

**Through his 'abstract gardening' Goethe discovered the 'Urpflanze', the 'ur-plant', an ideal prototype that contains all the plants of the past and the future. From this he conceived a stereoscopic mode of cognition in which simultaneity and succession both appear. The more general model extracted of this stereo-conception he terms the 'Urform' or the 'Urphänomen'. These shelter basic forms and all their future metamorphoses.** Esther Leslie/Melanie Jackson  
**The Urpflanze 2010**

We extend Goethe's idea of the primordial unit to contemporary science – to synthetic biology which likewise analyses biological, chemical and physical action down to 'least events' in order that they can be re-engineered. We fantasise about new forms of mattering that transcend any boundaries we once knew. The actions of cells, and the actions of chemical exchange and are broken down and used as substrates, as switches, parts to rebuild new exchanges from scratch – much like an electronic circuit – at the scale of a billionth of a metre and smaller. With an engineering approach to biology, it extends our taxonomies of the animate and inanimate, of the sentient and the inorganic and folds them in new ways. Like Goethe's prescient concept of the primordial plant that can unlock the potential of any future form, it dreams up complex new biological systems. It promises gourds that can be programmed to grow into fully-fledged houses, windows that create energy as they let in light through photosynthesis, drains that convert waste into energy, trees that can form useful structures such as bridges or towers, bio-robots that seek out pests such as flies, snails and rats to convert their bodies into sustainable bio-electricity, new foods that have a subtractive calorific content, bacterial coatings that transform pollutants and CO<sub>2</sub> into armorial masques healing concrete cracks, bio-sensors that glow, or change colour with the contamination of undesirable presences. It wants materials to be smart, responsive, full of switches, choices, thoughtfulness – it can think itself evolutionary *and* revolutionary.

Though much of the work of synthetic biology takes place in the realm of the digital, modeling, calculating, projecting outwards – the 'wet' work remains visceral and embodied in ritual and methodical physical process. Much work in synthetic biology requires a 'chassis' – a substrate on which gene transfer, synthesis and replication can take place. This is often e-coli – profuse in the gut and one of the most populous bacteria on earth – and in the popular imagination, a deathly infection. To create new organisms with re-scripted ATCG genetic data, strands of DNA are combined with e-coli – by processes of heat shocking, centrifuge, streaking, incubation, scraping, electrification, inoculation with anti-biotic, feeding with broth, cloning, amplification, ligation and transformation.\* This harbouring of work, embodied states, making use of entropy and of replication takes us to the very core of where the narrative arcs might project into the future. There is an opening here of the boundaries through and between objects, signs, bodies, nonhuman and human events, thoughtfulness and matter, production, exchange, entropy.

Is this a new status where we could reformulate and accept partial identities, contradictory standpoints? Can we ditch the old familiar binaries, the appropriation of nature as a resource for the production of culture, myths of linear progress, the old divisions of gendered identity? Can human and non human, thoughtful and non-thoughtful matter can be reimagined<sup>1</sup> in a new dynamic? Or is it an invitation for capitalism and militarism to extend it's grasp to the life of the cell and beyond, instrumentalising commodified and alienated subjectivities at the scale of the infinitesimal? The realms of biological reproduction and capital accumulation move closer together. As Melinda Cooper argues in the introduction to her book 'Life As Surplus' "it is becoming difficult to think about the life sciences without invoking the traditional concepts of the political economy – production, value, growth, resistance, and revolution.

Technologies of the present and of the future are revealed in proto form in those of the past. Can we see a presentiment of the GPS in the sexton and the compass? The clipped word count of twitter in the telegram? Goethe described the Urpflanze (The Ur-form) as a machine of metamorphosis – a shapeshifter capable of adopting any form our imaginations can unleash.

The smartphone is a machine of metamorphosis. It locates us in the real. It records and documents our presences through the index of the lens and the microphone, it makes omnipresent our social and professional networks, seemingly infinite 'facts' and posted and published pages, it locates our co-ordinates and movements on the globe, – and at the same time can perform and invent fantastical worlds and fairylands. It is a talisman against loneliness and alienation, of being 'unnetworked' it offers omnipotent knowledge. It simultaneously seethers us or disrupts our present moment or presence in the moment, it constantly reminds us of machine time, it teases our neurotic and narcissistic urges for attention and affirmation. It teases us with ever better, faster technological wizardry. It locates us and it loses us. Its gleaming hermetically sealed casing belies its enormous appetite for industry and mineral, and its constant upgrading and obsolescence create stockpiles of cankerous dirty matter.

