MACBENESH:

A "WORD PROCESSOR" FOR CHOREOLOGISTS

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Introduction

"MacBenesh" is a graphics editor for the preparation of Benesh Movement Notation scores. As its name suggests, "MacBenesh" runs on the Apple Macintosh personal computer. Its development resulted from a cooperative effort on the part of the Ontario Science Centre, the University of Waterloo, and Apple Computer Incorporated. This article is a brief description of how it was developed, what it can do, and its potential significance for the professional choreologist.

History

The Ontario Science Centre is located in Toronto. It is a government funded interactive museum featuring exhibits on science and its relation to society. In addition to maintaining permanent exhibits, it periodically stages special temporary exhibits devoted to selected themes. In 1984 the theme was the interrelationship between computers and the arts. This exhibit was called "The Artist as a Young Machine". After seeing the work being done at the University of Waterloo on dance notation (as described in the previous article), the exhibit planners decided to include, as part of the dance section, a display focusing on the use of computers in assisting choreologists.

It soon became obvious that it would be impractical to install the hardware required for "ChoreoScribe" at the Ontario Science Centre. Fortunately, Apple Computer had recently placed the Macintosh computer on the market. This computer had the graphics capabilities required by a Benesh editor, was low in cost, and incorporated many of the advanced end user interface features used in "ChoreoScribe". The Ontario Science Centre had acquired several of these machines for use in the exhibit. It was therefore decided to use "ChoreoScribe" as a model for the development of "MacBenesh", a new Benesh editor to run on the Macintosh.

Doug Moen was hired as the programmer and Robyn Hughes-Ryman was hired as the consulting choreologist. Work began in May 1984 and an initial version was completed in time for the opening of the exhibit. The exhibit ran from July 1st to October 8th, during which time over half a million people got their first exposure to Benesh Movement Notation!

University of Waterloo

After the close of the exhibit both Doug Moen and Robyn Hughes-Ryman continued work on the project at the University of Waterloo where they interacted closely with the "ChoreoScribe" team. This effort was assisted initially by the Ontario Science Centre who provided access to a Macintosh computer. Later, Apple donated several Macintoshes to the university, one of which is being used to compose and produce this article!

The Macintosh Computer

The Macintosh computer represents a significant technological breakthrough for the choreologist. It brings computing power and graphic performance out of the laboratory and onto the desk top. It is cheap enough for a dance company to afford, it is easy enough for anyone to use and it is light enough to be carried in a shoulder bag (the basic computer weighs approximately 22 lbs). In

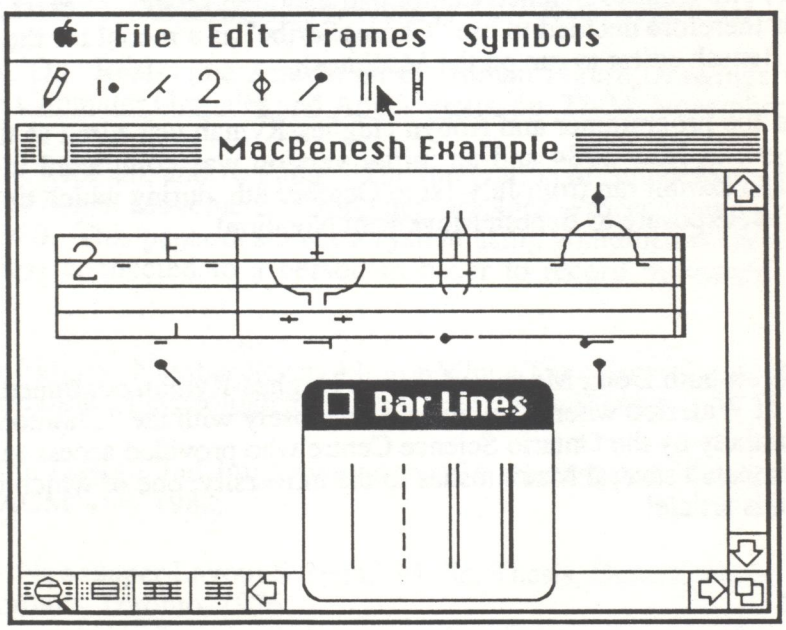
addition to specialised programs like "MacBenesh", there are a multitude of general purpose programs such as word processors and business programs. This means the dance company can use the machine for other purposes and thereby help justify its expense.

