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## **Storia ambientale dell'energia nucleare. Gli anni della contestazione [Environmental History of Nuclear Energy. The era of contestation] (Andrea Candela, 2017)**

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Andrea Candela, *Storia ambientale dell'energia nucleare. Gli anni della contestazione* [Environmental History of Nuclear Energy. The era of contestation] (Milano/Udine: Mimesis Edizioni, 2017)

**Abstract**

En utilisant les outils de l'histoire environnementale, Andrea Candela analyse les événements sociaux et scientifiques qui ont lieu en relation avec l'énergie nucléaire dans les années 1970, une époque caractérisée à la fois en Europe et aux Etats-Unis par la contestation des autorités et par le mûrissement de l'écologie scientifique. Candela centre son approche sur l'Italie pour mettre en lumière l'ensemble des questions géo-environnementales critiques soulevées par les applications de la technologie nucléaire.

**Plan of the article**

- Early stages of global environmentalism
- The international evolution and development of the nuclear option
- Nuclear controversy at national level: the case of Italy
- Concluding remarks



1 As indicated by its title, Candela's work focuses mainly on environmental history: however, one would be mistaken if s/he thought the interest of the book stops at that. Candela's is also, to a considerable extent, a work that provides valuable elements to historians of science and technology. In fact, these two historical fields, while different in their analytical focuses, are often intertwined, as the case of the birth and development of radioecology clearly demonstrates. But *Storia ambientale dell'energia nucleare* can also be understood as a work relating to the history of mobilizations, given the significant attention that the author dedicates to anti-nuclear protest movements. Candela's book is therefore a work that, although it had to leave out for reasons of space extensive analysis of a debated topic in the nuclear realm, such as the management of radioactive waste, fills important gaps in different historical sub-disciplines. This is true, first, in relation to the historical period studied: the 1970s. Secondly, it is even truer as far as Italian historiography is concerned, where this gap is largely a consequence of the policies of declassification of the main archives of the Italian state. These are characterized by a certain inertia, which makes access to documents dating from after the early 1960s complex (as I myself was able to experience) even today. It is perhaps no coincidence that Candela opted to limit his archival sources to the Fondazione Luigi Micheletti in Brescia and the Istituto Nazionale

per la Storia del Movimento di Liberazione in Italia in Milan, archives that are less extensive and more accessible than their big brothers in Rome. This limit on primary archival sources, however, is compensated by numerous references to non-archival primary literature, consisting mainly of literary and scientific essays from the period Candela analysed, but also of newspaper articles, bulletins and newsletters available on the web.

The book is divided into three, long chapters, preceded by a methodological introduction and followed by a conclusion that sets a narrative terminus—which is also a political terminus in the history of Italian nuclear power—at the 1980s. The three chapters are ordered according to a scalar structure, which goes from the general to the particular and from the world scale to the national, Italian scale through the European scale, with some back-and-forths that, however, do not affect the reading. The Introduction to the book explains the methods of historical analysis that inspire the work: referring to Fernand Braudel's writings, Candela distinguishes between a long duration (thousands and millions of years—geological, geographical and cultural times), an average duration (decades or centuries—social and economic time), and a short duration (or “events”: days, weeks, a year—diplomatic and political time). The concatenation of these three temporalities is particularly relevant to the case of nuclear energy. Here the geological times related to uraniferous formations interact with the “middle” times of the implementation of national energy plans, and with the short times of significant events such as the release of atomic bombs on Hiroshima and Nagasaki, the Chernobyl nuclear accident, or more simply the publication of a foundational document, or the organization of a particular conference.

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### EARLY STAGES OF GLOBAL ENVIRONMENTALISM

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The first chapter introduces the 1970s historically, politically, and culturally: a decade in which the two oil crises of 1973 and 1979 intertwined

with the consolidation of the world's bipolar political structure, the questioning of the concepts of progress and technical-scientific development, and in some European countries the emergence of movements of political protest characterized by violent modalities of action. At the same time, however, a widespread passion for ecology was also consolidating, because of the spectre of atomic death caused by ever-growing arsenals. Ecology was not only intended as a space for creativity and problematization, but also of political confrontation. It is in this period that some founding texts of ecology and political ecology were published, by both scientists and thinkers. Candela dwells on the Earth Day in 1970 and on the UN conference on the human environment in 1972. He analyses the reception and criticism received from seminal publications of the time, such as *The Limits to Growth* (1972), authored by researchers at MIT, and Barry Commoner's *The Closing Circle*, which highlighted the potential ecosystem hazards arising from the use of nuclear power. Commoner, in particular, was to be taken up by the movements of the Italian left to push towards a democratization of the power of technology. That in turns would lead to the creation of various groups of scientists-activists.

