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AUTHOR Dickson, W. Patrick
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ABSTRACT

Focusing on the application of new technologies to the creation of rich environments for writing, this project entailed the assembling of a low-cost microcomputer system that included a microcomputer, speech synthesis, voice recognition, and videodisk player. A variety of alternative input devices were explored, and software that permitted the smooth integration of these different technologies was developed. Summaries are provided of the development and pilot testing of the Talking Text Editor, exploration of videodisks and development of the Video Browser Program, development of the Name Frame Program as a bridge between the Video Browser and the Talking Text Editor, pilot testing of the videodisk integrated with word processors, and pilot testing of the voice recognition system. References are provided, and program listings for the Integrated Writing Environment Software (Talking Text Editor, Video Browser Program, and Name Frame Program) are appended. (KM)

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Program Report 86-10
EXPERIMENTAL SOFTWARE PROJECT:
FINAL REPORT

W. Patrick Dickson

Wisconsin Center for Education Research
School of Education
University of Wisconsin
Madison, Wisconsin

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The Wisconsin Center for Education Research is a noninstructional unit of the University of Wisconsin-Madison School of Education. The Center is supported primarily with funds from the Office of Educational Research and Improvement/Department of Education, the National Science Foundation, and other governmental and nongovernmental sources in the U.S.

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Introduction

Background. The Experimental Software Project in the Wisconsin Center for Education Research was initiated with the purpose of exploring a variety of new technologies and approaches to software development. The original proposal envisioned a collaborative effort in which a team of investigators would participate in developing a coherent approach to the use of microcomputers in educational research. The departure of Professor Alex Wilkinson resulted in a shift in direction in the project away from the collaborative venture originally planned.

The project came to focus on the application of new technologies to the creation of rich environments for writing. A low-cost microcomputer system was assembled (Dickson, Neal, & Gillingham, 1984) that included a microcomputer, speech synthesis, voice recognition, and a video disk player. In addition, a variety of alternative input devices were explored, including light pens, touch tablets, mice, and joysticks.

In order to take advantage of this rich variety of hardware and peripherals, considerable effort was devoted to designing software that permitted the smooth integration of these different technologies. In retrospect it is discouraging to reflect on how many weeks and months were spent in obtaining the various cables, interface cards, dip switch settings, and software utilities, as well as in writing and debugging our own software.

In the end, we succeeded in developing the "Integrated Writing Environment" software, which is included in this final report. The "Talking Text Editor," which is one part of the larger system, was used in a dissertation (Borgh, 1985) study of the effects of spoken feedback on children's writing. A number of pilot studies were conducted using

the "Video Browser" program in conjunction with the "Talking Text Editor." A small number of elementary school students were also observed using the voice recognition system to interact with the computer.

The outcome of these observations led me to a fundamentally different perspective on what might be the most profoundly important uses of microcomputers in education. This perspective was described in my paper on "thought provoking software" (Dickson, 1985).

During the past months, the software developed in the project has been cleaned up, debugged, and made more user-friendly. Programs that resided on a number of disks have now been brought together on a single disk (titled "Integrated Writing Environment") containing the most important programs developed in the project. The programs have also been adapted so that they can be explored by users who do not have the full multi-media system developed in the Wisconsin Center for Education Research.

In this final report, I will summarize some of the observations we have made and the software products developed.

Talking Text Editor

Over the two years of the Experimental Software Project, we examined a large number of educational software programs. I was involved in reviewing software for Family Computing magazine and for "The New Tech Times," a television program produced for public television. Although parts of some of the software that I reviewed was intriguing, much of it was disappointing. In addition, observations of computer use in schools from preschool through university levels produced a growing sense of the wide disparity between the claims being made for the potential impact of microcomputers on education and the reality I observed.

As did a number of other educators, I became convinced that the major application of microcomputers in schools that held significant promise for substantial impact in the next ten years was in the general area of writing. We, therefore, gave priority to thinking about how the new technologies we were studying might be used to augment the application of microcomputers to writing.

Speech synthesis is a technology that has advanced rapidly in the past few years, so that it is now possible to equip a microcomputer with an acceptable speech synthesizer for about \$200. At the time we began working on the application of speech synthesis to writing, no commercial word processors were available that included the option of having the computer read aloud the sentences written.

We developed a simple but adequate text editor, "Talking Text Editor," (Appendix A) that could be easily used by children as young as grade one. The text editor allows a child to enter lines in a story and as soon as the child enters a terminal punctuation mark (period,

question mark, or exclamation point), the computer automatically reads the sentence aloud and asks the child whether he or she wishes to hear it again, change it, or leave it the way it is. The child has the option of hearing the whole story at any time.

Pilot testing this software gave hints that children were more likely to detect mistakes in their writing when they heard it read back aloud.

