

Humanities Computing Activities in Italy

By Aldo Duro

If by circulation one means large-scale application, we must agree that in Italy the use of the computer for the analysis of linguistic data and in general as an aid in humanistic studies and in the social sciences is rather recent. In fact, it is only in these past three or four years that the economic and psychological difficulties have been overcome—difficulties which had been delaying the acquaintance of Italian scholars with automatic tools of research. In the area of the exact sciences, particularly in the mathematical and physical disciplines, the use of electronic methods has always paralleled that of other countries, even though the number of research centers was and still is today somewhat small. The establishment of the Electronic Calculation Center (CNUCE) at the University of Pisa in 1965 has been most welcome for both the scientific and humanistic disciplines. For the latter one might say that the center gathers and coordinates virtually all the research conducted in Italy by the use of the computer.

Against such slowness of diffusion on a large scale we have, on the other hand, the precious interest which Italy experienced for automation. There is no doubt, in fact, that the planning of an *Index Thomisticus* to be completed with automatic equipment, and the creation of the Automation Center for Linguistic Analysis (CAAL) in Gallarate places Professor Roberto Busa among the pioneers in computing activities in the entire world. The publication of the small volume, *Sancti Thomae Aquinatis Hymnorum ritualium Varia specimina concordatarum*, with a "first example of word index automatically compiled and printed by IBM punched card machines," dates back to 1951. The refining of the *Index*, which has as its object of analysis the entire *Corpus Thomisticum* (more than 10 million words, 150,000 forms, 30,000 lemmata) is now nearing its completion. Such perfecting has been long in coming, to be sure. We cannot forget, however, that Professor Busa did not find the course charted which he began so many years ago, but that he himself had to explore it, little by little, with the help of his assistants. In order to hasten the completion of the work and its publication, the Center at Gallarate has ceased its activity since the latter part of 1966 and Professor Busa has

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moved to Pisa with a few of his collaborators, where he can supervise on a daily basis the work on the CNUCE computer. The tangible result of his effort will be comprised of catalogues divided into two sections: one of indices and the other of concordances. In addition to his work on the Latin of St. Thomas, we must mention that Professor Busa has also completed analyses on Aramaic and Hebraic texts, on behalf of the Philosophical Institute of Aloisianum at Gallarate.

Among the other undertakings which actually make use of the computer in Italy, the largest—if we consider the amount of work and its importance—is certainly the Accademia della Crusca, which resumed its lexicographic activity four years ago with the intention of compiling a *Treasury of the Italian Language from the Origins*, and soon after that, an *Historical Dictionary of the Italian Language*. In order to compile these two works the Accademia is in the process of collecting a wealth of linguistic documentation, provided for on about 100 million samples, or context cards, largely assembled with the aid of the computer. In addition, the filing cards assembled under other systems of research, either manual or xerographic, are written or reproduced on thin cards of mechanographic texture, in order that they may be punched and then included and organized mechanically. A staff of young linguists under the direction of Professor Aldo Duro attends to this work. Additional information on the methods and types of analyses done by computer may be found in the November 1967 issue of this publication, on page 79. By the end of this year (1968), no less than 200 works dealing with the origins of the Italian language (XIIIth and XIVth centuries) will have been analyzed, and we will have access to frequency lists and concordances of at least 100 other works.

The formulation of the programs, either of the projects undertaken at the Accademia della Crusca or of the linguistic analyses in progress at other institutes which utilize the computers of CNUCE, is all done by Dr. A. Zampolli of the IBM Center of Studies at Pisa. The type of computer employed is the IBM 1401, together with the IBM 7090. The printing of the concordances and of the context cards will be considerably improved in a few months' time, when the printer of the computer will be equipped with a special chain of 120 characters.