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The democratization of the management of technosciences is, still today, a fundamental theme of studies on science and technology, and in the 1990s led to a rediscovery from an academic point of view of the value of "lay expertise" (see below). The chapter closes with a reconstruction of the origins of radiobiology in the United States between the 1950s and 1960s: in particular, Candela dwells on a congress held at Colorado State University in 1961, whose proceedings he considers a fundamental turning point in the study of interactions between ecosystems and induced radiation. In the wake of the Colorado conference, radioprotection and radiobiology courses started to be devised at European universities. In Italy, it was not until 1970 that the first conference on health physics and radiation protection was organized.

## THE INTERNATIONAL EVOLUTION AND DEVELOPMENT OF THE NUCLEAR OPTION

The book's second chapter deals more extensively with the international nuclear context, as well as with disputes over the technological designs of reactors, and with conflicts surrounding the development of the continent's nuclear power plants. The geographical focus of this chapter is Brussels, where in 1977 the EEC members gathered to discuss and plan various energy options in a foreseeable post-oil era. In fact, Candela shows, the discussion was somewhat fictitious, since the EEC member representatives considered the nuclear option as inevitable, even if there were critical differences on the modalities of expansion and the models of nuclear power plants to be adopted. In any case, the discussion took place behind closed doors, among members of the European political and technical elites. That, argues the Author, reflected the idea of Europe that had come to succeed after World War II, with the concept of a rigid institutional apparatus prevailing over that of a shared space, open to various dialoguing instances.

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Unveiling the complexity of the decision-making situation at European level, Candela contrasts Euratom, an agency created exclusively for dealing with the civilian purposes of nuclear energy, with the 1957 report of the Three Wise Men, which instead saw the atom as a strategic element in anti-Soviet function. Euratom would be set up as a regulatory body, but any decision on fissile materials would be excluded from its scope, under pressure from the French Government, which wished to develop its nuclear arsenal. While Candela's reconstruction of the activities and critical moments of Euratom's initial history does not seem to add particularly innovative elements to the existing literature,<sup>1</sup>

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<sup>1</sup> Jaroslav V. Polach, *EURATOM: Its Background, Issues and Economic Implications* (Dobbs Ferry: Oceana Publications, 1964) ; Bertrand Goldschmidt, *The Atomic Complex: A Worldwide Political History of Nuclear Energy* (La Grange Park, 1982); Jonathan E. Helmreich, "The United States and the Formation of EURATOM," *Diplomatic History*, vol. 15, 1991, 387-410.

contrarily, his study of world uranium exploration activities in the 1960s and the analysis of various, more or less successful, European initiatives aimed at creating an adequate technological apparatus that could diminish Europe's dependence on US manufacturers, disclose novel and/or previously understudied aspects. As a result of various slowdowns, European countries—including France—were to eventually switch to reactors designed in the USA, while not completely giving up experimenting with new models (for example, France's fast-neutron reactors).

- 7 At this point in the book, a different story begins, more oriented to contestation and environmentalism in antinuclear function, and less to the decisions taken by technopolitical elites. With the anti-nuclear mobilization in the U.S., the institutional reorganization of the American nuclear regulatory institutional apparatus in the mid-1970s, the release of the film *The China Syndrome* and the almost contemporary Three Mile Island accident in 1979, the narrative moves back to North America, to then extend to the globe. Candela details the spread of anti-nuclear protest movements on all continents, and the contemporaneous—in fact, related—appearance on the nuclear agenda of the thorny issue of nuclear waste management. This issue, albeit belatedly, was to form the basis of the US Nuclear Waste Policy Act, a foundational document that became executive in 1982. Here again, regulation taking shape in the Western world's most technologically advanced nuclear power set the pace for other nuclear countries to start devising their own regulatory apparatus

