

Belonging. A person's membership of a group, or reciprocal obligation with another person. Belonging may be established and sustained by (e.g.) *inheritance, *presence, *contract or *ritual.

Betrayal. If *trust exists, the possibility of breaking it – betrayal – exists, too. In a culture which values trust, betrayal is viewed with horror. It opens up the possibility that the friendships, loyalty and trust that hold society together and make it comprehensible are not what they seem. Dante's *Inferno* reserves for traitors the deepest pit of hell.⁵⁴ There is no "now" in which logic can operate: an enemy has at least the merit of existing in the present; the person who has betrayed derives his value in his new life from what he was, and yet his old life has been repudiated; there is nothing there. The Psalms reflect on this with a summary of why it hurts:

For it is not an open enemy, that hath done me this dishonour: for then I could have borne it. Neither was it mine adversary, that did magnify himself against me: for peradventure I would have hid myself from him. But it was even thou, my companion: my guide, and mine own familiar friend. We took sweet counsel together: and walked in the house of God as friends.⁵⁵

Betrayal is an uncomfortable idea. It is out of its time, like *character. We will become aware of it again.

*Bad Faith, Lean Economics, Loyalty, Promiscuous Ethics.

Big Stick, The. (*Argumentum ad baculum*). The threat, or use, of force as a means of persuasion.⁵⁶



The role of force in argument was discussed by Antoine Arnauld and Pierre Nicole in their *Logic, Or the Art of Thinking* (1662), and it was the strongest form of the fallacy – physically attacking one's opponent until he gives in – that they had in mind. Naturally, they disapproved: "Any reasonable person will reject whatever is urged in so offensive a manner and not even the most stupid will listen". The threat can take many forms – blackmail, loss of job, execution – but its original meaning persisted in its name – *ad baculum*, "the big stick".⁵⁷

Arnauld's rejection of force as a means of argument was not a platitude. It was written not long before the Revocation of the Edict of Nantes (1685), the decision by Louis XIV to end years of tolerable coexistence with the Protestants and, instead, to apply persuasion in the form of the *dragonnards* – soldiers billeted at Protestants' houses, with instructions to cause trouble – and to silence contrary arguments by breaking the Huguenot pastors at the wheel.⁵⁸

This was also a time when the state was still working out, by trial and error, whether and how to come to terms with the way in which the individual's place in society was being shaped by the *market rather than by ancient structures of citizenship, *religion. There is no doubt that leaving matters to the market, to the price mechanism and to individual choices and contracts, saves a good deal of trouble. The market can appeal to something even more persuasive than the big stick – namely, simple self-interest – and when this began to be recognised in the seventeenth century it was all a great relief. "*Douce commerce*", sweet

commerce, wrote Jacques Savary, an early management consultant, in a textbook for businessmen (also in 1685), “makes for all the gentleness of life.” The authorities themselves agreed: commerce is the most “innocent and legitimate way of acquiring wealth”, observed an edict of the French government in 1669; it is “the fertile source which brings abundance to the state and spreads it among its subjects.”⁵⁹

The market to a large extent replaced the network of duty, responsibility and social capital which had been the basis for social *cohesion and *reciprocity. This was the “Great Transformation” which has delegated to the market so much of the burden of decision-making: it is prices that do the heavy work of signalling shortages and excesses, drawing the attention of business to the detail of demand, and supplying an incentive to deliver. The government’s main task in a mature market economy is to keep it free of obstacles that might stop it growing – like a bemused farmer would treat the enchanted goose: keep the foxes out so that it can go on magically laying its golden eggs.⁶⁰

The shock is that this period is coming to an end. During the early decades of the century, the market will lose its magic as a stabiliser. The main burden of holding society and economy together will shift to culture and reciprocal obligation, embedded in *social capital. Those assets will need to be remade. It will be difficult; we are starting in the wrong place. *Society and *economics, food and *transport, *culture and *politics, have evolved for a different world, and are riddled with cracks ready to break apart under pressure. But the alternative, should that fail, could be the big stick. You might think that the big stick is not the form of argument favoured by philosophers, even if it is the method used by the other side. But here is one who, from time to time, is driven to conceding that maybe there may be something to be said for it, after all:

What is a rational man to do, in the face of an appeal *ad baculum*? Knock-down arguments, alas, must be overcome not with a syllogism but a stick. Liberty *and* order are the prerequisites of reason. ... [In order to] protect and defend our rare and happy heritage of freedom and stability, let us have the courage, patience and wisdom to *enforce* restraint (without repression) upon our erring children. Then and only then, can the dialogue of reason continue.⁶¹

*Humility

Biofuels. See Energy Prospects.