Borgh decided to follow up on these observations in her dissertation, which was supported by the Project. The results of her dissertation (Borgh, 1985), which were presented at the 1986 meeting of the American Educational Research Association (Borgh, 1986), confirmed our hypotheses. Children in grades two and five wrote four stories using the Talking Text Editor. For two of the stories the spoken feedback was eliminated. The results showed that children engaged in between three and seven times more editing under the spoken feedback condition as compared with the no spoken feedback condition. A manuscript from this dissertation has been submitted for review. Copies of the dissertation and manuscript are included with this report.

Video Browser Program

The Experimental Software Project also explored potential applications of videodisks in education. We looked at several videodisks, including ones designed to teach specific topics, such as high school economics and college chemistry, as well as more general videodisks, such as the "First National Kids Videodisc" and a videodisk containing 50,000 archival pictures from the Smithsonian Institution.

These explorations led to feelings of intense dissonance over the gulf between the extraordinary potential of the videodisk technology and the difficulty in assimilating this technology into education. Some of the most carefully developed instructional materials using videodisks, such as one devoted to the single topic of high school economics, seem unlikely to be widely used and seemed to us to be only slightly better than other media for presenting the same content.

Our experience with the videodisk from the Smithsonian gave me a perspective on how videodisks might be used in schools that is quite different from that common among instructional media designers. The videodisk from the Smithsonian Institution came with no documentation or catalog. The videodisk contained an absolutely fascinating collection of colorful pictures of almost every imaginable subject matter distributed almost at random across the disk. Photographs of astronauts were juxtaposed with native Americans, panda bears, insects, and old musical instruments. We decided to create a simple catalog for our use but after a few days realized that we were not making much progress.

I did a simple calculation and found that if we looked at each image on the videodisk for only one minute (the minimum to write down

even a two or three word description), it would require someone to work 40 hours a week for half a year to look at each image only once! So we abandoned the notion of cataloging the disk.

We also determined that it would require a hard disk, expensive data base software, and a substantial number of person-years to create such a catalog. I concluded that the sheer potential of videodisks may turn out to be a massive impediment to their successful use in schools.

This led us to develop the "Video Browser" program, that is included in the "Integrated Writing Environment" software. This program is simple enough for a first grader to use. It permits anyone to "browse" through a videodisk by pressing the arrow keys on a microcomputer. When the user sees an image of interest, it can be added to his or her file by simply pressing "K" for "Keep". This little program, which requires only 7K of memory, essentially allows a user to treat any videodisk as a collection of pictures from which to sample. An analogy may be drawn to having a very large box full of color slides. A teacher might use a program like the "Video Browser" to select a set of "slides" to show to the class ^{IN} connection with a social studies unit on native Americans, for example. Given a videodisk with a wide variety of images, the potential uses in a classroom would be quite broad.

The "Video Browser" can help make the videodisk more accessible to teachers and students without requiring the larger data base programs required for more comprehensive uses of videodisks. This program can be seen as small-scale technology that allows the teacher or student to use the videodisk as a tool in ways they wish to use it. This approach contrasts sharply with that taken by designers of instructional

packages, where the videodisk is designed to teach a particular content in relatively constrained fashion.

Articulating the Video Browser with the Talking Text Editor

The Name Frames Program

The Experimental Software Project next sought to articulate the videodisk with the word processor in order to allow writers to insert into their writings images taken from a videodisk.

We found that children and adults seem better able to make use of the images they select if they are able to name the images. The "Name Frames" program, that is included in the "Integrated Writing Environment," was developed as a bridge between the "Video Browser" and the "Talking Text Editor." In this program, which the user can enter automatically on leaving the "Video Browser," the user can review the pictures selected and name them.

In the same spirit discussed above, there is a fundamentally different relationship between user and videodisk when the user is able to name the images with whatever name is most useful, as opposed to having to remember a frame number or remember the name given in a data base of someone else's devising. Indeed, the same image might be used in multiple ways and named accordingly.

Integrating Videodisk with Word Processors

The next step in our attempt at creating a rich, integrated writing environment was to articulate the videodisk with the word processor.

The version of the "Name Frames" program in the "Integrated Writing Environment" software allows the user to go directly from naming the images into the "Talking Text Editor" program. Within the augmented text editing program, the user can insert pictures from the videodisk into the story he or she is writing by simply entering the name given the picture into the story, enclosed in square brackets. When the program detects the square brackets, the name is matched with the names in the users file, and the image from the videodisk is displayed as the text is scrolled by pressing the return key.

We conducted pilot tests with a small number of elementary school children in our laboratory. The students seemed to be enthusiastic about the effectively unlimited number of pictures they could look at and choose from. The variety of pictures seemed to lead to whimsical, creative stories.

Although I do not have hard data on a large sample to support it, my impression is that the augmentation of the word processor with images of the kind available with videodisks would help create a highly stimulating writing environment.

