

## Scientific Knowledge-Building and Healing Processes

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Scientific knowledge-building is the consequence of a relational process, not of an utilitarian socio-economic process. Translation theory expresses the way in which science is constructed and used as a social link. In fact, translation theory contends that scientific knowledge is somehow governed by the logic of exchange. This logic of exchange would ultimately be the source of science and well being and characterize the way in which science and technology work in our contemporary world especially regarding healing processes through mobilising a kind of hidden energy.

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In the sixth century, with the pre-Socratics, *logos* emerged in Greece as a way of thinking that broke away from reiterations and explanations rooted in mythology. New thought was attributed to unusual characters who had actually taken part as individuals in precisely-dated historic events, such as Thales (Farouki, 1996). A way of thinking emerged which allowed objects to be described independently of subjective relationships. This new kind of thinking would make it possible to build, from discourse of reason, beyond tradition, a new political order, i.e., the laws of the Greek city states (foundation of democracy etc.).

*Logos* was originally a project from Heraclitus. For him, the law of the world was permanent change, the unity of opposites (dialectic) and consequently, the notions of conflict and war were natural. Later, *logos* became the project of Plato and the dogmatic philosophers. There was a law of the world inscribed in logic (through the law of the excluded middle) as a methodology for describing nature and Man. Ideas as eternal and pure concepts — especially mathematical ones — were included in this law.

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*Logos and Form of Scientific Knowledge*

With the emergence of *logos*, it became possible to describe objects with identical properties independent of their location or use. After providing the geometry and mathematical description of objects, the modern science of Galileo (now mainly through experimentation which was ignored by the ancient Greeks) would describe processes and actions with the same logic of identity and law of the excluded middle. This resulted in thought which expressed the action and its consequences outside of any relational logic or mimetic process. This led to the logic of causal processes set down over time and to another aspect of Cartesian dualism (the relationship of body and spirit, spirit being related to God beyond science). Technical objects had the same properties regardless of where they were used. An objective power of objects emerged beyond all magic and it was precisely this power that science would set about to develop. Science built objects displaceable through space and time. A law of the world emerged from these viewpoints.

*Translation and Actor Network Theory as Social Link*

New sociology of science claims that scientific knowledge-building is the consequence of a relational process, not of an utilitarian socio-economic one. Translation and actor network theory (Akrich, Callon, and Latour, 2006; Law and Hassard, 1999) suggests that a genuine social bond circulates through the exchange of objects beyond that which is based on utilitarian satisfaction. The underlying exchange of objects is an implicit definition of the partners involved. Many studies on the social consequences of technology have shown how innovation defines a user, for example, a baby's push-chair or pram defines a child and the relationship with its mother, etc. It is as if a common humanity were circulating through the exchange of objects. According to this point of view, objects would represent a centrifugal social bond with their designer: the basket would transport fruit the same way for both the buyer of the basket and the basket weaver. The buyer of the basket together with the weaver can be linked by means of the same network characterized by ability, i.e., the ability to carry more fruit with one hand than would otherwise be possible without the basket. From a cultural perspective, scientific society developed a kind of causal objective bond, which was centrifugal vis-à-vis the inventor. Conversely, from a centripetal perspective, the designer is defined in terms of her ability to weave many baskets for transporting fruit. In other words, the same objective instrumental associations are used to define what somebody does and what somebody is. This kind of consciousness is the consequence of the objective links constructed by way of modern thought, working in both directions and is centrifugal in relation to object properties and centripetal in relation to subject properties.

This approach provides designers as well as users with the eventuality of an objective consciousness based on centrifugal ties to which their actions are linked. These ties then become centripetal (the basket weaver is designated in turn).<sup>1</sup> Reality ceases to be that of the permanent here-and-now. Instead, there is a social reality which is the reality of objective action. As far as it is possible to attribute centripetal and centrifugal links to actions by only taking into account objectivity, the reality of objective action, objective thinking becomes reflexive and this makes it possible to develop an objective awareness of the self. As far as objectivity is reflexive, reflexive thought (“I think that I think”) becomes possible. Words are now associated with action, according to objective social rules. The peasant is the one who provides food without the least cosmogonic significance. Free speech (i.e., speech that is not induced by the circumstances) is now possible.<sup>2</sup> The individual applies his responsibility according to a concept of objective causation. Unlike humankind in traditional societies, in fact, the individual may perceive thoughts from another perspective. The hierarchy of *logos* relies on the hierarchy of associative harmonization, access to the thought of the others.<sup>3</sup>

This concept of the doer — “I,” doer of my deeds — defined centripetally by way of one’s acts results in a materialist “I.” Thus, the “I” is compatible with the accountable “I” built into monotheism. The alliance of Greek philosophy and monotheism is therefore possible and the fathers of the Church, Augustine and Thomas Aquinas, would devote themselves to developing this powerful alliance.