Biomass. See Energy Prospects.

Biomimicry. The use of natural processes to produce materials. For instance, the material from which mollusc shells are made is extremely strong, in many ways superior to the strongest materials developed so far by industry, but its manufacture produces no pollution and uses only sea-water. Biomimicry, or “green chemistry”, is the science which aims to understand natural processes like this and to apply them.⁶² *Lean Materials.

Biotechnology. See Genetics, Robotics Information Technology and Nanotechnology (GRIN).

Bivalence. Bivalence exists where the argument is about a matter of either/or, true or false, black or white, self-hate or self-love. There is no middle position – or this is thought to be so. *Dialectic, Fuzzy Logic.

Blame. The fallacy that you have explained and in part solved a problem when its complexities have been focused, summarised and embodied in a person, a group, or other agent. A goat, perhaps.

Blame is therefore a quick way of making up your mind about a situation which you have not understood, or which provides a useful distraction. It avoids the need to explain a person's behaviour or an event, still less to trace the sequence of cause-and-effect through to its origins. It is a way of making sure that trouble, once it comes, will settle in, its causes forever undiscovered.

If blame for an action is to have any meaning, it must be the case that the person was free to choose a different action. And yet, if the sequence of cause-and-effect is traced properly, there is no space left in which "free choice" makes any sense. Why not? Because the *choice the person made was shaped by circumstances which were themselves beyond his control – and without free choice, blame becomes meaningless. This does not in any sense eliminate the role of responsibility in making a judgment; a choice is undoubtedly a person's responsibility and he or she must be held to account for it. *But* the possession of a sense of responsibility is itself a matter which is itself largely or entirely a gift of inheritance or up-bringing or other circumstances not of the person's own making.

What, then, can you make of an undesired action or a circumstance? You can apply judgment, or you can apply blame. If you apply *judgment*, you may simply, but reasonably, judge the action, or the person, or any of the circumstances surrounding it, to be bad (or good), against any standards you wish to use, such as the laws and expectations of the time, and you can then proceed to punish (or reward) accordingly. Equally reasonably, but at greater depth, you may wish to apply judgment by understanding how the event came about. The alternative is to apply *blame*. The problem is not just that, when you do this, you fail to understand how the action came about, but that, having failed to do so, you then proceed to plug the gap in your understanding with the pretence that the action *has* been understood: it fills the gap with blame, the thought-equivalent of fast food.

It matures easily into the witch-hunt. It is evidently comforting, when there is a crisis, to have someone to blame for it. Typically, the search for someone to blame crowds out all other deliberation. Blame seems to explain everything: any part of the analysis which is *not* blame is seen as evasion: to blame is to affirm and establish one's own moral standing beyond challenge – for if you challenge it, you are defending the guilty. And a common variant is the conspiracy version: no action or statement, not even the most benign ones, can be understood until the evil intent underlying them has been ruthlessly exposed. That ability to discover the true, rotten heart of everything is proof of intelligence and moral standing.

The number of people on whom anxiety and confusion will be dumped in the form of blame is likely to rise as, in the future, unexpected events crowd in. There is witch-hunt potential. But *Lean Thinking does not blame. As far as it can, it explains.

*Choice, Causes, Devil's Tunes, The Five Whys, Trust.

Boredom. (1) Distress caused by exposure to circumstances offering low levels of stimulus, an unintended but life-threatening consequence of the banality, regulation and risk-aversion which corrodes our culture. (2) Adaptation, or addiction, to a life

with minimal stimulus, leading in due course to an inability to cope with an argument or an event that surprises. (3) A moment of freedom from urgency, opening the way to the reflection that makes you a person. *Calibration.

Borsodi's Law. "Distribution costs will tend to move in inverse proportion to production costs". That is: although small-scale local production of food, goods and services tends to be more expensive (per unit produced) than large-scale centralised production, these costs are off-set by lower distribution costs (i.e. less transport). It does not follow that locally-produced goods will always be cheaper, because so many variable factors are involved, such as wages and fuel costs, as well as the economies that are available to the large scale. However, it does follow that, as the cost of fuel for transport increases, the relative advantages of local production can be expected to increase.⁶³

*Localisation, Household Production.

