Science and destruction

Carlos Malferrari

Cratylus' finger

We are all familiar with Heraclitus' statement that no man can step twice into the same river. Cratylus, his disciple and master of Plato, went further and said that man cannot step even *once* into the same stream, for the perpetual flow of all sensible things makes them unknowable. In fact, it would be impossible to even utter the name of things or *think* about the river without a correspondingly agile syntax and semantics. It was this extreme perspective that Aristotle ultimately immortalized, when writing that Cratylus "ended thinking that one ought not to speak of anything, and was content to merely move his finger".[1]

If the muteness of philosophy with regard to the things-in-themselves is an inevitable consequence of the clash between the fluidity of phenomena and the fixedness of language, Cratylus moving his finger seems to indicate that, nevertheless, something about something can somehow be said. Cratylus' finger should thus be seen as a symbol of the human revolt against the state of ignorance to which we are doomed – and also as a symbol of the human hope that some kind of knowledge is possible, even if acquiring it requires us to interrupt the eternal flux of things.

This possible knowledge of things we today call science, and we may say that the history of science is the history of humanity's long struggle to "halt" Heraclitus' river, even if momentarily, in order to know it.

Where does an unflowing stream flow to?

Copernicus halted the perfect motion of the stars and found that the Earth moved. Newton briefly stopped the movement of bodies and found in each of their constituent particles an inexorable force that draws to itself all other particles. Hubble suspended time and his eyes were opened to the moment of the origin of all things, the Big Bang. Darwin ceased the hypothetical interference of the godhead on our planet and discovered the secret of biological transmutation.

In other words, motionless rivers generate knowledge. New contents emerge from their placid waters, and novel events may be foreseen because the state of rest ensures that the phenomena will recur. So, after a long period during which religion predicated the primacy of movement and reserved immobility to God, science eventually flourished.

Yet, however "ethereal" the study of mechanical and electromagnetic forc-

es may be, however "non-carnal" the laws of thermodynamics may be, "Nature is red in tooth and claw,"[2] as Tennyson said, referring to the essential brutality of life. Perhaps for this very reason, when the inductive method is applied to the study of living beings, it becomes likewise brutal and bloody, as if by mimicry, in such a way that the selective immobilization of the object of study – the "halting of the river" – only becomes possible if the living being is transformed into a dead being.

William Harvey only discovered the circulation of blood after disjoining an endless number of live pigs. He was preceded by a certain Matteo Colombo, who vivisected dogs and other animals for the same purpose at the University of Padua, where Galileo would later study the celestial bodies (and eventually become blind from gazing at the Sun).

In other words, although motionless streams were generating new knowledge, they were now doing so at the expense of destroying the object of study.

Unshaken by all this, however, the experimental method continued to be perfected and applied to the biological sciences, until it was eventually legitimized as the standard methodology of medicine after Claude Bernard,[3] that is, until the scientific establishment accepted that vivisection is essential for medical progress. Interestingly, however, ethical unease regarding this most controversial of processes was minimal – a silence caused perhaps by the huge amount of new knowledge being acquired.

Yet, the very success of this practice ended up creating a dilemma, since the only definitive criterion to confirm the applicability of animal research to the study and resolution of human medical conditions is to carry out vivisection experiments in humans. This final step in the pursuit of knowledge, still a taboo but also an inevitable consequence of the inductive method applied to medicine, would have to await the emergence of favorable socio-political circumstances – which, incidentally, were soon to come.

The important thing is that the precedent had been set and the destruction of the object of study became a procedure not only justifiable, but also fruitful for acquiring new knowledge.

The paradigm of destruction in physics

In the late nineteenth century, it was found that Heraclitus' streaming river was much more torrential than one might imagine. The discovery of X-rays by Roentgen in 1895, of radioactivity by Becquerel in 1896 and of the electron by Thomson in 1897 demonstrated that one could not even rely on the *apparent* stability of matter. Stopping this river to study it would not be easy.

As we have seen, however, a precedent had been set. If the destruction of the object of study had been so fertile for biology, would it not be equally fecund to describe the whirlwind of the subatomic universe?

Thus, in 1919, Rutherford used the *destroy to learn* technique and became

the first person to deliberately split an atom, using the still "natural" method of bombarding it with alpha particles from an existing radioactive substance. The results were wonderful: the atom ceased to exist, giving way to the proton. In 1932, under his guidance, a particle accelerator was used for the first time to split the atom through entirely artificial means. Also in 1932, using the same *destroy to learn* technique, Chadwick discovered the neutron, which Lise Meitner would use seven years later to discover nuclear fission. Six years later, in Alamogordo, the detonation of the first atomic device would release upon the planet a hitherto unknown type of energy.

Rather astonishing in this brief history of nuclear physics is the fact that none of the protagonists expressed concern, or even curiosity, about the, say, "metaphysical" results of their research, although they were dealing with the innermost core of matter, with points on the threshold of space and time, where no man or god had ever laid eyes or hands before.

Even though nuclear fission is not a process that occurs spontaneously in nature,[4] no one asked, "Is it licit to do this? What might be the consequences of annihilating the very core of matter?". No committee of scholars was formed to investigate the ethical implications of the new forms of destruction, no congress was convened to discuss whether shattering matter in one point of the cosmos would have effects – and if so, which – elsewhere on the cosmos.

On the other hand, considering that animal or even human vivisection did not, and does not incite any bona fide ethical concern, it is not surprising that no one worried about the extinction of some tiny amorphous granules of matter.

