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Francisco Tirado and Daniel López (eds.)*Teoría del Actor-Red. Más allá de los Estudios de Ciencia y Tecnología [Actor-Network Theory. Beyond Science and Technology Studies]*

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Over 30 years, actor-network theory (ANT) has evolved from a proposal for the study of science and technology to a theoretical approach about reality in general, questioning the basic notions of modernity, challenging sociology and other social sciences, and involving explicit ethical and political implications. Throughout this journey, ANT has sustained an intense dialogue and self-criticism. Today, it is an internationally recognized approach with institutional consolidations but nevertheless maintaining a spirit of inquiry and questioning. This book, product of a group of researchers from Spain and Latin American countries, is an expression of that spirit. It consists of twelve chapters, one introductory, sketching some highlights of the trajectory of ANT, and eleven containing research results or reflections based on ANT. They innovatively explore realities in which science and technology are involved, appealing to the conceptual and theoretical tools provided by the ANT, but revising them and relating them to other approaches and adding new conceptualizations.

The three chapters that follow the introduction are directly based on empirical investigations and are extremely interesting. In a long and substantial chapter, Jorge Castillo & Francisco Tirado analyze the new reality of cancer. Through the practices and technologies of the current biomedicine, especially of the genetic analysis, a cancer has been constituted that extends itself beyond human tissues, a cancer that even exists in healthy people. It is a presymptomatic cancer, constituted in a probabilistic way, and identified through the results of the oncological genetics. Now, cancer patients are also those who have risk of contracting it and that could be intervened in a preventive manner. In this way, the disease incorporates several superposed levels: an individual, bodily level; a family, genealogical level, and a population level at which statistical calculations are made. The cancer is, therefore, a phenomenon extended at those three levels or scales that are folded in the individual patient, involving a multitude of actors and practices of very diverse nature. In spite of that complexity, the network of medical operations enact, according to the authors, a well harmonized and non multiple disease. Castillo & Tirado also argue that the medical protocols play a central role in the coordination of the diagnostic processes, technological handling, treatment and monitoring. These protocols would be a central force harmonizing the disease,

avoiding a differentiated ontology, despite the existence of multiple scales. It would be possible to discuss if the integrative force that Castillo & Tirado attribute to the protocols is so powerful and effective as they assume, and if this is the main integrative factor, but their exposition is well argued. The authors conclude that this type of cancer represents a peculiar type of object that they call “potential object”. It is the result of calculations in an extended field that are instantiated in a specific body. This would reflect a variety of objects and processes of enactment different from those habitually treated by the ANT.

In the next chapter, Blanca Callen studies another particular type of technological, scientific objects: computer programs built using free software (FS), whose constituent code is released and may be copied, distributed, used and modified by anyone, contrasting with the restrictive logic of commercial circulation. Unlike what is usually raised by the ANT, the effectiveness and success of these objects based on FS does not derive from their black boxing but precisely from the opposite: from its openness and transparency. The construction of socio-technical objects using FS proves, according to Callen, that the stabilization and proper functioning of an object do not necessarily require its closing and blackening. The sustainability and quality of these products based on FS are provided by the users' collaboration and appropriation of the products. This openness of the productive process rather than destabilize it, contributes to its improvement and reinforcement. These objects, instead of “immutable mobiles”, in terms of Latour, are “mutable mobiles”, fluid objects, whose advantages lie on such character. In a larger perspective, this proposition supports the benefits of using ample collaboration in the construction of facticity and can be read in the perspective of an ontological democratization.

Tomás Sánchez Criado studies how the user of telecare services for seniors is constituted and maintained. His investigation is in continuity with the approach of the co-construction between users and technology, and incorporates Mol's notions of multiple reality and their articulations. The user is understood, therefore, as an effect of multiple material and semiotic processes; as an assemblage developed through diverse practices. These practices include a certain type of legal, bureaucratic work and the management carried out by the suppliers of the service regarding relatives and acquaintances who can inform about the user and help him. Along with this, Sánchez Criado seeks to address the psychosocial domain and subjective process involved, to which the ANT has not paid attention. He recognizes, thus, in that process of user enactment, a particular semiotic and material articulation allowing the constitution of a singular subjective dominion, habitualized, located and dynamic.