It is worth mentioning that this same system would allow a teacher, or student, to create a "slide show" out of images selected from the videodisk. By using the text editor and entering the names of the images in the desired order, a teacher could, for example, have a highly flexible tool to extend the kind of teaching commonly done with

filmstrips or boxed sets of slides. The attractive features of using a videodisk in this fashion include the extraordinary number of images available and the possibility of reordering and intermingling the images for different purposes. The images also do not become disordered with use, as can occur if students are allowed to sort through sets of slides, for example.

Voice Recognition

The multi-media system developed in the Experimental Software Project included voice recognition. The system we used could recognize up to eighty words for an individual user. Each user must first train the computer to recognize his or her voice. The users voice patterns are stored on disk for later use.

We conducted a small pilot study of several elementary school students using voice recognition with several different pieces of software. The most interesting application of voice recognition that we observed was with the programming language, Logo. The students we observed trained the computer to recognize key Logo commands, such as "FORWARD," "PENUP", and "COLOR". We then gave them assignments to draw certain shapes with the Logo turtle, as is commonly done in computer programming classes. We had the students contrast programming under voice control with typing in commands on the keyboard.

The students reported, and our observations confirmed, that programming the turtle under voice control was much more engaging. The students commented that when they used the keyboard, the turtle usually had already moved before they looked up from the keyboard, whereas with voice recognition the students' eyes were focussed directly on the turtle. In view of the widespread interest in Logo as an instructional tool, I believe that further research on programming Logo under voice control should be conducted. Our small scale study suggests this might be a fruitful area for investigation.

Concluding Comments

The topics raised in this report offer many interesting points of departure for further research. The Experimental Software Project, true to its name, developed several innovative software programs. Most importantly, the immersion in a wide variety of technologies led me to a fundamentally different perspective on educational uses of computers than I had at the outset of this project.

Undoubtedly, by trying to explore so many different kinds of hardware and software, the project was unable to pursue any of them in sufficient depth. Each new program was infested with bugs. Each new interface board spoke a different language.

But the "Integrated Writing Environment" we have created can serve as a prototype for the work station of the near future in our schools. Speech synthesis can be added to microcomputers for about \$200. Compact videodisks are becoming available at costs hardly exceeding that of a disk drive. Voice recognition can be added to microcomputers for about \$1000.

What is needed is a vision of how to articulate these different systems and integrate them into classrooms and the curriculum. The explorations conducted in the Experimental Software Project suggest that the potential benefits of such an integrated approach may be great but they may also be difficult to achieve.

References

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APPENDIX A

TALKING TEXT EDITOR

```

-----
100  REM -----
-----
110  REM  TALKING TEXT EDITOR
-----
120  REM -----
-----
1000 HIMEM: 16382
-----
1005 P2R = 6 * 4096
      : DIM AL(2),AH(2)
-----
1010 NUMQUES = - 1
      : PTR = 16640
      : D$ = CHR$(4)
-----
1015 GOSUB 8000
-----
1017 C$ = STRY$
      : GOSUB 62000
      : C$ = "BY"
      : GOSUB 62000
      : C$ = NAME$
      : GOSUB 62000
      : PRINT
-----
1019 REM
(cJ)
(cJ)"main body
(cJ)
-----
1020 NUMQUES = NUMQUES + 1
-----
1030 HI = INT (PTR / 256)
      : LO = 256 * (PTR / 256 - HI)
      : LC = (16384 + (NUMQUES * 2))
      : POKE LC,LO
      : POKE (LC + 1),HI
-----
1040 PRINT RIGHT$ (" " + STR$(NUMQUES + 1),2);": ";
-----
1050 DL$ = "."
      : GET A$
      : POKE P2R, ASC (A$)
      : P2R = P2R + 1
      : IF A$ = DL$ THEN 9000
-----
1060 OV = (37)

```

```

-----
1070 OLD = PTR
    : CH = 1
    : GOSUB 2020
    : POKE PTR, ASC (DL$)
    : PTR = PTR + 1
-----
1080 OLD = PTR
    : GOSUB 3000
-----
1095 PRINT
    : PRINT
    : PRINT
-----
1090 VTAB 22
    : PRINT "C)HANGE W)HOLE STORY N)EXT";
    : IF (VOT) AND (SOUND) THEN PRINT " H)EAR";
-----
1092 IF VID THEN PRINT
    * : PRINT "P)ICTURES";
-----
1095 GET A$
    : POKE P2R, ASC (A$) + 128
    : P2R = P2R + 1
    : IF A$ = "c" OR A$ = "C" THEN GOTO 10000
-----
1100 IF (A$ = "H" OR A$ = "h") AND (VOT) THEN PRINT
    * : GOSUB 3000
    * : GOTO 1090
-----
1102 IF (VID) AND (A$ = "P" OR A$ = "p") THEN GOSUB 8900
    * : GOSUB 7005
    * : GOTO 1085
-----
1105 IF A$ = "W" OR A$ = "w" THEN GOSUB 5000
    * : GOTO 1090
-----
1110 IF A$ < > "N" AND A$ < > "n" THEN 1095
-----
1140 GOSUB 7000
-----
1500 PTR = OLD
    : GOTO 1020
-----
1990 GET A$
    : IF NOT ((A$ = "y") OR (A$ = "Y") OR (A$ = "n") OR (A$ = "N")) THEN 1990
-----
1992 POKE P2R, ASC (A$) + 128
    : P2R = P2R + 1
-----

