**Ideology of power and the Power of ideology.**

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“Power” as defined by physics must coexist with time. On the other hand, the power of money, state, ideology, etc. isthe creations of human beings. Bertrand Russell evenbelieved that the laws of social dynamics can only be stated in terms of such power.1 This article examines the intimate relationships between power as defined by science, and these other kinds of power.Going by the history of the last two hundred years, it would appear that any concentration of economic and ideological power increases the level of political and social disorder in society, a dynamic very similar to what is observed in nature. According to Russell social power could be variously classified – naked, kingly, revolutionary, and so on. Referring to manifestations of social power, like economic power or propaganda, he said that “Power, like energy, must be regarded as …passing from…one of its forms into…other”.

The first fundamental law of nature is the law of conservation of energy: energy can transform from one form to another but it cannot be created or destroyed. Physics defines power as the amount of energy consumed, or *useful* work done, per unit of time. The term useful is important since it carries ideological connotations in a social context. For instance, trying to lift a heavy stone consumes one’s energy by generating power regardless of whether the stone moves. The power generated to lift the stone would increase one’s metabolic rate and ensure that the law of conservation of energy is obeyed. If the stone is too heavy and does not move at all, no useful work is done. However, if the intention is to exercise then some useful work has been done. On the other hand, if the person trying to move the stone has a weak heart and is not aware of it or ignores it, the exertion may further damage the heart, or even precipitate a heart attack. The point is nature does not care about our intentions or tell us what is ‘useful’ and the consequences of our actions are often independent of our intentions.

Human beings have transformed energy into power through a variety of techniques. In the early 1780s, James Watt defined one horsepower (HP) as the average power output by (of??) a healthy horse in one day. Much later, it was found that the power output from a horse could be as high as 12- 15 HP but would last for only a few seconds.2 That is, regardless of the source of energy, the effects of power depend on the time over which it is consumed or released.

The enormous destructive power of an atom bomb (A-bomb) is an example. Its power comes from the huge amount of energy stored in radioactive matter which is released in a very short time. The energy of a one megaton A-bomb is roughly the same as that of four trillion light bulbs, each of thousand watts power, turned on for one second. The difference is that in the case of the A-bomb, the stored energy is released in the billionth of a second. Hence the evocative Oppenheimer quote: “brighter than a thousand suns.” However, while the original quote eulogized the cosmic radiance and power of Lord Krishna, the “Preserver” of the Universe, the A-bomb’s power has become a destructive tool in the power politics of nations.

The generation or consumption of power takes time, and the time scale in nature covers a very wide range. In contrast Economics, supposedly the most “scientific” among all the social sciences uses only 2 time scales – “short run” and “long run”. In the absence of precise quantification, “short run” and “long run” must depend on the social context, and this article seeks to examine the dynamics between power operations in the physical and social realms during what the historian Eric Hobsbawm called the “long 19th century”, and the “short 20th century”. 3

The chemical explosives of World War I, the A-bomb of World War II, and the nuclear tests during the cold war era, demonstrated the enormous destructive capabilities of physical power, prompting Russell’s observation: “To frame a philosophy capable of coping with men intoxicated with…unlimited power and also with the apathy of the powerless is the most pressing task of our time”. 4

The second universal law of nature, the 2nd law of thermodynamics, brings energy and time together. It addresses how the effects of turning energy into power are dependent on time. In the early stages of the Industrial Revolution the French military engineer, Sadi Carnot demonstrated how, when heat is converted into power to get work done, some of the heat (and therefore power) is *always* wasted. 5 The word “always” is important because it implies the irreversibility of time, bringing a historical dimension into science.

 Essentially, that wasted part gets randomly distributed in the surroundings. Such randomness,or the *disorder* in energy distribution, is called entropy. Carnot’s work was eventually shown to be entirely consistent with the atomic theory of matter and statistical approximations. It was also shown that a lowering of entropy, i.e., the concentration of order in energy distribution in one place, increases the level of disorder elsewhere, the latter being always greater than the former.

Socio-politically, the decade that began with Watt’s work, ended in the French revolution of 1789, temporarily replacing “kingly” power with “revolutionary” power. This redistribution of social power followed the same pattern as that of physical power or the 2nd law, in that the combined powers of the monarch and the aristocracy were no match and could not control the increase in the societal disorder or social entropy. What Russell called “the apathy of the powerless” turned into blind fury, unleashing the “reign of terror”. The word “ideology”, coined by a French aristocrat [Antoine Destutt de Tracy](https://en.m.wikipedia.org/wiki/Antoine_Destutt_de_Tracy) around that time, was supposed to mean the “science of ideas”. The hope was that with an appropriate ideology, the impulsive anger, or the power of the “powerless”, could be controlled.