The user interacts with the Macintosh by means of a conventional typewriter keyboard and a novel pointing device called a *mouse*. The keyboard is used to enter text. All commands are entered through the use of the mouse. Unlike the *puck* used in "ChoreoScribe" which is moved across a *graphics tablet*, a mouse can be moved across any flat surface. The movement is sensed by the mouse and transmitted to the computer to which it is attached. This information can be used by the computer to control the position of a *tracker* (or *cursor*) on the screen. In this way, the tracker can be moved to the desired command or object and selected by pressing a button on the mouse. Information is graphically displayed to the user on the screen. The combination of a graphical interface and the mouse pointing device means that the user does not have to memorise complicated computer commands or constantly refer to manuals while using the machine.

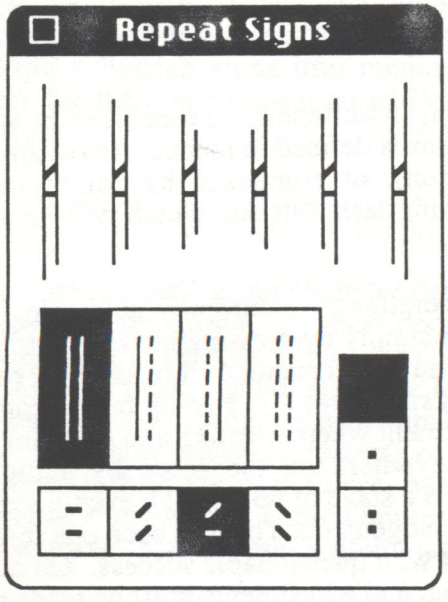
As a point of interest, Apple Macintosh computers are being used to produce Labanotation scores at the University of California, Los Angeles (U.C.L.A.), and Ohio State University. Sutton Movement Writing programs are under development on Apple computers, through a grant from The U.S. National Institute of Health.

Description of the Program

The following figure shows a typical "MacBenesh" screen. The centre of the figure shows a stave of notation produced by "MacBenesh". Unlike, "ChoreoScribe", "MacBenesh" does not have a *work-frame*. Signs are positioned directly on the stave. Each sign is selected from one of several *menus* (lists of choices) accessed by the *icons* (pictographic representations) seen at the top of the figure. The **Bar Line** menu, for example, appears on the screen when the user positions the arrow, as shown, on the icon representing that menu. When the menu pops up (hence the term *pop-up menu*), the arrow can be positioned over any of the signs displayed. Once a sign is selected the arrow becomes that sign, and can then be dragged into position on the stave. When a different menu is selected the current menu automatically disappears.



Not all menus are as simple as the Bar Line menu shown above. For example, there are more repeat signs than can be explicitly displayed on a single menu. In order to represent the entire set, the menu has controls that allow the user to specify the attributes of any subset. This is illustrated in the following figure where the user has specified the subset of repeats on alternate sides. The user specifies the desired attributes by clicking on attribute boxes. The selected attributes are highlighted (by being drawn as white signs on a black background) and the corresponding subset of six repeat signs is displayed in the top half of the menu. The user then selects the specific repeat sign from the subset and drags it onto the score.



Referring back to the first figure, the icons, from left to right across its top, represent the following: pencil strokes (free-hand drawing used for movement lines, etc.); basic extremity signs (hands, elbows, feet and knees); head and torso signs (turns, tilts, bends and combinations); numerals (2 - 9, used for time signatures and repeats); rhythm signs (pulse beats, sub-beats, etc.); direction signs (8 basic signs); bar lines (single, dotted, etc.); and repeat signs (the full range of possibilities). In due course it is planned to add additional icons representing menus containing a wider range of Benesh signs.

The lower left corner shows four modes in which the notation can be displayed. The farthest left icon represents the *magnify mode* in which the stave is enlarged, allowing the notator to produce very detailed notation more accurately and without eyestrain. The next mode gives the notator the option of viewing a string of notation frames all at once on the Macintosh screen (which is narrower than standard-paper-width), or of viewing the Institute A4-page-width format (so that only part of a page can be viewed on the screen at any one time) by *scrolling* left and right on the screen, as will be described shortly. The next mode displays dotted vertical lines between frames, in order to define the boundary of a frame for formatting purposes. The last of the four modes displays a dotted centre line which can be used as a frame of reference in positioning signs. All of these modes can be turned on or off at any time without affecting the notation score format on the screen or the printed output.

The vertical bar on the right of the figure, known as the **Vertical Scroll Bar**, allows the notator to view the score at any point from top to bottom. A corresponding **Horizontal Scroll Bar** at the bottom of the figure allows the notator to scan the score from left to right when in Institute-page-width mode. When wider screens become available this horizontal scrolling will not be necessary.