```

```

1995 PRINT A$
      : RETURN
-----
2000 REM
(cj)
(cj)"input routine
(cj)
-----
2010 GET A$
      : POKE P2R, ASC (A$)
      : P2R = P2R + 1
      : CH = CH + 1
-----
2020 IF (A$ = ".") OR (A$ = "!") OR (A$ = "?") THEN DL$ = A$
      * : PRINT DL$
      * : RETURN
-----
2030 IF (A$ = CHR$ (8)) AND (PTR < > OLD) THEN PTR = PTR - 1
      * : CH = CH - 1
      * : PRINT A$;" ";A$;
      * : GOTO 2010
-----
2035 IF A$ = "[" OR A$ = "]" THEN 2050
-----
2040 IF NOT ((A$ > = " " AND A$ < = "Z") OR (A$ > = "a" AND A$ < = "z")) THEN
      PRINT CHR$ (7);
      * : GOTO 2010
-----
2050 PRINT A$;
      : POKE PTR, ASC (A$)
      : PTR = PTR + 1
-----
2060 GOTO 2010
-----
2200 REM
(cj)
(cj)"STUFF
(cj)
-----
2210 VTAB X
      : HTAB 1
      : CALL - 958
      : RETURN
-----
2250 POKE - 16368,0
-----
2255 IF PEEK ( - 16384) < > 141 THEN 2255
-----
2260 POKE - 16368,0
      : RETURN

```

```

-----
3000  REM
      (cJ)
      (cJ)"speak a sentence.
      (cJ)
-----
3005  GOSUB 3990
-----
3007  PIC = 0
      : IF CHR$ ( PEEK (PTR)) = "[" THEN PIC = 1
-----
3010  GOSUB 4000
      : IF LEFT$ (W$,1) = "[" THEN GOSUB 8800
-----
3015  IF RIGHT$ (W$,1) = "!" THEN W$ = LEFT$ (W$, LEN (W$) - 1)
-----
3020  IF (SOUND) AND (VOT) THEN PRINT D$;"PR#2"
      * : PRINT W$
      * : PRINT D$;"PR#";SL
-----
3030  IF NOT (W) THEN 3010
-----
3040  RETURN
-----
3990  LC = 16384 + (NUMQUES * 2)
      : PTR = 256 * PEEK (LC + 1) + PEEK (LC)
      : RETURN
-----
4000  REM
      (cJ)
      (cJ)"get a word.
      (cJ)
-----
4010  W$ = ""
      : W = 0
-----
4020  X$ = CHR$ ( PEEK (PTR))
      : IF (X$ = ".") OR (X$ = "!") OR (X$ = "?") THEN W = 1
      * : W$ = W$ + X$
      * : RETURN
-----
4025  IF PIC THEN 4050
-----
4030  IF (X$ = " ") AND W$ ( ) "" THEN W$ = W$ + " "
      * : PTR = PTR + 1
      * : RETURN
-----
4050  W$ = W$ + X$
-----
4060  PTR = PTR + 1

```

```

: GOTO 4020
-----
5000 REM
(cJ)
(cJ)"speak & list story.
(cJ)
-----
5005 HOME
: C$ = STRY$
: GOSUB 62000
: C$ = "BY"
: GOSUB 62000
: C$ = NAME$
: GOSUB 62000
: PRINT
-----
5006 REM IF(SOUND) AND (VOT) THEN: PRINT D$"PR#2":C$ = STRY$: GOSUB 62000:C
$ = "BY": GOSUB 62000:C$ = NAME$: GOSUB 62000: PRINT D$"PR#";SL: PRI
NT
-----
5010 TEMP = NUMQUES
: FOR NUMQUES = 0 TO TEMP
-----
5015 GOSUB 3990
: PRINT RIGHT$ (" " + STR$ (NUMQUES + 1),2);": ";
-----
5020 GOSUB 5500
: PRINT
: GOSUB 3000
-----
5030 IF INT ((NUMQUES + 1) / 22) < > (NUMQUES + 1) / 22 THEN 5050
-----
5040 GOSUB 2250
-----
5050 NEXT
: NUMQUES = TEMP
-----
5055 PRINT
: PRINT
: PRINT
-----
5056 RETURN
-----
5060 VTAB PEEK (37) - 2
: RETURN
-----
5070 POP
: GOTO 10000
-----
5500 REM
(cJ)

