Histoire de l'automatisation des sciences du langage. By Jacqueline Léon. Lyon: ENS Éditions, 2015, 216 pp. ISBN 978-2-84788-653-5. €19 (PB).

Reviewed by Bernard Ycart (Université de Grenoble)

How and when did computers pervade language sciences? How did the different disciplines encompassed under that denomination evolve towards more and more automation? Which research groups were instrumental in assimilating into linguistics new methods and concepts coming from mathematics or computer science? These are the main questions investigated in this book. The period under scrutiny spans half a century, from 1942 and the emergence of machine translation as a new technological challenge, to the early 1990s and online-wide scale corpora. The story starts with a double paradox. On the one hand, machine translation was largely independent, sometimes even opposed to linguistics: the latter was not an established "war science", and very few linguists joined the groups of mathematicians, physicists, cryptographers, who participated in the common project. On the other hand, the endeavor was perceived by many as a pipe dream, and it soon became clear that it would fail to output the expected flow of reliable automatic translations.

Yet Jacqueline Léon convincingly argues that it is precisely through those failed attempts that formal languages, born in the wake of the pre-war development of mathematical logics, were invested into syntax analysis algorithms, eventually leading to the creation of formal grammar systems, in particular — in the wake of his mentor Zellig S. Harris (1909–1992) — that of Noam Chomsky (b.1928). Consequently, the second period distinguished by the author is that of integration: during the 1950s and 1960s, language sciences had to absorb many new concepts and techniques, essentially coming from other disciplines. Two epitomes are information theory and Markov chains. Both had been created outside the field of linguistics; in both cases, linguistics had been identified from the beginning by the creators themselves as a supply of examples and applications. Going from analogy and illustration to a true assimilation of the new concepts took longer. The development of the integration process is examined from different countries: the USA, Great Britain, the USSR and France. Interesting differences are pinpointed, and related to the sociological contexts of the different countries. The third period, called "corpus turn", is more a change of scale than a true paradigmatic revolution, and it is common to most scientific fields at the end of the 20th century. In linguistics as in most other fields, the sudden availability

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of huge amounts of data to experiment upon, and the possibility to do so at a time-scale not reachable by humans, has induced a true scientific revolution, the aftermath of which is nowadays daily experience of most scientists (Sloman 1978, Robertson 2003).

The book is divided into nine chapters, the first five of which take place mainly in the United States where it all started. In the first chapter, machine translation is presented as the founding event of the "turn to automatization". The second chapter describes the early evolution from machine translation to computational linguistics and language processing. Chapter three examines the relationship of linguistics with war sciences in the contexts of World War II and the Cold War. In the fourth chapter, the integration of information theory by linguists is thoroughly detailed. Chapter five concerns the central question of the emergence among post-Bloomfieldian linguists of generative grammar and syntax. In chapter six, the genesis of intermediary formal languages is explained. Chapter seven is devoted to the reception by French linguists of the 'automatic turn', and their synthesis of the new concepts coming from both the USA and the USSR. Chapter eight describes the evolution of the field of information retrieval, which, although outside the main trend of theoretical linguistics, has experienced a similar pattern of evolution. Chapter nine takes place in the United Kingdom, where the British empiricist tradition had an important influence on the perception of automation, the constitution of corpora, their status and the way they were used.

A product of the author's longtime expertise in the history of linguistics, the book is usefully completed by an extensive bibliography compiling sources from different countries, carefully compared and put into perspective. The interest of Léon's study goes beyond the history of linguistics: virtually all scientific fields have had to take their own 'automatic turn' during the second half of the 20th century. It can be conjectured that the integration process described by the author for linguistics also took place in physics, chemistry, or biology. Another interesting question raised by this book is that of the swarming outside linguistics, of a field initially perceived as an application domain by outsiders. Indeed, the "applied linguistics" issues, the automation of which is described here, gave birth to some major branches of current mathematics and computer science. Yet specialists of data science, information analysis, or artificial intelligence, have never considered themselves as linguists (Rosenberg 1975, Skagestad 1993). Many biologists, in their daily use of genomic databases, do not usually see them as corpora, nor do they see their activity as information retrieval (Atkinson & Russell 2005). We can recommend the reading of this book, not only to linguists interested in the history of their field, but also to the many scientists of different disciplines, involved in computerized information treatment in a very broad sense.

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Reviewer's address:

Bernard Ycart
Laboratoire Jean Kuntzmann
Université de Grenoble
51, rue des Mathématiques
F–38041 Grenoble Cedex 9
F r a n c e

bernard.ycart@imag.fr