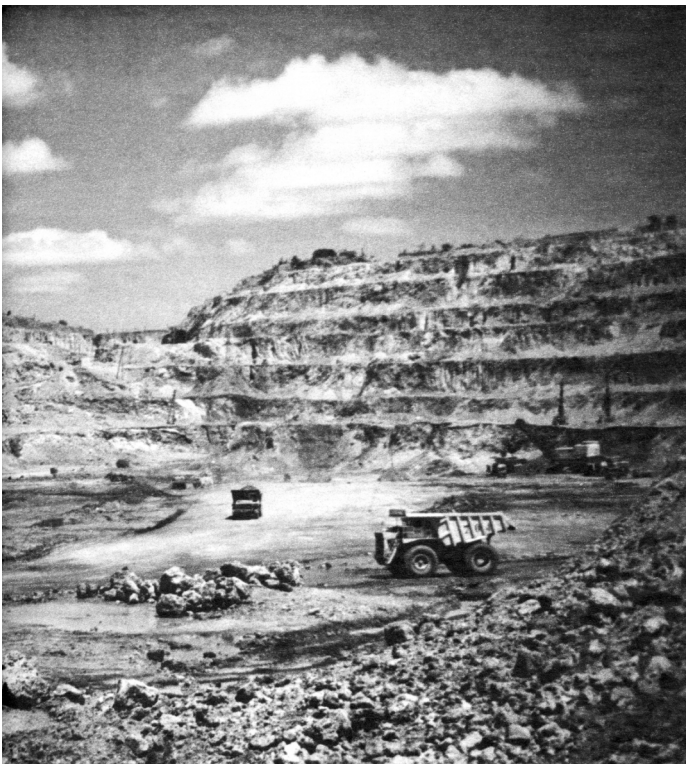

Figure 1: Open-cast copper mine. Kolwezi, Katanga, eastern Democratic Republic of Congo

In the past, mining used to be an activity limited by beliefs that the earth was a living organism. The metals themselves were regarded as alive, and mines were allowed to rest after a period of active excavation. In the Middle Ages religious ceremonies accompanied the opening of every mine.[6] Religious constraints on mining were only overturned in the sixteenth and seventeenth centuries, when writers such as Agricola and Bacon sanctioned the view that nature was there to be exploited for human benefit. In the course of the seventeenth century the earth came less and less to be regarded as a living subject, to whom thanks would be due for what she gave to us, and more and more as an object bereft of life, a kind of storehouse for us to raid.[7] It may be hard for us to associate our own mobile or smart phone, let alone the use we put it to, with such a view, and yet it is the product of precisely this way of regarding the natural world. The open cast copper mine depicted in Figure 1, or one like it, has provided an essential component of your apparently innocent device. Its awful barrenness is the unmistakable signature of the secular view of nature as a resource to be plundered.

Another important rare metal used in the electronics industry is tantalum, which is derived from a substance called coltan, sometimes referred to as “black gold” (Figure 2). One of the main sources of coltan is the dense jungle regions of central Africa, where the shiny black nuggets of this precious substance are mined with little more than pans and sluices, as gold was in the U.S.A. in the mid-nineteenth century. It has been for the most part

an unregulated activity conducted by thousands of unofficial miners, including an estimated fifty thousand children, in search of a source of ready cash.[8] As well as destroying the forest, mining has badly hit the wildlife - gorillas, okapis and other rare species being an easy target for food. When coltan is refined, the metal tantalum is yielded in the form of a heat resistant powder that can store a high electric charge. Because tantalum is a vital ingredient of electrolytic capacitators, there continues to be a consistently strong demand for it from the electronics industry, for use in mobiles, smart phones and tablets as well as laptops, video game consoles and so on.

Figure 2
Coltan, the source of tantalum.

A Terrible Human Cost

During the 1990s and for most of the first decade of the twenty-first century, one of the cheapest sources of copper, cobalt and tantalum was the Democratic Republic of Congo. During precisely the time of the surge in demand for mobile phones, the Democratic Republic of Congo was devastated by an extraordinarily violent and brutal war. Literally millions of people were killed, tens of thousands of women raped, and many civilians forced at gunpoint to work as slave-labourers for one side or the other. One of the industries in which forced labour was used was mining. Over that roughly fifteen-year period, much of the mining of tantalum was done by men, women and children held at gunpoint by militias. With the world demand for tantalum rocketing, it was an easy source of income to finance their murderous campaigns.

While the situation in the Congo has over the last few years become marginally more stable, militias continue to fight each other and young women are still being forced to work in conditions of slavery in mines producing gold, coltan and tin ore.[9] It is important to recognise that our craving for wireless digital technologies to a very large extent fuelled the long and terrible conflict that to this day continues to ravage that part of the world. A large number of multinational corporations were directly or indirectly involved on our behalf in the mining of copper and cobalt, and the exploitation of tantalum. These metals would then be sold on to "household name" companies such as Nokia, Sony, IBM, Hewlett-Packard and so on.[10]

As well as the mining of the raw materials required by our wireless devices, we should not forget the manufacturing process by which they are made into the products we buy. Perhaps it is because electronic devices seem to have a mode of existence that is unconnected to nature that, for most of us, smart phones might as well be made on Mars. In fact, most are made under inhuman conditions in factories in China. These factories are really cities: Foxconn's factory at Shenzhen, for example, which makes almost all of Apple's electronic devices (along with dozens of electronic goods for companies like Dell, Sony and Hewlett Packard), has a population the size of Leicester, with a workforce of a staggering three hundred thousand or more, housed in overcrowded dormitories in tower blocks on site.