```



```

(cj)"list a line
(cj)
-----
5510
   : C = 5
   : PIC = 0
-----
5520 GOSUB 4000
   : IF LEN (W$) + C > COL THEN PRINT
   * : PRINT " ";
   * : C = 5
-----
5525 IF LEFT$ (W$,1) = " " AND C = 5 AND LEN (W$) < > 1 THEN W$ = RIGHT$ (W$,
      LEN (W$) - 1)
   * : GOTO 5525
-----
5527 IF W$ = " " AND C = 5 THEN 5520
-----
5530 PRINT W$;
   : C = C + LEN (W$)
-----
5540 IF W THEN RETURN
-----
5550 GOTO 5520
-----
6000 REM
(cj)
(cj)"Edit last line.
(cj)
-----
6005 GOSUB 6010
   : OLD = PTR
   : PRINT RIGHT$ (" " + STR$ (NUMQUES + 1),2);": ";
   : GOSUB 2000
   : POKE PTR, ASC (DL$)
   : PTR = PTR + 1
   : OLD = PTR
   : GOSUB 3060
   : GOSUB 7005
   : GOTO 1090
-----
6010 VTAB 22
   : HTAB 1
   : CALL - 958
   : GOSUB 3990
   : TTEMP = PTR
-----
6015 PRINT RIGHT$ (" " + STR$ (NUMQUES + 1),2);": ";
-----

```

```

6020 GOSUB 5500
-----
6030 PRINT
      : PRINT
      : PRINT "REPLACE LINE NUMBER "; RIGHT$ (" " + STR$ (NUMQUES + 1),2)
-----
6040 PTR = T1EMP
      : RETURN
-----
7000 REM
(cJ)
(cJ)"List the story.
(cJ)
-----
7003 IF NOT (CH > 35) THEN X = OV + 2 * (OV < 20) + 1 * (OV > 19)
      * : GOSUB 2200
      * : RETURN
-----
7005 HOME
      : C$ = STRY$
      : GOSUB 62000
      : C$ = "BY"
      : GOSUB 62000
      : C$ = NAME$
      : GOSUB 62000
      : PRINT
-----
7010 TEMP = NUMQUES
      : FOR NUMQUES = 0 TO TEMP
-----
7020 GOSUB 3990
      : PRINT RIGHT$ (" " + STR$ (NUMQUES + 1),2);": ";
-----
7030 GOSUB 5500
-----
7035 IF INT ((NUMQUES + 1) / 22) < > (NUMQUES + 1) / 22 THEN 7040
-----
7036 GOSUB 2250
-----
7040 PRINT
      : NEXT
      : NUMQUES = TEMP
-----
7050 PRINT
      : PRINT
      : PRINT
      : VTAB PEEK (37) - 2
-----
7060 RETURN
-----

```

```

8000  REM
      (cJ)
      (cJ)"query.
      (cJ)
-----
8001  POKE 768,160
      : POKE 769,0
      : POKE 770,32
      : POKE 771,44
      : POKE 772,254
      : POKE 773,96
-----
8003  HOME
      : C$ = "TALKING TEXT EDITOR"
      : GOSUB 62010
      : PRINT
      : C$ = "DESIGNED BY PATRICK DICKSON"
      : GOSUB 62010
      : PRINT
      : C$ = "PROGRAMMED BY"
      : GOSUB 62010
      : PRINT
      : C$ = "DAN JATNIEKS AND CURT ELLMANN"
      : GOSUB 62010
      : PRINT
      : C$ = "VERSION: JULY 19, 1986"
      : GOSUB 62010
      : GOTO 8006
-----
8005  INPUT "DO YOU HAVE 80 COLUMNS? -->";IN$
      : IF IN$ = "Y" OR IN$ = "y" THEN COL = 80
      * : SL = 3
      * : GOTO 8008
-----
8006  COL = 40
      : SL = 0
-----
8008  PRINT
      : PRINT
      : INPUT "DO YOU HAVE A VIDEO DISK? (Y/N)";IN$
      : IF IN$ = "N" OR IN$ = "n" THEN 8011
-----
8009  PRINT D$"BRUN VIDEO.CODE"
      : POKE 9,3
      : VID = 1
-----
8010  & "PLAY"
-----
8011  INPUT "DO YOU HAVE A VOTRAX? ";IN$
      : IF IN$ = "Y" OR IN$ = "y" THEN VOT = 1

