

PDP10=Power

PHOTOGRAPHS BY
JOSEPH KACHINSKI

ON the final day of the Sixties ten thousand pounds of new and very sophisticated computing equipment was squeezed into the neo-Gothic confines of Hubbard Hall. Its arrival, while unheralded, is expected to have significant impact on Bowdoin in the Seventies and beyond.

"Acquisition of this equipment," says Myron W. Curtis '58, director of the Computing Center, "places Bowdoin first in computing power and capabilities among the nation's small liberal arts colleges."

The computer, called the PDP-10, came with a \$438,000 price tag. The College has acquired the system through a third-party lease-purchase arrangement and has amortized the cost over five years.

To no one's surprise, this figure represented the largest single equipment purchase ever made by the College. What did raise some eyebrows was the timing of the acquisition: should Bowdoin, in the face of an estimated annual operating deficit of \$350,000, risk the financial commitment?

Yes, according to a faculty committee studying the Computing Center. In a 100-page report presented to President Howell in February 1969 the committee urged the College to obtain a general purpose time-sharing computing system that would give Bowdoin a facility "second

to none" among colleges. The report also cited deficiencies in Bowdoin's then existing facilities—a small IBM 1620 and a time-sharing hook-up to Dartmouth's computer.

However attractive the suggestion, President Howell and the Governing Boards had to struggle with the basic questions of finance and educational policy raised by entering big-time computing. Some argued the sheer cost was prohibitive at a time when the College was feeling a financial pinch. Others felt a computer of such capabilities was more attuned to the needs of a large technical school than to the college of Hawthorne and Longfellow. Was it a gamble or a gambol?

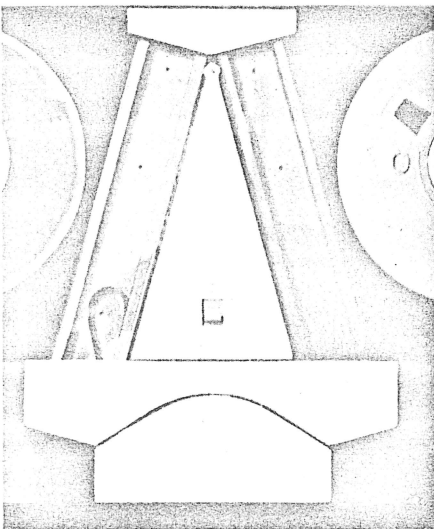
In the final roll call the decision makers were swayed by the arguments in favor of the acquisition. The faculty committee report outlined ways the computer system could pay for itself; how the administrative, instructional, and research needs of the College could be met; and, perhaps just as important, how the system could help Bowdoin expand its historic commitments in education to neighboring communities, the state, and New England.

The PDP-10 is technically called a time-sharing system. This means that several persons working at teletypes scattered over a wide area can use the computer almost at will. Each user has the impression that he alone has the computer's attention. The phenomenon is explained by the speed of the computer: it can perform all the necessary computations for a program many times faster than a person can type out instructions and information.