These workers making iPhones and iPads, etc. are by all accounts mercilessly exploited, having to work twelve-hour shifts with only relatively rare days off, receiving poor pay, and reportedly having pay docked if they talk to each other on the production line. Some workers say their hands continue to twitch at night, mimicking the motions that they have incessantly to repeat during the day. A spate of suicides from workers jumping off the top of dormitory buildings at Shenzhen last year led to the company having to install safety nets around the dormitory tower blocks – not a particularly good advertisement for iPads.[11]

Figure 3
Factory workers at the Foxconn factory in Shenzhen, China.

The Unquenchable Thirst to Live in Gratitude

As we have flocked to buy the latest mobile, Blackberry or iPad, enamoured with the most recent sleek design and its new applications, the extent to which we neglected to consider what it was made of and how it got there, reflects the extent to which we too have been mesmerised by the collective illusion of "pure technology". The fact that so many of us did not associate these devices with a cost to the earth, to the jungles, to the wildlife, let alone to the human beings caught up in the mining of the minerals and the manufacturing process, is an indication of how susceptible we all are to falling under the spell which these incredibly clever, brilliant and useful

machines have cast over us. Belatedly we realise that the innocent face that our digital technologies present to us, due to their apparent remoteness from all things earthly, is false. There is human misery inside them as well as the suffering of nature, for which each of us bears a degree of responsibility.

Rest assured that the global electronics industry is under more scrutiny now, and campaigns to boycott "conflict minerals" have made a difference. Similar campaigns to improve working conditions in the manufacturing sector are still at an early stage, but will no doubt gather momentum.[12] But whether successful or not, there remains a deeper question that is far more difficult to address. It is the question of how we can begin to free ourselves from the mentality in which we are all enmeshed, which lies behind the secular industrial-technological paradigm. This mentality has established itself in the rift of our estrangement from the earth. Inhabiting that rift, our hearts have hardened as we have allowed ourselves to pursue without conscience the allurements of urban-industrial society, not least those most seductive digital devices that seem to us so desirable. A possible answer to this question may be found in the need, indeed the unquenchable thirst, that all of us have to live in gratitude to the world around us – a thirst that I believe is ultimately greater than the desire even for consumer electronics.

One of the qualities of gratitude is that it cannot abide with a conscience ill at ease with itself, for it is only in good conscience that we can feel and express our

heartfelt thanks. Thankfulness, truly heartfelt, cannot ride on the back of acts of pillage, exploitation and abuse. Where we cannot feel legitimate thankfulness, either because of our own bad conscience or because of our awakened sense of moral outrage, the thirst to live in gratitude can itself become our guide. For it corresponds to our deep human need to revere the world of nature and to respect other human beings on whom we depend. To rediscover the feeling of gratitude so that it imbues our thoughts and guides our day-to-day decisions is to take a step towards opening the eye of the heart that, in the febrile atmosphere of our consumer culture, all too often remains sealed. No doubt, to determinedly and consistently attempt to live in gratitude would involve us in great inner struggles, especially in relation to our beloved digital technologies. But perhaps we have been far too easy on ourselves, and these technologies – just because they seem so desirable – will prove to be our fiercest teachers on the moral path that it seems we are obliged to tread if we are to heal the rift between ourselves and the afflicted soul of the earth.

Notes

[1] 3rd September, 1906, "Oriental and Christian Thinking" in *At the Gates of Spiritual Science* (London: Rudolf Steiner Press, 1970), p.126.
[2] David Steindl-Rast, *Gratefulness, the Heart of Prayer* (Mahwah, NJ: Paulist Press, 1984).
[3] Richard Dawkins, "The Age of the Genome". BBC Radio 4, 14th July, 2010.
[4] See Felix Padel, "Aluminium Propensities for Life and Death", *New View* 57 (2010), pp.24–26; see also the comprehensive study by Felix Padel and Samarendra Das, *Out of This Earth: East India Adivasis and the Aluminium Cartel* (Hyderbad: Orient Black Swan, 2010), pp.39–43.
[5] In the first quarter of 2011, the amount of mobile communication devices sold world-wide was just under 428 million: 327 million mobile phones, and 101 million smart phones, according to the information technology research and advisory company, Gartner (19th May, 2011). This represents a 19% increase from the first quarter of 2010, and promises to bring the total annual sales for mobiles and smart phones in 2011 to 1.7 billion. Further statistics can be consulted on www.Gartner.com.
[6] Mircea Eliade, *The Forge and the Crucible* (Chicago: University of Chicago Press, 1978), p. 45 and p.54.
[7] See Carolyn Merchant, *The Death of Nature* (London: Wildwood House, 1980), pp.29–41
and Chapter 8.
[8] David Reay, "The True Mobile Phone Toll", *The Times, 'Eureka'* 12, September, 2010, p.32.

[9] Diane Taylor, "Congo girls work in mines", *Guardian Weekly*, 9th September, 2011.
[10] For an overview, see Kristi Essick, "Guns, Money and Cell Phones" in *The Industry Standard Magazine,* June 11th, 2001. See also the *UN Expert DRC Panel Report S/2001/357*, April 12th, 2001. For more recent analysis and information go to the website of Friends of the Congo, http:// www.friends of the congo.org.
[11] Malcolm Moore, "Inside Foxconn's Suicide Factory", *Daily Telegraph*, 27th May, 2010. See also Gethin Chamberlain, "Apple factories accused of exploiting Chinese workers", *The Observer*, 1st May, 2011.
[12] Garrett Brown, "Global Electronics Industry: Poster Child of 21st Century Sweatshops and Despoiler of the Environment?" *EHS Today*, September, 2009, pp.45–48.