Chemistry has invented simulants and surrogates for naturally occurring materials, often as compensation for the absence of natural resources in a world of carved-up territories and economic competition. These new replicant wonders emerged sometimes as the result of accidents or as by-products of pollution. In a guidebook to the World Exhibition of 1862 in London, Hofmann noted that extraordinarily beautiful colours were made from the most disgusting tar, and he expressed a technological optimism about the possibility of making all plant and animal matter synthetically and thereby 'making accessible to the many the basics of welfare and well-being that was previously only the privilege of the few'. As a book published by ig Farben on the history of organic chemistry, the chemistry of carbon and its compounds, expressed it in 1938 : the shiny black of coal deposits had locked inside of them a previous world of life, and all its colours.<sup>57</sup> That composite deadness, black but multi-coloured, dead but once

teeming with original life, could again release from itself life, for, as Goethe put it in *Faust*, 'Am farbigen Abglanz haben wir das Leben', 'Life exists in colourful reflections'.

Esther Leslie, *Synthetic Worlds*

Prior to this moment the most precious colours had been imported from exotic places. Micheal Taussig argues that we "diminish our sense of the world if we do not recognize that like spices and furs, gold and silver, lapis lazuli, slaves, and feathers, the most desired colors came from places outside of Europe, exotic places, we call them, meaning *colored* places." Color, then, "is a colonial subject." The circulation of dyes and colour were at the heart of the industrial revolution, seminal in the slave trade, simultaneously desired and repressed. Taussig also begins his book with another reflection about colour: "Men in a state of nature," wrote Goethe in his book *The Theory of Colour* "uncivilized nations and children, have a great fondness for colours in their utmost brightness." The same applied to "uneducated people" and southern Europeans, especially the women with their bright-colored bodices and ribbons. It seemed to him people of refinement deliberately avoided vivid colors in the objects around them and seem inclined to banish vivid colors from their presence altogether.

It was 'allowed' in frames and flashes: in stained glass windows, in state rituals, in war. Desired, and yet feared – even to this day, Taussig suggests, Westerners generally prefer drab, mid toned colors and keep their Hawaiian shirts and brightly colored dresses tucked away in the back of the wardrobe. Think of the cultural repression that is implied by the off-white wall. "Bright colors in this cultural matrix usually turn up in confined spaces – such as framed paintings, a child's playroom, or the pages of a comic book". Micheal Taussig, *What Colour Is The Sacred?*

In 1896 William Randolph Hearst's *New York Journal* proudly announced its first colour comic supplement "Eight pages of polychromatic Effulgence that makes the rainbow look like a lead pipe". Colour printing opened up the doors to a palace of excess, though its claim so excessive we enjoy it but know we are not entirely to believe in it. It is a medium that was considered vulgar, anti intellectual – pitched at semi literate (immigrant) workers. The magazine was a form that suggested itself as appendage to this version of the exhibition. Comics are, a melange of fact and speculation, an induction into the codes of science, science fiction, myth, legend, rumour, humour, fantasy, literature – \*in comic strip form.



In the course of this work, we have looked at the origins of the comic strip. Its originator was a Swiss man called Rodolphe Töpffer, who drew little graphic novels of continuous strips, with their characters, Mr Cryptogam and Vieux-Bois and others, in whimsical, nonsensical plots. His transformations of an object, for example, a face, are credited with inventing the genre of bandes dessinées in the mid-nineteenth century, and they were first passed around Europe by the enthusiast Goethe, poet and naturalist, who recognized in them their conjoined quality of movement and imitation.



Books and magazines and comics have leaves of paper. Is it curious that Goethe who loved to look at comics also loved to look at leaves. What fascinated him in the comic strip was the relation between each panel. He perceives incremental movement – or morphology – the name of the science of plant development that Goethe developed. Esther Leslie in Conversation with Melanie Jackson, Flat Time House 2013

The origins of the comic are with the line drawing but they come to embrace colour and its potential to animate " Drawing gives shape to all creatures says Diderot but colour gives them life, such is the divine breath that animates them".

Walter Benjamin proposes in his writing on the rainbow:

When colours are mixed they produce nuances of colour, not a blur. The rainbow is a pure childlike e image.' Colour resists the reduction of things to isolated, discrete things, favouring it instead as a response to it as infinite nuance, alive with shimmering energy....colour cancels out the intellectual cross references of the soul".