The **Menu Bar**, the row at the top of the figure, begins with three items common to most Macintosh programs: an **Apple** icon representing various desk accessories, such as a **Scrapbook** (which notators may need for saving excerpts of scores to be used at a later date) and a **Note Pad** (for saving helpful reminders); the **File** icon which allows the user to open a new or existing document (eg. notation score), save it, print it, etc.; and the **Edit** icon which allows the user to work within a document, that is to **Cut**, **Copy**, or **Paste** sections. The **Frames** and **Symbols** icons are unique to the "MacBenesh" program. The former contains formatting commands used to change the layout of frames in a score. The latter will provide operations on Benesh signs. These will include the ability to rotate signs, to combine signs, and to create new signs (those not predefined within the "MacBenesh" program).

Practical Considerations

At its present stage of development, "MacBenesh" is capable of producing dance solos. Although only a limited subset of Benesh signs is defined in menus, almost any sign can be drawn free-hand (accessed through the **Pencil** icon), or composed by combining existing signs. Creating undefined signs is a time-consuming task, but one which will be alleviated as more menus are added.

Certain time and effort-saving operations are currently available. Frames can be added either through the **Frames** icon, or more simply by pressing the keyboard *space bar*. Bar Lines can be added through the **Bar Lines** menu and formatted through the **Frames** icon, or by one simple operation -- pressing the keyboard *stroke key* (/). Pop-up menus can be dragged anywhere on the screen to minimise the hand movement when selecting and dragging signs. Signs can be selected from menus, or copied from anywhere on the score by using the keyboard *option key*. "MacBenesh" automatically formats a stave of notation by evenly spacing out frames, according to rules based on the notator's visual judgement. This has been one instance in which efforts to save time through automation have met with questionable success. On many occasions, the automatic spacing is not aesthetically pleasing, and adjustments must be made manually. This problem may be solvable by using a more sophisticated formula which requires greater understanding of the "rules" notators intuitively apply.

By combining "MacBenesh" with existing programs, several interesting options become available. For example, a "MacBenesh" score can be saved as a MacPaint document. This allows the notator to make minute changes, dot by dot, to any part of the score, and to add text. A MacPaint document can also be cut into a word processing program such as MacWrite. Such a facility makes it possible to produce documents consisting of portions of text interspersed with notation excerpts and graphics such as diagrams -- just the tools needed to produce notation theory notes, technical papers, and articles.

Printed copies of scores created by "MacBenesh" may be produced on the Apple ImageWriter, an inexpensive printer which has a resolution of 72 dots per inch. This resolution is adequate for working drafts; while copies are generally legible, certain elements such as movement lines appear jagged and hard to read. A more expensive printer, the LaserWriter, prints at 300 dots per inch, bringing the resolution closer to master copy quality. (See example of the Peasant Pas de Deux, Boy's Variation, "Giselle" Act 1. Note that the resolution of this example could be improved if the MacBenesh program stored the notation signs as geometric shapes rather than dots on a page. Then the higher resolution printer would have the necessary information enabling it to smooth out the movement lines, legato lines, etc.)

Future Development

No further development will be done on "MacBenesh" until the summer of 1986. Until that time we will be working with the existing program in order to re-evaluate our initial goals and determine priorities for future development. One original goal was to produce a program which could be operated by choreologists with little experience using computers. This approach has resulted in a program which is simple to use, but initally time-consuming (although the update facility makes editing scores relatively fast). If the time needed to input data is found to be too slow to justify the

programs use, the original goal may be abandoned. The time taken to produce a score could be significantly reduced by requiring more user expertise, that is more initial training time, on the part of the user.

From another perspective, the process of developing "MacBenesh" has brought up interesting observations about the way Benesh scores are written. For example, the practice of using predrawn notation staves has limited notators to using a set amount of space between staves. Computer technology could make it possible to vary the distance between staves depending on the amount of above and below stave information written.

Other interesting thoughts centre on the nature of Benesh Movement Notation. One of the first questions asked by computer programmers is, "How many symbols are there in Benesh notation?" There is, of course, no clear cut answer in view of the evolving nature of any language. The process of defining and grouping Benesh signs into menus has been of great value. The organisation of signs necessary for the computerisation of Benesh Movement Notation should facilitate cataloguing Benesh signs.

Conclusion

Although the current version of "MacBenesh" is not ready for day to day use by the choreologist, it can be used with existing programs for producing short documents containing sequences of notation. A great deal of work remains to be done to give the choreologist access to the full range of Benesh signs. At present, the print quality is not adequate for master scores. Improved print quality will depend on the development of a program which makes full use of a higher resolution printer, such as the LaserWriter. The more advanced features of notation checking and animation will not be available on the Macintosh in the near future, but, given the rate of technological advance, they could be practical in a few years. These features, together with the relatively low cost of the Macintosh, promise to make "MacBenesh" a useful tool for choreologists.

GISELLE ACT 1

Peasant Pas de Deux: Boy's Variation

Choreography: Coralli/Petipa

Music: Burgmüller