```

```

* : SOUND = 1
-----
8012  LD = 0
-----
8015  PRINT
      : INPUT "LOAD EXISTING STORY? ";IN$
      : IF IN$ = "Y" OR IN$ = "y" THEN LO = 1
-----
8019  PRINT D$"PR#";SL
      : HOME
      : PRINT
      : PRINT
      : INPUT "WHAT IS YOUR NAME? -->";NAME$
-----
8020  INPUT "WHAT IS THE STORY NAME? -->";STRY$
-----
8021  INPUT "WHAT IS THE DATE? -->";DTE$
-----
8025  N = 3
      : R$ = "2R" + STR$(N)
      : IF SOUND THEN PRINT D$"PR#2"
      * : PRINT R$
      * : PRINT D$"PR#";SL
-----
8030  IF NOT (VID) THEN HOME
      * : RETURN
-----
8032  PRINT
      : INPUT "DO YOU WANT TO INCLUDE PICTURES ? ";IN$
      : IF IN$ < > "Y" AND IN$ < > "y" THEN 8034
-----
8033  INPUT "ENTER PICTURE FILE NAME :";F$
      : F$ = F$ + ".FRAMES.NAMED"
      : GOSUB 8500
-----
8034  IF LO THEN F$ = STRY$ + "." + NAME$ + "." + DTE$
      * : GOTO 8600
-----
8035  HOME
      : RETURN
-----
8037  N = 3
      : GOTO 8055
-----
8040  INPUT "CHANGE THE SPEECH RATE? (Y/N) -->";IN$
      : IF IN$ = "N" OR IN$ = "n" THEN HOME
      * : PRINT
      * : RETURN
-----
8050  INPUT "ENTER NEW SPEECH RATE (1-9) --->";N

```

```

: IF N < 1 OR N > 9 THEN 8050
-----
8055 PRINT
: PRINT "THE SPEECH RATE IS ";N
-----
8060 R$ = "2R" + STR$(N)
: PRINT D$"PR#2"
: PRINT R$;"THIS IS THE SPEECH RATE."
: PRINT D$"PR#";SL
: GOTO 8040
-----
8500 REM
(cJ)
(cJ)"LOAD IN PICTURE FILE
(cJ)
-----
8505 PRINT D$"VERIFY";F$
-----
8510 PRINT D$"OPEN";F$
: PRINT D$"READ";F$
-----
8520 INPUT L
: DIM FR(L)
: DIM NAM$(L)
-----
8530 FOR Z = 1 TO L
: INPUT FR(Z)
: INPUT NAM$(Z)
: NEXT Z
-----
8540 PRINT D$"CLOSE";F$
: RETURN
-----
8600 REM
(cJ)
(cJ)"GET EXISTING FILE
(cJ)
-----
8610 PRINT D$"BLOAD";F$;"A16383"
: NUMQUES = PEEK (16383)
-----
8620 LN = NUMQUES
: X = 0
: FOR NUMQUES = 0 TO LN
: GOSUB 3990
: IF PTR > X THEN X = PTR
* : TEMP = NUMQUES
-----
8630 NEXT
: NUMQUES = TEMP

```

```

: GOSUB 3990
: OLD = PTR
: NUMQUES = NUMQUES - 1
-----
8640 POP
: GOSUB 7005
: OV = PEEK (37) - 1
: GOTO 1090
-----
8800 REM
(cJ)
(cJ)"FIND & DISPLAY PICTURE
(cJ)
-----
8810 W$ = MID$ (W$,2, LEN (W$) - 3)
: FOR Z = 1 TO L
: IF W$ = NAM$(Z) THEN 8820
-----
8815 NEXT Z
: RETURN
-----
8820 C$ = "SEARCH FRAME " + STR$ (FR(Z)) + " SEARCH"
-----
8825 & C$
-----
8827 GOSUB 2250
-----
8828 & "FLIP"
-----
8830 GOSUB 2250
-----
8840 & "FLIP"
-----
8850 POP
: RETURN
-----
8900 REM
(cJ)
(cJ)"LIST PICTURES
(cJ)
-----
8910 HOME
: PRINT
: PRINT
: C$ = "PICTURES AVAILABLE"
: GOSUB 62000
: C$ = "-----"
: GOSUB 62000
: PRINT
: PRINT