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### NUCLEAR CONTROVERSY AT NATIONAL LEVEL: THE CASE OF ITALY

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- 8 In the book's third and last empirical chapter, we shift from the global to the national scale. Here, it is the environmental history of Italian nuclear energy that takes centre stage. Considered by the Italian scientific, political and industrial elites as the only viable path towards greater energy autonomy and economic recovery, nuclear energy nevertheless started to be the subject of serious controversy in the wake of the 1968

protest movement. The antinuclear protest was to become an integral part of the demonstrations of the 1970s. It would be characterized by an increasing questioning of the neutrality of the Italian nuclear institutions (such as CNEN—National Committee for Nuclear Energy—and ENEL—National Electricity Agency), as well as by the emergence of figures of scientists-activists, not unlike what was happening in the same period in neighbouring France.<sup>2</sup> Candela argues that a further witness to the technocratic mode of managing the Italian nuclear sector was the absence of legislation involving public participation in major decisions on issues of public interest, such as those concerning the locations of power plants and storage sites for radioactive waste. While this situation was rather common in all European countries active in the implementation of nuclear plans, it was particularly critical in the Boot.

The Law no. 393 of 1975, establishing an emergency regime that restricted individual and collective freedoms in the event of disagreement with the nuclear plans decided by the central administrations, gave concrete expression to the technocratic conception according to which the management of the nuclear option developed in Italy. Here, I believe, the Author could have seized the opportunity to refer to, and reflect on works by Giorgio Agamben, one of the most influential contemporary theorists on emergency states.<sup>3</sup> In conjunction with this technocratic drift, an ever-increasing environmental awareness was also emerging and being institutionalized. In addition to protests concerning environmental and medical aspects, political protests ensued, since the places for the construction of new power stations were mostly in rural areas, which would not benefit in terms of jobs, and which depended on the surrounding areas for their livelihood. In this regard, Candela identifies an important criticality in the different positions

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<sup>2</sup> Sezin Topçu, *La France nucléaire. L'art de gouverner une technologie contestée* (Paris: Seuil, 2013).

<sup>3</sup> Giorgio Agamben, *State of exception* (Chicago: University of Chicago Press, 2003). A further, older reference could have been to the German political theorist, Carl Schmitt.

taken by left-wing political parties on nuclear power, and the frequent differences between the central bodies of these parties (generally, more in favour of nuclear power) and their local sections (generally against).

10 Another of the book's innovative elements is the analysis—though perhaps described with an excessive amount of details and quotations from primary literature, which abound also in other sections of the book—of the institutional conflict of interest involving CNEN, to which the State Council entrusted the study of the reliability of seismic findings in view of the construction of the Montalto di Castro nuclear plant, overlooking the fact that the CNEN itself was engaged in the research and development of nuclear power. CNEN was therefore at the same time controller and controlled. As one would expect, CNEN's study, the *Charter of Sites likely to host nuclear plants* (Carta dei Siti suscettibili di insediamento di impianti nucleari), which appeared in 1979, was to provoke criticism from many sides for both its methodology and results: among the critics stood no less than the National Order of Geologists. In particular, Candela points out that the uncertainty about seismic hazard conditions was a consequence of the lack of a high-resolution geological map of Italy, and that that could have instead highlighted some geodynamic processes that remained hidden in the region of Lazio, where the plants was scheduled to be located.

11 Criticism of the Charter was not only formulated by official geologists but also by scientists-activists and ordinary citizens with knowledge of aspects of the local geology. This led Candela to reflect on the formation of lay expertise and its role in mobilizations. Such expertise was not only geology-, but also epidemiology-related: on its basis, technical committees were formed, even if the degree of institutionalization did not reach that of France. In its evocation of the concept of lay expertise lies probably one of the book's (minor) weaknesses: while Candela does mention the concept of lay expertise, he fails to mention the scholars, especially in the domain of the STS, who contributed most to the reflection

on this topic. Works like those by Sheila Jasanoff, who spent over 20 years documenting avenues for co-production of knowledge in the US; Brian Wynne, who similarly worked on lay expertise in connection with the nuclear industry in the UK; or Steven Epstein, who pioneered the concept in epidemiology by working on knowledge co-production by AIDS-affected communities in the US, would have deserved larger credit.<sup>4</sup> The role of scientists-activists and of non-scientists in the production of knowledge on nuclear matters is mentioned again in the conclusions (p. 294), and rightly so, as we learn it was particularly important in the contestation. Nevertheless, one has the feeling that this item is left a bit hanging, and that the Author could have dedicated more space and deeper analysis to it.