It is said that some scientists who worked on Manhattan Project had serious conscience issues, but only *after* the bombs exploded in Hiroshima and Nagasaki. It is also said that, on the eve of the explosion of Trinity, the first atomic artifact, Oppenheimer actually considered the possibility that the chain reaction might not remain confined to the plutonium and might extend to other elements, ultimately destroying the cosmos in one huge fireball. It is likewise said that at 5:30 a.m. on July 15, 1945, when a light that was not from this world emerged from the bowels of matter, Oppenheimer thought to himself: "Now I am become Shiva, the destroyer of worlds," alluding to the Hindu deity who, besides destroying, also creates worlds.Things ran their quite unnatural course and today we have the Large Hadron Collider, the most colossal destroyer of objects of study ever created. Such neglect toward existence is bound to spill over into other planes.

Embryos, fetuses, abortions, and the dream of eternal life

The favorable socio-political environment that modern biology had been waiting for to release human vivisection into the world was, of course, Nazism, with its notorious camps of sociobiological experiments at Buchenwald and Auschwitz, and its mass export of scientists and researchers to the West after the war.

What kind of medicine can result from a physics and a biology ravaged by the paradigm of destruction, from a scientific milieu devoid of ethical concern and any supernatural angst, from a still-Cartesian philosophy that, like its founder, aspires to eternal life?

Cleopatra allegedly devised an experiment to test the theory that male and female embryos take, respectively, 40 and 80 days to fully fashion. After adjuring the courts to sentence her handmaids to death, she had them inseminated and subjected to operations that tore open their wombs at specific stages of pregnancy. In other words, Cleopatra, as a true extemporaneous proto-scientist, replicated our old and well-established scientific method and stopped the flow of pregnancy to discover the secrets of the embryos.

More than two thousand years later, with all the ethical lore acquired in Alamogordo and Buchenwald, science began to move systematically towards the same research project. Underlying every breakthrough in treatments based on embryonic stem cells there is a vast trade network dealing in embryos, fetuses and blastocytes – whole or in parts. In 1998, for example, the last year for which I have data[5], a whole embryo extracted by aspiration in the first trimester of pregnancy cost US$ 220 per fresh specimen and US$ 260 per frozen specimen. Their parts were worth much more, in a puzzling example of parts larger than the whole: the pancreas of an embryo less than eight weeks after conception cost US$ 100, the same price as a kidney (with or without the adrenal gland) of a fetus more than eight weeks old.

Whatever the benefits of this type of research, it is certain that future historians will be perplexed with the explicit autophagy of our society and wonder what could have led us to get on this sinking boat. And they will likely attribute this deviation to our hubris and to the adoption of a scientific method that assumes the destruction of its object of study.

Cratylus' tongue

The medieval controversy over the nominalist or realistic character of the universals sounds graceful and old-fashioned to us, but that's only because today we are radically nominalist. Likewise, the controversy in ancient Greece over the conventionalist or naturalist character of language also sounds quaint to us, but that's just because, like Socrates, we are radically conventionalist. Or as Niels Bohr put it, "It is wrong to think that the task of physics is to find out how Nature *is*. Physics concerns what we can *say* about Nature."The old Cratylus, unlike Wittgenstein, chose to remain silent in face of the impossibility of saying anything. The young Cratylus, however, was a naturalist and believed that "there is a proper name, by nature, for every being" and this name "is uttered to teach and instruct"[6] – more or less like in the book of Genesis,[7] according to which the name of each thing was given by the archetypal primal man himself.

We, however, have been expelled from paradise and there is no way for us to go back to being naturalists. Yet, metaphorically speaking, the key to good

knowledge might be to grasp the true name of each thing, which can only make itself known if the thing is not destroyed.

Science took Cratylus' finger for itself and discarded his tongue. It is more than time to correct this mistake.

Notes

1 *Methaphysics* IV, c. 5. 101 to 5-15.

2 [Man,] who trusted God was love indeed / and love Creation's final law / tho' nature, red in tooth and claw / With ravine, shriek'd against his creed. *In Memorian*, 55.

3 In 1865, Bernard even published an "Introduction to the study of human experimentation."

4 Today, some scientists believe, although they cannot prove it, that nuclear fission occurs in the process of formation of supernovae. The genesial character of fission in this case only confirms the semi-ontological status of this process.

5 *Alberta Report*, v.26, n.32, 23 Aug. 1999.

6 Plato, *Cratylus* 428d.

7 "And out of the ground the Lord God formed every beast of the field, and every fowl of the air; and brought them unto Adam to see what he would call them: and whatsoever Adam called every living creature, that was the name thereof" (Genesis, 2:19)

Abstract – This essay sees science as humanity's longstanding effort to stanch the Heraclitean river of things in perpetual motion, from which knowledge would emanate. The application of the inductive method to the study of living things, however, requires that these also be stanched – killed, ultimately. The history of biology provides abundant examples and, in modern times, fetuses and embryos have been victims of this paradigm. In physics, since the late nineteenth century, the stanching has engendered like destruction. In his old age, the philosopher Cratylus, disciple of Heraclitus and master of Plato, chose to silence himself in the face of the impossibility of knowledge, but when young he was a naturalist who believed that there is a proper "name" in nature for each being. This article proposes that, to avoid contributing to the autophagy of contemporary society, science must cease to destroy its objects of study and learn to understand their real name.

Keywords: Science, Destruction, Cratylus, Vivisection, Abortion, Ethics.

Carlos Malferrari is a translator and has a degree in Philosophy from USP. @ – cmalferrari@uol.com.br

Received on 4 August 2009 and accepted on 21 Sept. 2010.