In the remaining chapters the authors present different reflections, more tentative, connecting approaches and making conceptual discussions around the ANT. In six of them, the main center of attention is the relation of ANT with politics, giving special value to Stenger's notion of

“Cosmopolitics”, assumed by Latour, and to the derived proposal of “ontological democratization”. Such notions propose a configuration that is not actual, involving a normative concern. This means, as Yann Bona and Salvador Rodríguez say, to take care of several different cosmos, without the universal rules and possibilities of convergence expected by a Kantian cosmopolitanism. This raises the need for mediation, for which role science has special conditions as a connecting “diplomacy”. It is a political - diplomatic and scientific work with a prospect of future construction, which deviates from the direction assumed by the original ANT. Besides, part of this diplomatic work would be with the own “sociologists of the social” who have been questioned and fought relentlessly by Latour based on his “sociology of associations” approach. Such “internal” diplomacy would also be a new direction for the ANT, not easy to carry out. Paloma García expands on this diplomatic role of the social scientist who seeks to communicate different worlds or cosmopolitics among themselves. This is a scientist who seeks to connect worlds, from within and not from some external point of reference, promoting an ontological pluralism. However, according to García, Latour particularly addresses the interpretive descriptive work and not the intervention mechanisms that such diplomatic perspective requires; he does not elaborate proposals on how to enhance the ontological democracy that involves a complex relationship with various publics, in many cases conflicting among them. Latour's method, according to this author, it would not be sensible to a “heterogeneous public opinion”, which would limit its practical impact. The transformative potential of this line of work would be limited by its lack of attention to the socio-technical mechanisms of agency involved in such diplomatic mission. In this matter, it would have been helpful that Garcia included further discussion and assessment of approaches such as Callon, Lascoumes & Barthe (2009) on Hybrid Forums and its practical applications, where it is taken care of such plurality, addressing specific mechanisms to be used.

In his text, Israel Rodríguez draws up the trajectory of the network concept in ANT and some of the criticism it has received. He highlights the increasingly prominent political orientation of ANT, with its ideas of des-ontologization and ontological politicization. He also shows a special concern for the spatialization of networks and the resulting complex configurations. In this regard, he explores connections with other concepts, such as Peter Sloterdijk's notion of “spheres”, which could be understood as strong networks of relations that operate protectively. There are many and varied stabilizations, such as these spheres, resulting from the movement of the networks; one could conclude that the ANT's emphasis on the movement and circulation perhaps should be balanced with further study of the crystallizations that are being generated and that contribute to the ever-growing complexity of networks.

The text by Ignacio Farias provides a theoretical perspective useful to frame several lines of inquiry that arise from the book's chapters, for ex-

ample on potential objects or on the stabilization of complex configurations. His central question is how the complex social plurality is formed, how to reconcile the logic of networks with the existence of configurations that traditional sociology has identified as social subsystems, fields and value spheres: politics, economics, science, art, etc. In fact, the same Latour (2013), in his last book, arrives at similar distinctions, now understood as “modes of existence”. Farías, based on Niklas Luhmann's theory, argues that ANT, with its emphasis on ongoing practices, leaves out the “virtual”, which may serve as background for the actual. Social reality depends on communication, and each communication introduces a difference between what is indicated and a horizon of possibilities. Social meaning is inevitably a combination of presence and absence; it is based on differences and anticipations. Luhmann shows how different forms of semantic accumulation and communicative configuration, such as the economic, legal, political, artistic and scientific systems, have been constituted historically. These configurations, or networks of meaning, operate in a world of possibilities with respect to any specific practice. To the extent that, in each wave of practices, neither all those elements of meaning nor all those connections are actualized, Farías attributes to them the character of virtual. These virtual stocks of meaning have a procedure of selection, accumulation and maintenance, which is based on the constant local application of a general criterion or code. The recursivity in the application of such a code, around the reference problem, gives form, through historical evolution, to social differentiation. This is a theoretical perspective of exploration that is very suggestive. Along with its potentiality, however, it contains a number of aspects that require clarification or deepening. To begin with, the apparent dissociation between a practical-material-actual dimension and another semantic-virtual dimension would require to be specified, in order to avoid confusing it with the ontological separations and purifications that precisely Latour questions.

This book is aimed mainly at an academic audience already interested in the study of science and technology, and especially at an audience with some knowledge of ANT. This public can better appreciate the questions, comparisons and new conceptualizations. However, for those who have less knowledge on ANT, several chapters include illustrative syntheses and reviews about it that will facilitate them to approach this theory.

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