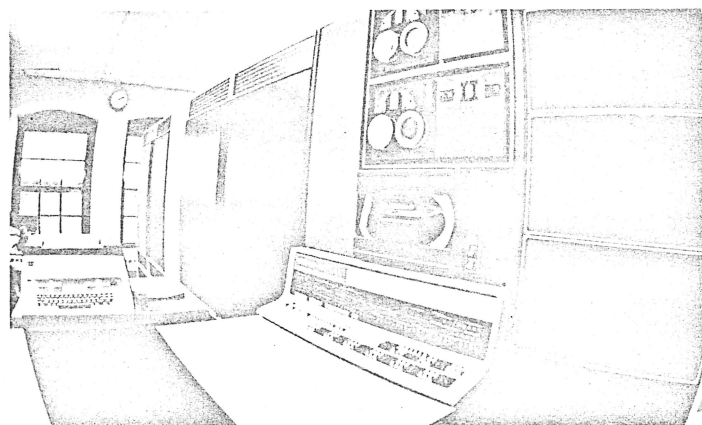
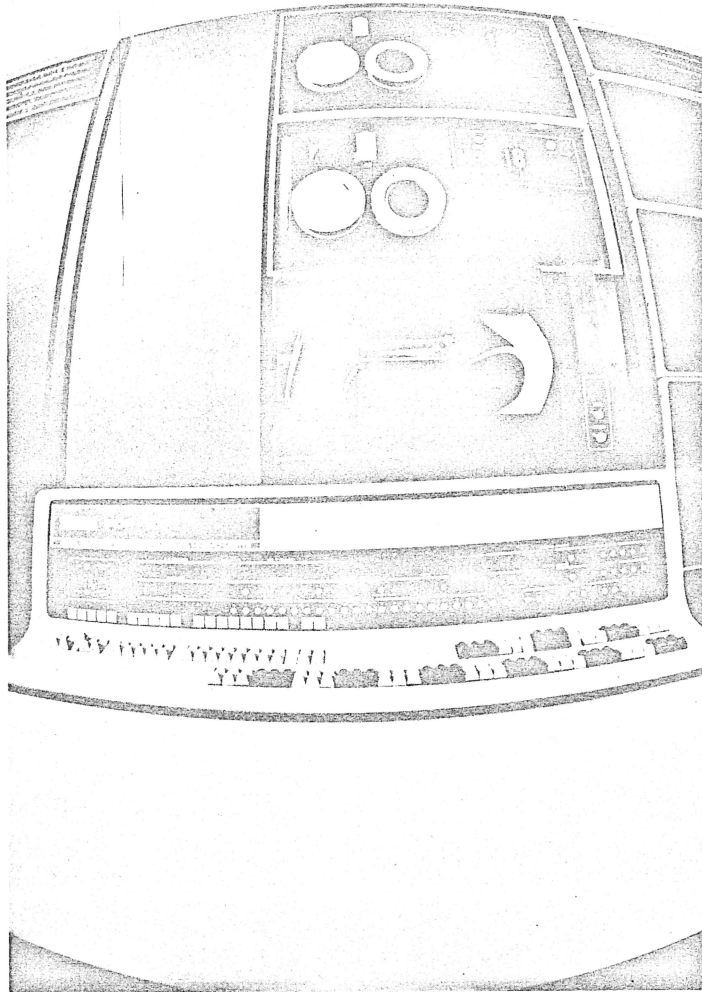
What this means to the College is that excess computer time can be "rented" to other institutions, thereby helping

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comput ing



PDP-10



to defray the original cost. According to Curtis, several high schools and colleges within a 75-mile radius of Brunswick (the suggested sphere of influence of the PDP-10) have expressed interest in time sharing with Bowdoin. Portland and Deering high schools are already tied into the system.

The College is confident that enough institutions will participate in time sharing (and cost sharing) to make what appeared to some as a calculated risk look like a sound investment. The confidence seems well-founded. Within a 75-mile radius of Brunswick are 46 high schools with student populations over 300 and eight colleges. Initially, Bowdoin plans to charge about \$600 a month per teletype to high schools and about \$1,000 a month per teletype for colleges. Both rates are subject to the fluctuating volume of usage in hours, and two teletypes at the same high school or college may not necessarily double the cost of one.

Time sharing is not new to Bowdoin or to many of the institutions thinking of hooking up with the PDP-10. Since February 1968 Bowdoin has rented time from a large time-sharing system at Dartmouth. Since this relationship with Dartmouth began, about 300 Bowdoin students have acquired some degree of computer know-how. The number of faculty members using computers has doubled.

The Dartmouth time-sharing system—one of the first in the nation—was costing Bowdoin about \$500 a month for telephone lines and terminal rentals plus anywhere from \$1,000 to \$2,000 a month for computing charges (depending on how many hours were used) with the four terminals. National Science Foundation funds, which helped defray costs of the Dartmouth system, were scheduled to run out this spring, making time sharing with Hanover very expensive. Bowdoin will drop all ties with the Dartmouth system shortly except for a simple call-up arrangement.

As important as the time-sharing partners will be, college officials stress the primary uses for the PDP-10 are for Bowdoin students, faculty members, and administrators. Actually, there is no danger of any user being crowded out by other users because of the speed at which the machine operates.

Wolcott A. Hokanson Jr. '50, vice president for administration and finance, points out that several courses in mathematics and economics already demand of the students some knowledge of using a computer. He expects more academic disciplines will integrate the computing system into their curriculum. Says Hokanson: "A time will come fairly soon when the PDP-10 will be used the way Hawthorne-Longfellow Library is used now."