Bottom-Up. See Lean Thinking.

Boundaries and Frontiers. Boundaries and limits are necessary conditions for a system to have any meaning and identity. They give a system its structure and stability; as Schumacher writes, boundaries

... produce 'structure'. ... Now, a great deal of structure has collapsed, and a country is like a big cargo ship in which the load is in no way secured. It tilts, and all the load slips over, and the ship founders.⁶⁴

Boundaries have three crucial functions. First, they control access to the system, to the commons and the community, empowering the people who live within them with the expectation that what they decide on has a reasonable chance of happening. This assurance that their decision-making is not mocked by events and interests outside their control is a key condition for successful management of the *commons and for the evolution of *community.

Secondly, boundaries are central to the principle of a *closed system. For a system whose boundaries give it the benefit of a small *scale, *modular structure, it becomes realistic to conserve its materials and other assets – developing the *proximity principle, keeping *transport and *intermediate *needs to a minimum, conserving, *sorting, reusing and recycling, and trading materials across its *edges. This *complex, *holonic, bounded structure opens to way to a zero-waste, *resilient ecology.

Thirdly, boundaries have a complementary effect for the people who live within them: they limit access to territories *beyond* the boundary. In this sense, "boundaries" are the opposite of "frontiers". "Frontiers" can carry the implication that, if things get difficult at home – if fertility is in decline, if the demand for goods and services is allowed to rise beyond what can be supplied in the proximity, if there is overpopulation or conflict, or any other persistent problem – the natural thing to do is to cross the frontier and start again somewhere else. There are clear easy-option benefits here: you do not have to manage land in a sustainable way, nor do you have to resolve disputes: you can just move on.

The market economy has demolished its boundaries and turned them into frontiers. Its communities have lost control of their own decisions while at the same time pretending that there are always new frontiers beyond which new wealth can be plundered to solve troubles brought about by mismanagement at home. The principle

of the *localised, *resilient lean economy, on the contrary, celebrates its limits and recognises that, when you can't either walk away from a problem or export it, you need instead to organise your brain. This is a world without a frontier – a “beyond”. It has to solve its own problems, or at least try to.⁶⁵

*The Commons, Closed Access, Closed System, Resilience.

Building. See Lean Building.

Bullshit. (1) The waffle produced by someone who is expected to know what he is talking about, but does not. (2) An accusation thrown at a person who is hoping to lift the discussion from the reductionist torpor into which it has sunk. (3) Brief description of a content-free argument.⁶⁶ *Charisma, Intelligence, Icon, Osmosis.

Butterfly Effect. The case where small causes lead to big consequences. This applies to a system with an energy source which enables events to ripple through it, improving, impairing, or simply changing its behaviour or its fitness for the environment it is in. It applies most obviously in the field of weather forecasting, and it was discovered by the mathematical meteorologist Edward Lorenz in 1959.



While experimenting with a computer programme designed to supply forecasts for months ahead, Lorenz set out to verify a simulation that he had already run, and to extend it further into the future. For the new run, he fed back into the computer a set of numbers which he assumed to be identical to the set he was already using, since he copied them off a printout. Then off he went for a (now famous) coffee, leaving the computer to chunter away to itself with this re-entered data set. But when he got back, he found something

surprising. The first couple of days of modelled weather were reasonably similar to the original, but then they departed from it and eventually became completely different. The reason was that whereas the computer was working with numbers to six decimal places, the printout just showed the first three decimal places. Although the difference between the numbers was extremely small, it radically altered the result. Evidently, in a chaotic system such as the weather, small differences can have big consequences. Lorenz had demonstrated sensitive dependence on initial conditions.⁶⁷ He published his results at a scientific meeting in Tokyo in 1962, and then went on to develop the idea. Ten years later, at a meeting in Washington DC in 1972, he presented a paper, “Does the Flap of a Butterfly’s Wings in Brazil Set off a Tornado in Texas?”. and the image has stuck.⁶⁸

The weather is a good way of demonstrating the butterfly effect because it is chaotic. It can produce almost any result within a certain range – and still be weather. Complex systems – antelopes, for instance – do not have this quality. On the contrary, they sustain a high degree of homeostasis: they must maintain a more-or-less unchanging temperature, metabolism and form under all circumstances short of catastrophe (being eaten by a lion). But even antelopes can fail to prevent chaos entering their systems. Grazing in the wrong place, near where some lions are hiding, or being pricked by a thorn which causes an infection, will probably not prove fatal, owing to antelopes’ powers of prevention and recovery – its resilience – but it might. Little events can

ripple through an orderly, complex system and change it completely. Chaos can break into even the most orderly system, giving the butterfly's wing its slim, but significant, chance.