What will be regarded as reality in current day life of modern society based upon science then will be defined by what one does, through objective causation.<sup>4</sup> What one is will henceforth be determined through the consequences of action. A reality defined by acts becomes one of matter. Any other logic of relational energy, in other words logic within a relationship that could lead to a final higher order reality, will be thus separate from usual and customary reality of classic science defined by objectivity and causality.

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<sup>1</sup>This may be related with Nobel prize Sen’s (2002) definition of capability. Sen defines functioning as being or doing. Capabilities are the opportunity for people to honour choices they value or have reason to value.

<sup>2</sup>There is the identical fear of this free speech in a non-modern society as reported by United States President B. Obama (1995) talking about Kenyan people.

<sup>3</sup>It is this inability to perceive the thought of the other which, according to mind theory, would explain, say, autism.

<sup>4</sup>It is interesting to note in this respect that, for Hippocrates, illness was not the consequence of an objective cause, but rather a process for which the stages must observe steps (Pigeaud, 2008).

*The Dynamics of Science as an Exchange Structure*

Translation and actor network theory (Courtial and Bailon–Moreno, 2007) analyses science in action (Latour, 1987) or scientific knowledge being constructed, not as a causal structure but as a structure of exchange — the transfer of expertise from one field to another. Translation theory is a powerful epistemological concept, since it restricts itself to only taking into account what kind of human links is exchanged between actors. It accounts for social links in general and mimetic dynamics as well as social links through objectivity. For translation, there is no universal expertise. Expertise is a personal non-transmissible synthesis and may not be reduced to knowledge as contained in books. During the discovery process, individuals involved in science and technology translate society's problems into laboratory problems that can be more easily solved (Callon, Bauin, Turner, and Courtial, 1983; Callon, Courtial, and Laville, 1991). By doing so, scientists escape the duality which separates modern science from, for example, traditional Asian thought, ideas which support most practices in complementary medicine.<sup>5</sup> The distinction between objects and subjects disappears; new objects arise as forms emerging from the background, beyond duality. A biologist establishes the equivalence between a problem of autism defined biologically and that of autism defined by his psychologist colleague (Courtial, 2003; Courtial and Gourdon, 1999). For instance, an overabundance of endorphins in an animal will result in symptoms equivalent to autism (hence the possibility of controlling autism — at least its symptoms — by controlling the level of endorphins). I have demonstrated that this equivalence leads to fractal networks, i.e., networks propagating the same structure whatever the level of analysis within the networks (Courtial and Bailon–Moreno, 2007). This structure is the new link between autism and endorphines at the level of the various symptoms of autism, as well as the level of various biological data linked to the level of endorphins. Such equivalences are parallels interlaced through networks and nodes of these networks. They may be linked to the logic of form, referred to in innovation sociology as structural equivalence (Burt, 1982), and are perhaps a kind of morphic resonance, i.e., the increased frequency of common structures shared by two actors' networks.<sup>6</sup> Nodes can be of any nature: cognitive, biological, technological, etc. Simply stated, with structural equivalence dynamics, there is no causal actor setting the system in motion. Instead, there is a kind of mimetic resonance

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<sup>5</sup>We must keep in mind that Chinese civilization is renowned for having discovered gun powder, the compass, and hydraulic pumps but without making the merest global theory about these technics.

<sup>6</sup>Morphic resonance is still a hypothesis that is suggested by the mirror neurons system, according to which, two people may enter into oscillatory communication cycles. There are also consciousness theories based on neuron networks (Koch, 2004). Morphic resonance is also a general hypothesis about life processes suggested by Sheldrake (1981).

allowing two actors, within a single moment, to become unified — in opposition to Aristotelian identity principle.

Consciousness is not only a co-emergent bio-cognitive structure as suggested by Martinez (2001). It takes into account the centrifugal or centripetal direction of the associations within this structure. Consciousness is thus a consequence of the flow which circulates within structure according to the direction of associations (for instance, the link from endorphins to autism has not the same meaning as the link from autism to endorphins).