The chapter closes with an analysis of the phases preceding the closure of the first Italian power plant, the Garigliano power plant, following two flooding events of the nearby river, the consequent contamination of the surrounding areas, and a series of scientific publications that testified to this contamination. In the conclusions, Candela reflects on a foundational event that occurred at the beginning of the new decade of the 1980s: namely, the National Conference on Nuclear Safety held in Venice. The conference, where very different positions on nuclear energy were confronted, and which saw the participation of both state agencies and anti-nuclear and ecologist associations was, according to the Author, a lost opportunity for dialogue and discussion, as the decision to increase the number of nuclear stations had already been taken before the conference. As a demonstration

<sup>4</sup> Sheila Jasanoff, (ed.), *States of Knowledge: The Co-production of Science and the Social Order* (London; New York: Routledge, 2004); Brian Wynne, "May the Sheep Safely Graze? A Reflexive View of the Expert – Lay Knowledge Divide," in Scott Lash, Bronislaw Szerszynski, Brian Wynne (ed.) *Risk, Environment and Modernity: Towards a New Ecology* (London: SAGE, 1996), 44-83 ; *Id.*, "Misunderstood misunderstanding: social identities and public uptake of science," *Public Understanding of Science*, vol. 1, n°3, 1992, 281-304; Steven Epstein, "The Construction of Lay Expertise: AIDS Activism and the Forging of Credibility in the Reform of Clinical Trials," *Science, Technology, & Human Values*, vol. 20, n°4, 1995, 408-437.

of such intent, in the months following Venice the National Energy Plan involving the construction of additional power plants was approved. The change of course in Italy's nuclear history would only come with the Chernobyl accident.

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### CONCLUDING REMARKS

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- 13 Overall, this well-written and instructive piece of work, while sometimes indulging in too much technical detail, discloses and analyses understudied aspects of nuclear energy. It sheds light on the recent environmental history of a country that, because of its current nuclear status as a have-not, is seldom associated with nuclear energy and the attendant complexities of its political, diplomatic, environmental, and social consequences. Perhaps a different organization of the structure of the book, in shorter chapters, would have benefited the agility of the text.
- 14 One may find the book wanting in terms of archival sources: while it dedicates much space to international matters, it accessed no sources from non-Italian archives. Possibly these sources might have contributed to making the history of the environmental aspects of Italy's nuclear energy more global, for example by investigating the links woven by anti-nuclear activists with their non-Italian counterparts. Informed readers may also wonder why, considering that the

book's core relates to a topic characterized by a marked techno-scientific basis, the Author did not access the historical archives of Italy's ENEA (Agency for new technologies, energy and environment), which keeps the records of the country's former nuclear agencies. However, a criticism in this sense would be inappropriate, as those archives were under construction at the time the book was being written. Quite possibly these archives will help scholars of nuclear Italy access a vast amount of previously widely scattered materials that will further contribute to increase our knowledge on this topic.

Besides environmental historians and historians of science and technology, who are the most immediate audience for this book, *Storia ambientale dell'energia nucleare* is of interest to scholars of nuclear cultures and history, who will find here an analysis of nuclear energy as seen through a rather uncommon environment-centred perspective. Scholars of contemporary Italian history will also enjoy this book as a complement to the existing literature on Italy's nuclear domestic and foreign politics.<sup>5</sup> Finally, because of its focus on social movements, organizations, associations involved in the contestation of nuclear energy and in the production of expertise, Candela's work will also be of interest to social historians.

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<sup>5</sup> Leopoldo Nuti, *La sfida nucleare. La politica estera italiana e le armi atomiche 1945-1991* (Bologna: Il Mulino, 2007); Silvio Labbate, *Il governo dell'energia. L'Italia dal petrolio al nucleare (1945-1975)* (Firenze: Le Monnier-Mondadori, 2010).

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