Here is an example of a small event with big consequences. No complex system is without its weaknesses, but in the early years of the twentieth century, the complex system called Europe had achieved, to an extraordinary degree, qualities which might be seen as ideal in a civilisation, with a strong culture and a strong – though still far from completed – trend of improvement in measures of social justice such as education, social security and political participation.

The future Kaiser Wilhelm II, Emperor of Germany, was born on 27th January 1859. It was a breech (feet-first) birth. At the time, only some 2 percent of babies born in the breech position survived. The greatest risk in a breech birth is that the baby's head squeezes the umbilical cord running up alongside it, causing it to suffocate. To avoid offence to royal decency, Dr Eduard Martin, who was in attendance, did not like to raise the Empresses long skirts, and had to do everything by feel.⁶⁹

When the child was in the birth canal with its head still in the uterus, and with both arms raised above its head, Dr Martin manoeuvred its left arm down out of the canal, using (as he explained in his report) "considerable force" – that is, enough to tear the brachial plexus in the complex of nerves in the baby's neck. He then, as was required, rotated the child's trunk in the birth canal. The only way to achieve this rotation without injury is to use both hands to grip the upper trunk firmly before turning it. Dr Martin did it by pulling on the now protruding left arm.⁷⁰

The baby was thought to be dead for several minutes following the birth, and modern medical judgment estimates that it would have been hypoxic (lacking oxygen) for at least eight minutes, sufficient to produce "minimal brain damage", a condition whose symptoms are now well recognised. It is not associated with loss of intelligence, but with psychopathic disturbances, hyperactivity, loss of attention span, inability to develop social sense or empathy, with the person having little or no understanding of the impact of his behaviour on others.⁷¹

The young prince's left arm was paralysed and six inches shorter than his right arm, and the effects of the injury was soon also revealed in his twisted neck. His mother, Vicky, Queen Victoria's eldest daughter, referring to his "deformity" and "disfigurement", never came to terms with his injury; she felt revulsion towards him, and lavished affection, instead, on her other children. Prince Wilhelm developed a hatred towards his mother and towards the English in general.⁷²

As he grew up he showed symptoms typically associated with minimal brain damage, such as requiring his advisers and generals to participate in a court life to a significant extent based on practical jokes. The head of the German Military Cabinet, Dietrich von Hölser, died of a heart attack while dancing for the Kaiser in a large feather hat and a tutu. He required his advisers to take part in morning gymnastics, which he spiced with pranks such as cutting General Scholl's braces with a penknife. The British foreign secretary Sir Edward Grey found the Kaiser "not quite sane, and very superficial". He reminded him, he wrote, of "a battleship with steam up and screws going, but with no rudder"; he could well "cause a catastrophe some day".⁷³

His politics were largely shaped by an appetite for revenge, which his ministers were usually able to ignore. When the German envoy was killed by the Boxer rebels in China

in 1900 he ordered that Peking should be razed to the ground. During a tram-drivers' strike in Berlin in the same year, he ordered that troops should move in and gun down at least 500 people. In 1919 (after his abdication) he wrote that no German should rest until all Jews on German soil had been exterminated.⁷⁴

His one consistent pleasure was the company of tall young men in the army. He explained that it was in his regiment that he found his family, his friends, his interests, everything which he had previously missed. In their daily company he was able to reduce each complex issue to a "purely military question".⁷⁵

In retrospect we can always see the big-brained reasons for big events: the rivalries between the empires of that time, the excessive confidence that comes when small nations join up into an empire, the knowledge learned from industry about how to organise large numbers of men, the implications of German dominance of Europe's North Sea ports and trading routes, the trouble with the ailing rivals – the Austro-Hungarian and Russian empires – dangerously played-out in the Balkans. *Realpolitik* can explain everything backwards. On the other hand, these were states which had achieved an astonishing degree of accomplishment, along with links of family, friendship and passport-free travel in a diverse European culture described and celebrated by critics such as Stefan Zweig. There is no reason to believe that the First World War would have taken place without the lifelong, and anachronistic commitment of the Kaiser to that end. And there is no reason to believe that this commitment would have occurred if it had not been a breech birth, if the doctor has been sufficiently skilled to deliver the baby without injury, or sufficiently unskilled to have been unable to achieve a live birth. Or if he had felt it was all right to raise the Empress's skirts.⁷⁶