Courtial and Bailon–Moreno (2007) have shown that nodes within the network dynamic can be seen to match the keywords of scientific and technological discourse. It has thus been possible to model the dynamics of scientific knowledge on the basis of translation theory. Scientometry is the quantitative science of knowledge construction dynamics. An initial series of equations derived from the translation model demonstrates the current laws of scientometry. A second series of equations illustrates that everything happens as if some kind of knowledge-building relational energy was the consequence of maximal exchange: either by optimizing the niche of the central network player (variable, according to context), or by expanding the niche of a clearly-defined network player (of local usage). Technology, of course, continues this relational exchange, both on a patent- and public-used scale.

Translation dynamics seems to bring into play some kind of a new energy, absent from ready-made science. Contemporary social studies of science have opposed achieved or ready-made science and science in construction (Latour, 1987). Ready-made science is a corpus of laws ruling object relations through classic matter energy. Science in action is a sociocognitive process that creates these objects according to an energy law. Achieved science has thus revealed a kind of energy that can be attributed to the constructed object, separate from Man. This energy sets the constructed object in motion, like mechanical, thermal, electric energy, etc. But the *relational energy* prior to the existence of scientific knowledge construction has been lost in achieved science following translation, although it remains embedded within the translation process.

Science thus leads to social link improvement. This approach transforms constructed scientific knowledge into anthropology if we keep in mind the spirit of translation behind achieved science. The inventor is someone who creates new associative networks, and makes them available for others by incorporating them into technological objects. These associations facilitate innovative actions: to produce new tools for agriculture and industry, medicines to improve health etc. Above all, the association networks introduce a new kind of social link through the sharing of a specific common humanity defined by science, the humanity of equivalent persons. If consciousness is constructed in such a way and therefore leads to action, it may also lead to a more complete state of *presence* in the world, provided we are prepared to feel both the centrifugal and centripetal

states at the *same time*, and without choosing one in favor of the other. In this way consciousness constructed through association networks could lead to awareness as defined by Gestalt psychology (Perls, Hefferline, and Goodman, 1951) or mindfulness as defined by Asian thought. A state of presence beyond time has been made thinkable through causal time-dependant links.

### *Qualitative Logic of Self Consciousness*

Scientific knowledge, according to translation theory, constructs an identity or social consciousness for individuals based on validated associations: for example for autism, when there is convergence of the defining symptoms of this state. Not only does science make it possible to define others based on this logic (derived from the principle of non-contradiction) but everyone is given an identity based on the causal logic of science.

The engineer, through the Galilean inertia law, flying in a high speed plane has acquired a consciousness of himself, moving rapidly without feeling any force on his body (consciousness centrifugal to his body as object, centripetal to himself as a conscious body). Someone, up to date on scientific research in relation to dietary fibre, perceives his digestion process as preventing cardiovascular diseases. The act of eating in relation to scientific knowledge leads thus to a new consciousness of who we are.

Each of us is faced with an infinite variety of situations in life. By way of the causal logic of *logos*, we attempt to determine who we are by choosing, in a manner similar to Dennett's (2005) fame in the brain metaphor, that which for us seems to focus on the heart of a maximum number of personal interpretations. It is also possible, after therapy, meditation, etc., to imagine a completely different life, by selecting other paths.<sup>7</sup> The identity (the self) which will provide the most energy will ensure the maximum exchange. The more compatible life scenarios are for everyone involved, the more energy will be exchanged.

### *Ancient and Modern Forms of Relational Energy*

Mauss (1950) was struck by the law of donation "giving, receiving, giving back" in Melanesian societies, by the latent violence of these exchanges if no equilibrium was reached and by the energy underlying equilibrium research: the act of giving also involves an idea about who the other person is, a possible transgression of the recipient's boundary of the self. Mauss contended that within this law of gift and counter-gift, there ran a kind of force or energy beyond duality that Melanesian society referred to as the *Mana* (Codrington, 1957).

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<sup>7</sup>This is also possible in relation to mirror neuron systems and vision–touch synesthesia (Banissy and Ward, 2007; Rizzolatti and Craighero, 2004).