```

```

-----
8920 FOR Z = 1 TO L STEP 2
      : PRINT RIGHT$ (" " + STR$ (Z),2);". ";NAM$(Z);
      : HTAB 20
      : IF Z < > L THEN PRINT RIGHT$ (" " + STR$ (Z + 1),2);". ";NAM$(Z + 1)
-----
8925 NEXT
      : PRINT
      : PRINT
      : PRINT
      : PRINT "ENTER NUMBER TO VIEW. "0" TO EXIT : ";
-----
8930 INPUT " ";IN
      : IF IN = 0 THEN RETURN
-----
8935 IF IN > 0 AND IN < = L THEN 8945
-----
8940 GOTO 8930
-----
8945 Z = IN
-----
8946 C$ = "SEARCH FRAME " + STR$ (FR(Z)) + " SEARCH"
-----
8948 & C$
-----
8950 & "FLIP"
-----
8955 GOSUB 2250
      : HOME
-----
8960 & "FLIP"
-----
8970 GOTO 8910
-----
9000 REM
(cJ)
(cJ)"the end.
(cJ)
-----
9020 POKE PTR, ASC (DL$)
      : PTR = PTR + 1
-----
9025 PRINT
      : PRINT
      : INPUT "WHAT IS THE STORY NAME? -->";STRY$
-----
9030 S$ = LEFT$ (STRY$ + "." + NAME$ + "." + DTE$,30)
-----
9035 PRINT
      : PRINT

```

```

: PRINT "GOODBYE ";NAME$;" , HAVE A NICE DAY!"
: GOTO 9045
-----
9040 PRINT "YOUR FILE IS ";PTR - 16384;" BYTES LONG"
-----
9045 POKE 16383,NUMQUES
-----
9050 PRINT CHR$(04);"BSAVE";S$;" ,A16383,L"; STR$(PTR - 16393)
-----
9060 REM
(cJ)
(cJ)"Save history file
(cJ)
-----
9070 S$ = S$ + ".HST"
-----
9080 PRINT CHR$(04);"BSAVE";S$;" ,A24576,L"; STR$(P2R - 24576)
-----
9090 PRINT
: INPUT "DO YOU WANT TO WRITE ANOTHER STORY? ";IN$
: IF IN$ = "Y" OR IN$ = "y" THEN RUN
-----
9095 END
-----
10000 REM
(cJ)
(cJ)"change any line
(cJ)
-----
10005 X = 22
: GOSUB 2200
-----
10007 INPUT "CHANGE WHICH LINE? -->";IN$
: IF LEN (IN$) = 0 THEN 10000
-----
10010 FOR X = 1 TO LEN (IN$)
: POKE P2R, ASC ( MID$( IN$,X,1))
: P2R = P2R + 1
: NEXT X
: N = VAL (IN$)
: IF N > NUMQUES + 1 OR N < 1 THEN 10000
-----
10015 N = N - 1
-----
10016 LN = NUMQUES
: N1 = N
-----
10017 X = 0
: FOR NUMQUES = 0 TO LN
: GOSUB 3990

```



```

: IF PTR > X THEN X = PTR
* : TEMP = NUMQUES
-----
10018 NEXT
-----
10020 NUMQUES = N1
: GOSUB 3990
: N = PTR
-----
10025 X = N
: O = N
: LIM = N
: GOSUB 10500
: AL(0) = XL
: AH(0) = XH
: REM " TO addr.
-----
10040 GOSUB 10600
-----
10050 X = N + 1
: O = X - O
: GOSUB 10500
: AL(1) = XL
: AH(1) = XH
: REM " FROM addr.
-----
10060 NUMQUES = TEMP
: GOSUB 3990
: N = PTR
: GOSUB 10600
-----
10065 IF X - 1 = N THEN 6000
-----
10070 X = N
: GOSUB 10500
: AL(2) = XL
: AH(2) = XH
: REM " THRU addr.
-----
10073 NUMQUES = N1
: GOSUB 6010
-----
10075 X = X + 1
: GOSUB 10500
: NUMQUES = N1
: GOSUB 3990
: POKE LC,XL
: POKE LC + 1,XH
-----
10080 POKE 66,AL(0)

```

```

: POKE 67,AH(0)
: POKE 60,AL(1)
: POKE 61,AH(1)
: POKE 62,AL(2)
: POKE 63,AH(2)
: CALL 768

```

```

-----
10090 FOR NUMQUES = 0 TO LN
:   GOSUB 3990
:   X = 256 * PEEK (LC + 1) + PEEK (LC)
:   IF X > LIM THEN X = X - 0
* :   GOSUB 10500
* :   POKE LC,XL
* :   POKE LC + 1,XH

```

```

-----
10095 NEXT

```

```

-----
10100 NUMQUES = N1
:   GOSUB 3990
:   OLD = PTR

```

```

-----
10110 PRINT RIGHT$ (" " + STR$ (NUMQUES + 1),2);": ";
:   GOSUB 2000
:   POKE PTR, ASC (DL$)
:   PTR = PTR + 1
:   OLD = PTR
:   GOSUB 3000

```

```

-----
10160 NUMQUES = LN
:   GOSUB 7005
:   GOTO 1090

```

```

-----
10500 XH = INT (X / 256)
:   XL = 256 * (X / 256 - XH)
:   RETURN

```

```

-----
10600 X$ = CHR$ ( PEEK (N))
:   IF X$ = "!" OR X$ = "?" OR X$ = "." THEN 10620

```

```

-----
10610 N = N + 1
:   GOTO 10600

```

```

-----
10620 RETURN

```

```

-----
62000 REM
(cJ)
(cJ)"center a line
(cJ)

