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The Next Step

By Louis T. Milic

With the inauguration of *Computers and the Humanities,* the time has perhaps arrived for a more serious look at the position of the humanistic scholar in the world of data processing. There have been a dozen conferences on the subject, the proceedings of two of which have been published, with another in the press. Courses in programming for humanists are being talked about, and perhaps given, in several institutions. A book devoted exclusively to matters of literary style treated with computers—a kind of manual of the subject—has just seen the light in Ohio.* And finally, this Newsletter has been established to bring together the humanists who may be interested in the use of data-processing machines. It may not be premature to say that we are past the first phase, when to admit that you were working on a literary problem with the help of a computer was equivalent to saying that you were an eccentric, at the very least, and possibly an underminer of the liberal tradition.

We are now moving into the phase of consolidation. As students of the mystique of technology have pointed out, technological innovations and new inventions always begin out of step. Motion pictures at first were merely photographed plays and early television was based on a blending of the techniques of radio and film. The first printed books tried closely to imitate the appearance of hand-copied books. Most of the books printed long after the invention of the printing press were not contemporary literature but classics and medieval works. It was as if it had been realized that now the old texts could be made available. But no one thought of the press as providing the writers of the day with a means of reaching an audience. That came much later. The rationale of such a process is a compound of caution and innocence. The consumers of the new product are less likely to be alarmed if the appearance of the new does not jar with the familiar. And inevitably the possibilities of the new medium have not been fully grasped by those who employ it.

The process of consolidation is the beginning of a realization of the advantages of the new technology. Similarly, the consolidation phase of computer-aided study in the humanities is beginning to provide us with all the good things we have been lacking for so long. Concordances of the poets are rolling off the presses, huge collation jobs are resulting in variorum editions of incredible complexity, bibliographies and indexes of abstracts are becoming available in satisfactory numbers, though perhaps not fast enough to keep up with the information explosion. I have heard that even publishers of dictionaries, the conservatives in a conservative field, have turned to the machines. Moreover we have been promised much more in the same line, editions of everything, concord-

* *The Computer and Literary Style,* ed. Jacob Leed, Kent State Univ. Press, 1966.

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ances and indices verborum of everyone, computerized bibliographies, auto-indexing, automated libraries—the automatic world, in short. These will be good things and scholars look forward to them, but satisfaction with such limited objectives denotes a real shortage of imagination among us. We are still not thinking of the computer as anything but a myriad of clerks or assistants in one convenient console. Most of the results I have just described could have been accomplished with the available means of half a century ago. We do not yet understand the true nature of the computer. And we have not yet begun to think in ways appropriate to the nature of this machine.

In a manner of speaking, the existence of computers has already had some influence on the thinking of humanistic scholars. They have perceived, as already noted, how easily a computer can perform the brute labor of scholarship: the leg work, the look-up time, the collation, the entering, the endless replication of much of the scholar's task. Consequently, the scholar's interest has begun to shift in the direction of this type of work, partly because of the availability of programs for it and partly because of the huge increase in the amount of material the scholar must handle, which puts a high premium on simple labor-saving.

Beyond this, the manner of thinking of scholars who have been affected by computers has also been modified. The demands of the machine have forced scholars in the direction of more explicit statement, because programs cannot be vague and tentative; of more modular statement, because programming, debugging and revising can be done more economically if a problem is sectioned into modules; of more pragmatic statement, because existing models of computer research in the humanities derive from the objective and quantitative paradigms of the sciences. In addition, the dependence of the scholar on the programmer has worked to simplify and perhaps denature his research. The programmer is not a scholar; he is the attendant of the machine. Essentially, he reduces any project for research in humanistic fields to the mechanistic level which is most congenial to him. As long as the scholar is dependent on the programmer, he will be held to projects which do not begin to take account of the real complexity and the potential beauty of the instrument.

Our fear that the study of literature may become mechanical if it is processed by a computer has kept us from trying to understand its rich and genuine possibilities. Unless we try to understand it in the way in which as scholars we try to comprehend any of our tools, we shall not only be incapable of exploiting its resources properly, but we shall be in danger of becoming its victims. Control comes from understanding, from a fusion of the user and the instrument, like the arm and the saber, the rider and his mount.