The industrialization of colour, first through colonization and the new industries of the industrial revolution then later through the development of the chemical industry promised us utopias and fairylands beyond our wildest dreams I quote

again from Taussig: these wildest dreams “not merely coloured, but magical. Not merely coloured but poisonous. As the spirit of the gift, colour is what sold and continues to sell modernity. As the gift that gives the commodity aura, colour is magical and poisonous and this is perfectly in keeping with that view which sees colour as both authentic and deceitful”. True colours and coloured vision/opinions.

In his 1840 study of the misery of the health AND CONDITIONS OF THOSE working classes France and England: Eugène Buret waxes:

The most fantastical creations of fairyland are near to being realised before our very eyes . . . Each day our factories turn out wonders as great as those produced by Doctor Faustus with his book of magic. ...

IG Farben – the most successful producer of chemical dyes the world has seen became central to the war effort of the Third Reich, and has come to symbolize the monstrous potential of modern technology. (Zirkon B) . Without colonies to glean of naturally occurring matter, the industry sought to colonise what was available down to the molecule, the subatomic.

The complex mix of minerals industrial processes and materials needed for hand held devices still require a truly international, global gleaning. It uses the most basic of tools as workers in the Congo strip coltan from open mines with bare hands and crude shovels, to the most dexterous roboticised assembly lines etching wafer thin substrates of silicon with 250 layer superstructures of conducting and semi conducting pathways The smartphone has consolidated multiple proto-devices GPS camera, calculator, Music player, tv, internet. It shrouds us in busy-ness and animation. In 1997 the global positioning system was not yet available in this consolidated form – it was emerging as a car accessory, and a separate handheld device. As with the smartphone that has now consolidated the handheld GPS into its Armoury, its technologies are manifold and complex. It takes 32kg of minerals to process and cajole into its 3g circuit. My animated film *A Global Positioning System* originated from the concept of mapping the totality of technologies and sites of production represented by a GPS device. The range of components that constitute are so complex and diverse that no single individual could ever have a comprehensive overview of it. The map is impossible.

In the film we briefly meet the boss of a Chinese factory that assembles GPS systems. he shows us the integrated circuit that he identifies as the “heart” of GPS technology: a cluster of millions of transistors, “like a whole city of skyscrapers”. *“In the finished work, the character’s facial image and mouth movements don’t lip-synch neatly with the recorded voice. The tiny marks and lines that form his mouth shatter and regroup, solidify and liquefy. the effect of the disconnection is subtle but decisive: something is not quite right, yet exactly right in its elusiveness. Connections are now visibly unhitched. The facts are dispersed and decentralised and can only be grasped collectively. This seems a cause for both optimism and anxiety. Technological production hinges on the sharing of practical expertise across collaborative networks. But part of the network may fail, or be destroyed, or opt to*

*withhold its knowledge. What then?* Rachel Withers, Six Signposts

In the space of 10 minutes and 2 seconds, A Global Positioning System propels us in imagination, all around the world: from a Western living room via a call centre to a Far Eastern city; to the clean room of an electronics factory; to an African marketplace, a latex plantation, a coltan mine, a shipping container port; past a military-looking checkpoint, across an ocean, even into outer space. At one point a list of the dozens of elements used in making a GPS scrolls down the screen. Later, a singsong computer-generated female voice, seductive and chilling all at once, intones the names of all the 32 countries from which the GPS's constituent parts may be sourced. The range of places and individuals depicted— workers, bosses, traders, carriers, consumers—draws viewers into considering another crisis in representation that most will be well aware of but may not often be prompted to visualise so vividly: the impossibility of grasping the incredibly complex network of micro-social, micro-political, micro-ecological and micro-economic relationships established by the GPS's production process.

The speed at which technologies upgrade and obsolesce, and their resource hungry components, present us with whole new strata of dirty matter – of transformed, co-opted elements.

*When Andre Breton wrote about the goal of surrealism in his 'Second Manifesto of Surrealism' in 1930 he wrote of the pursuit of 'the annihilation of the being into a diamond, all blind and interior, which is no more the soul of ice than that of fire'. The self is returned to its mineral state, before the contradictions that produce differentiation. Individuality is quashed in Breton's vision of the self as carbon, a mineral state prior to consciousness, is not pessimistic nihilism. It is a return to beginnings and the recognition of old relationships.*  
Esther Leslie

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