How can we define somebody else? In traditional society, in opposition to scientific society, the individual is scarcely defined by objectivity. In as far as time is abolished when centripetal links define an actor here and now, modern society builds a specific state of objective presence, providing a new approach to the problem of the actor's territory and energy exchange. Thus modern society makes presence possible, a return to the energy of pure exchange, a return to another reality that is perhaps more crucial than that of action. It is therefore possible, by means of scientific culture, to reintroduce the energy of the *Mana* — provided we allow awareness to accompany the state of consciousness and also introduce the idea of consciousness associated with *Mana* without turning our backs on the modern world. With scientific knowledge, we can understand the autistic person and be able in consciousness to behave in the same way without considering autism as divine curse. From this point of view, scientific knowledge is not only a technique, but may also lead to a source of energy of a new kind, a *relational energy*, that will improve well being by keeping in sense that we remain humans whatever the circumstances. In Chinese medicine — which is grounded in Taoism — illness is understood as arising from the sense of separation (from the Tao). Our disease represents aspects of the self which we have lost. Reestablishment of equilibrium restores energy (the Qi).

Thus science brings to humanity moral concerns. Keep in mind that, from the point of view of the history of medicine in the Western world, illness was first a cultural process (for instance God's punishment) before being attributed by Hippocrates, if not at that era to objective factors, at least to objective observation, requiring at the same time new moral concern for the patient made up of the idea that the sick person is to be protected.

#### *Healing Energy as a Consequence of the Relational Process of Consciousness*

Consequently the way in which science is constructed and used in technology may reinstate a total social link.<sup>8</sup> There may also be a common process at work between the patient treated by modern medicine and the patient healed at the same time by an acupuncturist. In both cases energy circulates: in the first, through causality of drugs and the physician's intervention embedded in a social scientific performance (witness the placebo effect); in the second, through some kind of cultural common way of thinking.

The energy of the *Mana* can be reincorporated into the scientific approach. It takes on the form of the energy of presence to the other as suggested by psychoenergeticians, i.e., therapists claiming to use energy for healing, and is a form

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<sup>8</sup>Consciousness would neither be the consequence of the laws of nature or matter (materialistic view) nor the origin of the laws of nature (spiritualistic view). It would be both at the same time, as suggests the contemporary approach to solving the paradoxes of quantum physics (Bitbol, 2008).

of self-engendering energy (contrary to the law of conservation of energy in traditional science), comprising various paths within the associative networks proportional to the range of these networks obeying a fractal logic, following a bio-cognitive coupling pattern (Martinez, 2001). Sadly, for therapists claiming to work with energy, the flow appears as natural as electromagnetic flow leaving aside the flow's relational dimension.<sup>9</sup> Consequently these therapists improperly seek to measure the energy with the traditional tools of science — as if it were a kind of energy characterizing objects separate from humans.<sup>10</sup> In doing this, they miss the real nature of relational energy.

### *The Dynamics of Relational Energy in the Context of Modern Thought*

This maximum number of exchanges results in a capacity to deal with a large number of situations *without destroying the self*, including the capacity to cope with death. The body as described by medicine, the body's history and potential trauma are no longer central to the construction of consciousness. The individual libido is no longer central to the dynamics of the body–mind system as suggested by Freud and perhaps the vital impetus of which Bergson (1910/1983) speaks. Bergson constructed his psychology from his experiments based on Mesmer's logic of energy of fluid animal magnetism (Bellet, 2009; Méheust, 2009; Vinchon, 1936). The purpose of Bergson's vital impetus or *élan vital* theory was to account for the creation by the individual within society of more and more complex forms. That which is central for the creation of forms is that which circulates from transpersonal or trans-generational origin.<sup>11</sup> Disease is no longer some exogenous attack on the body. Instead, disease is the consequence of the exclusion of the energy flow from a certain part of the body. Accordingly, in Chinese medicine, there is considerably less concern for the eradication of the sick part as there is for its reintegration of energy into the main flow (which Greenwood [2001] referred to as *healing* rather than *treatment*).

Taking this relational energy into account within medical treatment will make it possible for healers to broaden the field of scientific research of consciousness without using the body as a unique starting point, hence the idea of an extended consciousness beyond the body, in time and space. This is closely akin to the philosophical approach of consciousness described by Noë (2009). On this basis, the individual will no longer be a mere standard body for medical

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<sup>9</sup>See, for example, Brennan, 1987.

<sup>10</sup>What can be measured is only the classic electromagnetic state of the body (linked but indirectly in an [at the moment] unknown way to energy).