In a different context, that of the material world, Watt was motivated to define horsepower for practical reasons. He had been engaged in manufacturing rotary steam engines, machines that eventually replaced the horses in a ginmill to produce power. Due to the easy availability of coal, these machines added enormously to the growth of capital, and the might of capitalism as an ideology. By the mid-19th century, “The Age of Revolution” ended, and “The Age of Capital” with its deep penetration into the colonies in Asia, Africa, and Latin America began. 3

Thisconfluence of physical power with that of ideological power was most apparent when Britain used coal fired, steam engine driven war ships against China in the first Opium War of 1839. The intended short run effect was to subjugate China throughnaked power. This was achieved with the occupation of Hong Kong in 1842. The long run effects of the concentration of military and economic power in the hands of a few western nations were many. They began to unfold themselves after about three decades with the start of “The Age of Empire”. 3

Around the turn of the 20th century the long run effects were apparent. As the power of finance capital became increasingly concentrated, social entropy, economic inequalities, and the geopolitical rivalries between the imperial powers increased. The fragile power equilibrium finally broke down when World War I began. Capitalism temporarily ceded some of its ideological power to those of nationalism and socialism. The Russian revolution of 1918, the rise of fascism in Europe, the 2nd world war, and the revolution in China followed in quick succession. Finally, dropping the A-bomb on Japan and the switching to oil (from coal) in the twentieth century made the United States the world’s dominant power and began the decline of Europe’s great powers.6

Frederick Soddy, a Nobel laureate in chemistry, was the first scientist to recognize the fundamental difference between material wealth and financial products, including money. Soddy wanted a distinction to be made between material wealth and virtual wealth by taking entropy into account. 7 A few decades later, Nicholas Georgescu-Roegen also drew attention to the entropy problem in economic growth. He compared the irreversible loss of earth’s precious mineral resources to the loss of heat as entropy. 8

Finance capital, or Soddy’s “virtual wealth”, is given by the difference between the average rate of interest (r) earned by capital and the average rate of growth (g) of the economy. 9 That ‘r’ must always be greater than ‘g’ under capitalism is now a well-established fact. In the 21st century as a reminder that history repeats itself albeit by adapting to changed contexts, this has led to an unprecedented level of concentration of financial power in the hands of a few investment banks and technology companies in much the same way the industrial revolution had empowered a few nations.9 - 11 The resultant mind-boggling economic inequalities all over the globe, a discernable rise in social entropies in many countries, and a loss of trust in social institutions have harmed science and the scientific profession deeply.

Scientists have long been perceived as a part of the social elite. In 1993, an editorial in the journal “Science” pointed out how scientists were “engaged in building toys for the rich” though “the economic inequities in…society remain sharp”.12Just after the 2020 US presidential elections, another article observed that “almost half the voters, had cast their ballots for Donald Trump”, adding that the ‘anti-science’ label for those people “corrodes democracy… and before the present era of deregulation, government agencies …tended to enjoy greater trust.” 13

This observation is really the crux of the matter. When philosophers say that truth and power aren’t mutually exclusive, that each society has its “regime of truth” they refer to the ideology accepted by the “powerless” as the truth. 14 However, when a dynamic social equilibrium is seriously disturbed by “peddling prosperity” 15, it is to be expected that “the apathy of the powerless”, would transform into a mistrust of the ruling elites and social institutions.

Though the laws of nature discussed in this article lie outside the societal regime of truth, they have a direct impact on what we value and how we behave both as individuals and as social beings. More than 100 years ago Svante Arrhenius, the father of chemical dynamics, tried to quantify the contribution of carbon dioxide to the greenhouse effect16 and, fossil-fuel energy has been central to geopolitics for nearly 200 years, with *after-effects* that last decades.6 More alarmingly, burning fossil fuels indiscriminately has generated the very real prospect of climate change with disastrous natural consequences. How that would play out in terms of geopolitics and social entropy only time would tell, but the outcomes are unlikely to be pretty.

REFERENCES:

1. “Power”, Bertrand Russell, Unwin, London, 1975.
2. R. D. Stevenson and R. J. Wassersug, Nature, Vol 364, 15 July1993, p195.
3. “History of Western Philosophy”, Bertrand Russell, George Allen & Unwin Ltd., 2nd edition, 1961.
4. “Reflections on the Motive Power of Fire”, S. Carnot, (translated and edited by Fox, R.), Lilian Barber Press Inc., New York, 1986.
5. [The Age of Revolution: Europe 1789–1848](https://en.m.wikipedia.org/wiki/The_Age_of_Revolution%3A_Europe_1789%E2%80%931848), [The Age of Capital: 1848–1875](https://en.m.wikipedia.org/wiki/The_Age_of_Capital%3A_1848%E2%80%931875), [The Age of Empire: 1875–1914](https://en.m.wikipedia.org/wiki/The_Age_of_Empire%3A_1875%E2%80%931914), [The Age of Extremes](https://en.m.wikipedia.org/wiki/The_Age_of_Extremes).
6. H. Thompson, Nature, 2022, Vol 603, 17 March, 364.
7. [Wealth, Virtual Wealth and Debt](https://en.m.wikipedia.org/wiki/Wealth%2C_Virtual_Wealth_and_Debt). The solution of the economic paradox, George Allen & Unwin, 1926.
8. Georgescu-Roegen, N., The Entropy Law and the Economic Process, Harvard University Press, Cambridge, 1971.
9. S. Bhaduri, Current Science, 2015, Vol 109, 25 September 1026.
10. Sumit Bhaduri, Current Science, VOL 118, 10 January 2020, 22.
11. [20220304\_02.pdf (ias.ac.in)](https://www.ias.ac.in/public/Resources/Articles_Repository/20220304_02.pdf)
12. R. S. Nicholson, Science, 1993, Vol 261, 9 July, 143.
13. S. Hilgartner, J. B. Hurlbut, S. Jasanoff, Science, Vol 371, 26 February 2021, 893.
14. M. Foucault, Power/Knowledge, as quoted in “A Dictionary of Philosophical Quotations” ed., A. J. Ayer, and J. O’Grady.
15. “Peddling Prosperity”, Paul Krugman, 1995, Norton paperback.
16. Philosophical Magazine and Journal of Science Series 5, Volume 41, 1896, 237-276.