Hokanson says that all administration records currently on the IBM 1620 data processing unit will be transferred to the PDP-10. These include admissions files, business office records, and the registrar's records.

Bowdoin's PDP-10 features 32,768 words (36 bits of information a word) of main memory. A word, the standard unit of information in the computer, is made up of a

certain number of bits of basic information and is treated as a single unit by the computer. The PDP-10 also has auxiliary memory storage consisting of two magnetic disk units with a capacity of more than six million words, a line printer, a punched-card reader, three magnetic tape units, and a paper tape reader and punch combination.

One indication of the computer's speed was given by Curtis: "Every computation made by the data processing machine since we obtained it in 1964 can be done by the PDP-10 in a single day. The difference between the two machines is like the difference between hand copying and the printing press."

Another example of its speed was cited in the faculty committee report. A member of the faculty tried out a program on the college's old computer, which was designed ten years ago, and the PDP-10. The Central Processor Unit time required to perform the necessary calculations was 15 hours on the old computer and only 48 seconds on the PDP-10.

Any doubts about the quality of the new computing system were erased when it was learned that the Brookings Institution in Washington, D.C.—one of the nation's leading think tanks—had just acquired a PDP-10 and was ready to order a second one. For a nominal fee, Bowdoin may now obtain access to much of the research data stored at Brookings, something like getting Jack Nicklaus to play for your church pitch-and-putt team.

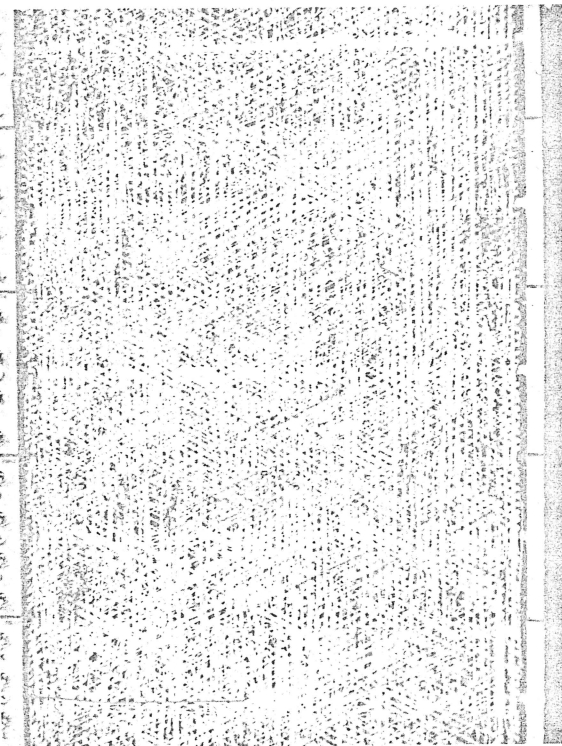
The PDP-10 may yet prove to be a valuable recruiting tool for the College. The Admissions Office predicts that a growing swell of high school students, trained on computers through time-sharing systems, will place as much emphasis on a college's computing power as on its athletic plant, library, or art museum.

Robert E. Ives '69, special assistant to the director of admissions, says that in his travels across the country "barely a day goes by without someone asking a question about Bowdoin's computer equipment." He thinks the College is now in a position to attract some bright students who might otherwise have ignored Bowdoin because of its previous computer shortcomings. This assessment takes on added significance in the light of a recent report by the American Council on Education which says computer programming can be (and clearly will be) taught as early as the seventh grade in many schools.

Whether the nature of the College as a small liberal arts institution will be radically changed by the PDP-10 remains to be seen. One indication of possible change might be a graduate program in computer science, something the PDP-10 is very capable of handling. A faculty committee is studying this and is expected to report later this year.

So while no administrator is ready to argue that the sophisticated machinery in Hubbard Hall could ever replace the humanity (and humaneness) of the accessible instructor, the PDP-10 is already guaranteed tenure since current and long-range demands for its services are virtually assured.—D.F.H.

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This photograph and the one on page 14 (lower left) are of the complex wiring systems of the PDP-10.