Statistical investigations other than lexicographic are directed by Professor Carlo Tagliavini of the University of Padua and Dr. Zampolli. These men intend to analyze a great number of literary texts and other documents normally handled by ordinary printing

methods and periodicals, as well as recorded conversation and other sources, in order to ascertain the frequency of the various elements which make up the Italian language on the graphemic, morphologic, lexical, and above all, phonologic levels. This project is still in the organizational stages, and has not yet been fully developed.

Further along in progress is a project to catalogue Italian folk-songs, directed by Professors V. Santoli and A. M. Cirese. The basis for the work is a vast collection of folk-songs under the name of the "Michele Barbi Collection." These folk-songs have been transferred onto filing cards and analyzed in order to obtain a rhyming dictionary, a first-word index, lists of their frequency, concordances, and vertical patterns. Having once passed the experimental period, the method of research will be extended to other collections of folk-songs, in order to deepen the knowledge of a subject so valuable to the history of popular traditions.

In the area of the social sciences there is yet another project which in its vast program has included the indexing of some works by computer. I speak of the *Lessico intellettuale europeo*, established at the Philosophical Institute of the University of Rome. The work at this center concerns the philosophic and cultural terms common to all European languages, both classical and modern, and the publication of monographs on the history of individual terms. The investigation is being conducted under various methods; among these surely is the use of the computer, especially since the programs adopted for electronic analysis by the Accademia della Crusca answer perfectly the needs of the *Lessico intellettuale europeo*, which are not dissimilar. The first attempt—on the *Aesthetica* of Baumgarten—having been successfully completed, the analysis of all of the works of Giordano Bruno and of Giambattista Vico is now being planned, in order to obtain concordances and context cards for these and for other authors who will be analyzed in the future.

The *Lessico rosminiano*, a project at the Philosophical Institute of the University of Genoa headed by Professor M. F. Sciacca, has a more limited sphere of research. The key-punching of almost all the works of the philosopher A. Rosmini has already begun, and the electronic cataloguing of those works already punched is now under way. The initial objective is to obtain frequency lists and concordances upon which one can make a primary selection of words of philosophic interest which appear in the production of the author; of these the most important examples will be electronically

transferred onto context cards, and then used in the compilation of a Vocabulary of the philosophic language of Rosmini.

In the area of classical languages, we should mention the research which the Center of Study for Greek lyric of the National Council of Research is carrying out, on the structural morphology of the choral poetry of ancient Greece, with textual analyses of Pindar, Bacchylides, and other choral poets. Professor P. Meriggi of the University of Pavia is conducting an electronic analysis of one of the oldest Indo-European languages, that of the Hittites, in order to prepare material for compiling a dictionary. This undertaking especially involves the translating of ideograms and the cuneiform characters of the texts being studied into characters which can be understood by the key-punch operator.

A survey so rapid and superficial as this one cannot, of course, claim to exhaust the information on all the non-numerical applications of the computer which have been employed or attempted with greater or lesser success in Italy. A program in philological programming at the Center of Cybernetics in Milan, in order to use data of the "collatio codicum" obtained mechanically in preparing critical editions of texts, has been reported in several publications, and most recently in an article by G. P. Zarri in the magazine "Lingua e stile" of Bologna (1968, No. 1); but this project still appears to be a long way from practical results. At any rate, we are dealing not with large-scale programs but with individual productions like, for example, the various indices and concordances of the *Divina Commedia* which have been assembled electronically at the Center in Pisa and published by IBM Italia in 1965; or the concordances of Dante's minor works which have been catalogued, again at the Center in Pisa, for the *Enciclopedia Dantesca*, now in preparation at the Institute of the Enciclopedia Italiana of Rome.

And here, finally, are two developments in the area of visual arts and in musicology. The first concerns the Catalogue of Greek Ceramics, just in the planning stages, which Professor P. E. Arias of the Archeological Institute of Pisa intends to complete electronically through a series of data (type of object, decorative painting on the object, provenance, etc.) which would be fed into the computer and then be correlated into a multiple filing system of Greek ceramics.