The true nature of the machine is unknown to us, but it is neither a human brain nor a mechanical clerk. The computer has a logic of its own, one which the scholar must master if he is to benefit from his relations with it. Its intelligence and ours must be made complementary, not antagonistic or subservient to each other. For example, understanding in

the arts and letters is based on the perception, identification and recognition of patterns. But the patterns must be small and traditional enough to be perceived by the human apparatus. Thus we have no trouble with certain musical progressions and rhythms, prosodic features in poetry, or color and form patterning in graphic or plastic art. Architecture, because of the dimensions of the object, begins to inhibit our perception of the relations. Perhaps for that reason Aristotle questioned whether a large object could be beautiful. In literature, we sense this when we read a long novel. Unlike the human perceiver, however, the computer can be made to detect the longest and best-concealed pattern, no matter how random an appearance it presents to the human eye. Thus, we must learn to ask it larger questions than we can answer and to detect what escapes our unaided senses. This may involve not only proposing old questions in new ways but even thinking up new questions. The computer can be made an extension of man only if it opens avenues we have not suspected the existence of.

Thinking in a new way is not an easy accomplishment. It means reorientation of all the coordinates of our existence. Necessarily, therefore, our first motions in that direction are likely to be tentative and fumbling. The most interesting direction, to my mind, for this new work to take is in the imitation of the process of literary composition. For a long time, we have asked ourselves how the mind worked when it tried to articulate its experience with linguistic symbols. Many kinds of analysis (grammatical, statistical, psychological) have provided us with only a fractional insight into this mystery. The notable failure of machine translation has been paradoxically a very instructive development. Computers were instructed to behave like human translators, and they could not. What was learned about the complexity of linguistic structure, however, far exceeds what might have been gained from translating Chinese or Russian political speeches or scientific papers. That use of the computer was constructive, if not creative. It moved in the direction of synthesis rather than analysis.

Interesting synthetic beginnings have been made. The music people have been the most imaginative, possibly because of the formal nature of their field, which makes the generation of artificial music less affected by cognitive aspects than the generation of poetry, for example. The musicians have the advantage that they are not bound, as literary scholars are, to literary modes of creation or investigation. Electronic music, synthesis of classical models, new sounds—these all represent departures from a concept of the computer as a mechanical clerk.

Despite the odium which is likely to greet such an attempt, I should like to see the next step in literary computation to be truly imaginative. Attempts have been made to program computers to write poetry but always it seems to me with a sense of shame. A more serious effort ought perhaps to be made involving a genuine willingness to put the creative powers of the computer to the test. The generation of poetry or of music is obviously not an end in itself. The creation of graphic designs by means of random number sequences is not intended to surpass human

performance. These and other creative uses of the computer are trials of strength, estimates of capability. As scholars involved primarily and ultimately with the mystery of the creative act, we are always responsive to what we can learn about the creative process. Making simple models which can produce music, language, design is only a primitive stage of this investigation. Far more complex models with considerable autonomy, self-correction and even introspection can be visualized.

Such speculations are not fantastic; they are at the border of reality. By abandoning our conception of the computer as merely a mechanical clerk suited mostly to repetitive routine operations, by learning to know its features, uses, limitations and possibilities—its nature, in short—we shall be properly re-organizing our thinking for the new age. What the computer will enable us to do in our humanistic tasks has hardly been imagined yet. Even immoderate speculation tends to fall behind the new reality.

Recent Publications

EDMUND A. BOWLES, comp., "Computerized Research in the Humanities: A Survey," *ACLS Newsletter,* Special Supplement, June 1966. ACLS, 345 East 46th Street, New York, N. Y. 10017. Free.

International Organization for Analysis of Ancient Languages by Computer, *Revue No. 1, Revue No. 2.* L.A.S.L.A., 2, rue Ch. Magnette, Liége, Belgium.

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