<sup>11</sup>This includes the energy metaphor of the self in Chinese medicine, according to which the body must transfer energy as best as it can from the heavens (its supposed source) to the earth where the body will dispense with it.



science. She will be a transpersonal entity driven by energy exchange beyond a uniquely affective or cognitive perspective and for which the horizon exceeds that of the simple survival of the body. Through the concept of relational energy, translation theory applied to scientific knowledge-building may reconcile Heraclitus's and Plato's *logos*, modern science, and Eastern thought.

## References

- Akrich, M., Callon, M., and Latour, B. (2006). *Sociologie de la traduction. Textes fondateurs*. Paris: Presses de l'École des Mines.
- Banissy, M.J., and Ward, J. (2007). Mirror touch synesthesia is linked to empathy. *Nature Neuroscience*, 10, 815–816.
- Bellet, P. (2009). Le secret de Mesmer. *Hypnoses et Thérapies Brèves*, 15, 66–73.
- Bergson, H. (1983). *Creative evolution*. Lanham: University Press of America. (originally published 1910)
- Bitbol, M. (2008). Is consciousness primary? *Neuroquantology*, 6, 53–72.
- Brennan, B.A. (1987). *Hands of light*. New York: Bantam Books.
- Burt, R. (1982). *Toward a structural theory of action*. New York: Academic Press.
- Callon, M., Bauin, S., Turner, W., and Courtial, J.P. (1983). From translation to problematic networks: An introduction to cword analysis. *Social Science Information*, 22, 191–235.
- Callon, M., Courtial, J.P., and Laville F. (1991). Cword analysis as a tool for describing the network of interactions between basic and technological research: The case of polymer chemistry. *Scientometrics*, 22, 155–205.
- Codrington, R.H. (1957). *The Melanesians: Studies in their anthropology and folklore*. New Haven: Behavior Science Reprints.
- Courtial, J.P. (2003). Analysis of scientists' social representations in action based on words associated by scientific articles. *European Review of Applied Psychology*, LII, 221–230.
- Courtial, J.P., and Bailon-Moreno, R. (2007). The structure of scientific knowledge and a fractal model of thought. *Journal of Mind and Behavior*, 27, 149–166.
- Courtial, J.P., and Gourdon, L. (1999). Mapping the dynamics of research on autism or the cultural logic of science. *Theory and Psychology*, 9, 579–604.
- Dennett, D.C. (2005). *Sweet dreams. Philosophical obstacles to a science of consciousness*. Cambridge, Massachusetts: MIT Press.
- Farouki, N. (1996). *La foi et la raison*. Paris: Flammarion.
- Greenwood, M.T. (2001). Acupuncture and intention. Needling without needles. *Medical Acupuncture*, 13, 23–28.
- Koch, C. (2004). *The quest for consciousness. A neurobiological approach*. Englewood: Roberts and Co.
- Latour, B. (1987). *Science in action. How to follow scientists and engineers through society*. Cambridge, Massachusetts: Harvard University Press.
- Law, J., and Hassard, J. (1999). *Actor network theory and after*. Oxford: Blackwell.
- Martinez, M. (2001). The process of knowing: A biocognitive epistemology. *Journal of Mind and Behavior*, 22, 407–426.
- Mauss, M. (1950). *Sociologie et anthropologie*. Paris: Presses Universitaires de France.
- Méheust, B. (2009). Hypnose, intuition, Bergsonienne et lucidité magnétique. Paper presented at Sixth Forum Hypnose et Thérapies Brèves. Nantes, May 7–9.
- Noë, A. (2009). *Out of our heads. Why you are not your brain, and other lessons from the biology of consciousness*. New York: Hill and Wang.
- Obama, B. (1995). *Dreams from my father: A story of race and inheritance*. New York: Times Books.
- Perls, F., Hefferline, R.F., and Goodman, P. (1951). *Gestalt therapy: Excitement and growth in the human personality*. New York: Dell.
- Pigeaud, J. (2008). *Poétiques du corps. Aux origines de la médecine*. Paris: Les Belles Lettres.
- Rizzolatti, G., and Craighero, L. (2004). The mirror–neuron system. *Annual Review of Neuroscience*, 27, 169–192.

Sen, A. (2002). *Rationality and freedom*. Cambridge, Massachusetts: Harvard University Press

Sheldrake, R. (1981). *A new science of life: The hypothesis of formative causation*. London: Blond and Briggs.

Vinchon, J. (1936). *Mesmer et son secret*. Paris: Amédée Legrand.