The series of events set in train by that failure is arguably the most catastrophic in human history, decisively shaping the modern world, and giving its problems a rootedness and a sense of being under a curse. The war of two halves that followed, and the revolutions and genocides that came with it traumatised our civilisation. Some butterfly...

Evidently, a high degree of sensitivity to initial conditions is a quality that can shape history. But there are two points to note about it before finally abandoning all confidence in the idea that there is any point in planning ahead. The first is that a resilient system – a complex system as distinct from a merely chaotic one – is usually capable of dealing with disturbances and maintaining its stability, its homeostasis, for a long time. That is what resilience means.

The second point is that even a resilient system can indeed be destroyed or transformed by an event which hits the spot – which happens to have the right gearing. That maximum result from a minimum cause may be exactly what we want when working with a system: it is the ideal aim of effective *systems thinking. But, if it hits the wrong spot, it can travel like a tsunami, and destroy comprehensively. Maybe if the system in question were perfectly resilient, that would not happen. But perfection is at risk from events from outside which, on arrival, disrupt it. Behaviour which had previously been good – a polite reluctance to lift a lady's skirt even in an emergency, for instance – can, if luck is bad enough, leave even resilience overwhelmed.

Resilience is the stability which confers life and form in a living world which otherwise, as the victim of chaos, predation and bad luck, would never have got anywhere. Most

little random disturbances – like most little random mutations – don’t get anywhere. But sometimes they do, with good or bad consequences, however well the system may be defended against them. It is the weak point in resilience: it has a gambling addiction – the Butterfly Defect.

C

Cacologic. Bad logic. *Caeconomics, Ideology, Lean Logic, Logic, Utopia.

Caeconomics. (Greek: *kakós* bad; *nómos* managing). Bad economics: *economics that has developed its own logic, disconnected from the texture and purposes of society, ecology and culture which it exists to serve.

Cacotopia. (Greek: *kakós* bad; *tópos* place). The inverse of *utopia; the state that develops when technology is employed to multiply the problems which, without the assistance of technology, would not have proved fatal. *Neotechnic.

Calibration. The scale against which an institution measures what is “good” and decides how to act. But the scale may be recalibrated quite suddenly and radically. Example: if guided by a scale calibrated in terms of “Health and Safety”, an institution may develop a busy and elaborate burden of regulation – and, given a chance, it adds to it. But this could be sharply replaced by other labels, such as “Boredom Kills” – which could approve without question anything which reduces the burden of regulation, and helps people to sustain the interest and joy in life whose absence increases the likelihood of resentment, depression and suicide; or, it could accept, without inspection, any policy, however absurd and authoritarian, just so long as it could be presented as necessary for reasons of climate change or terrorism. The governing calibration is so powerful that judgment itself is suspended: it crowds out higher-level judgment able to choose

RECALIBRATION... but not yet

Arthur Koestler writes in 1941 of the passive compliance with the occupation of France:
As long as they do not receive definite encouragement from hard facts, the French people will remain partial but passive observers. ... The French people have been too deeply disillusioned to risk their lives once more without being fairly certain of victory. They have to learn to hope again, like a man after long bedriddenness has to learn to walk. When the scales of success turn in favour of England, the barricades will emerge from the pavements of towns in France, the snipers will appear behind the attic windows, and the people will fight as in the old glorious days – but not before.
(Arthur Koestler, *The Scum of the Earth*.)

between them. Calibration saves the trouble of having to think things through afresh every time – and this may be sensible and necessary – but once the scale of measurement has been settled, it is hard to judge by any other standard until, in an unexpected flip, it is exchanged for another one.

Groups with a purpose tend to calibrate their mind-sets and prejudices as extreme positions. This is borne out by experiments which bring together small groups of people, suggest to each group a subject, and to each person a moderate view (which they were prepared to agree with), and then leave them to interact about the subject together. As the conversation progresses, views begin to shift towards the extremes. The behaviour