```

```

-----
62010 HTAB 20 - LEN (C$) / 2 = 1

```

: PRINT C\$
: RETURN

VIDEO BROWSER PROGRAM

Appendix B

```

-----
10  PRINT CHR$(4)"BRUN VIDEO.CODE"
   : POKE 9,3
-----
20  HIMEM: 29179
-----
30  & "PLAY"
-----
40  D$ = CHR$(4)
   : ADDR = 29184
   : GOSUB 10000
-----
50  FRAME = 1
   : C$ = "FRAME CHAPTER"
-----
55  & C$
-----
60  IF FIRST = 0 THEN FIRST = 56001
   * : LAST = 0
-----
70  & "FLIP"
   : GOTO 1030
-----
1000 REM
(cJ)
(cJ)"MAIN PROGRAM BODY
(cJ)
-----
1005 & "FLIP"
-----
1010 C$ = "SEARCH FRAME " + STR$(FRAME) + " SEARCH"
-----
1015 & C$
   : GOTO 1030
-----
1017 C$ = "STEPREV"
   : FRAME = FRAME - 1
   : IF REVIEW THEN D = - 1
   * : GOSUB 9500
-----
1020 IF FRAME < 1 THEN FRAME = 1
   * : C$ = "SEARCH FRAME 1 SEARCH"
-----
1021 GOTO 1025
-----
1022 C$ = "STEPFWD"
   : FRAME = FRAME + 1
   : IF REVIEW THEN D = 1

```

```

* : GOSUB 9500
-----
1023 IF FRAME > 56000 THEN FRAME = 56000
* : C$ = "SEARCH FRAME 56000 SEARCH"
-----
1025 & C$
-----
1030 REM
-----
1040 GET A$
      : PRINT
      : IF ASC (A$) = 8 THEN 1017
-----
1045 IF ASC (A$) = 21 THEN 1022
-----
1047 HOME
-----
1050 & "FLIP"
-----
2000 HOME
      : GOSUB 9000
      : IF TEST THEN I$ = " IN "
* : GOTO 2010
-----
2005 I$ = " NOT IN "
-----
2010 PRINT "CURRENT FRAME IS ";FRAME
      : PRINT "IT IS ";
      : INVERSE
      : PRINT I$;
      : NORMAL
      : PRINT "YOUR FILE."
-----
2020 PRINT
      : PRINT
      : PRINT "K)EEP THIS FRAME"
      : PRINT "D)ELETE THIS FRAME"
      : PRINT "G)O TO NEW FRAME NUMBER"
      : PRINT "R)EVIEW FRAMES IN CURRENT FILE"
      : PRINT "Q)UIT"
-----
2030 PRINT
      : PRINT
      : PRINT "ANY OTHER KEY RESUMES BROWSING."
      : PRINT "      -> BROWSE FORWARD"
      : PRINT "      <- BROWSE BACKWARD"
-----
2040 PRINT
      : PRINT
      : PRINT "ENTER SELECTION : ";

```

```

-----
2050 GET A$
      : PRINT A$;
-----
2060 IF A$ = "Q" THEN 2200
-----
2070 IF A$ = "R" THEN REVIEW = 1
      * : GOTO 2097
-----
2080 IF A$ = "G" THEN 2100
-----
2090 IF A$ = "D" THEN GOSUB 8000
      * : GOTO 2000
-----
2092 IF A$ = "K" THEN GOSUB 7000
      * : GOTO 2000
-----
2095 IF REVIEW THEN REVIEW = 0
      * : FRAME = F1
      * : GOTO 1000
-----
2097 & "FLIP"
      : F1 = FRAME
      : GOTO 1030
-----
2100 REM
(cJ)
(cJ)"ENTER FRAME #
(cJ)
-----
2105 PRINT
      : PRINT
      : PRINT
-----
2110 PRINT
      : PRINT "CURRENT FRAME IS ";FRAME
      : INPUT "ENTER NEW FRAME # : ";T1
-----
2120 IF T1 < 1 OR T1 > 56001 THEN 2110
-----
2130 FRAME = INT (T1)
      : GOTO 1000
-----
2200 REM
(cJ)
(cJ)"SAVE" FILE
(cJ)
-----
2210 HOME
      : VTAB 11

```

```

: INPUT "FILENAME TO SAVE :";F$
-----
2215 FLASH
: PRINT "SAVING ";F$
: NORMAL
: PRINT " MAY TAKE SEVERAL MINUTES..."
-----
2216 PRINT
: PRINT " DEPENDING ON FRAME NUMBERS CHOSEN."
-----
2217 XH = INT (FIRST / 256)
: POKE 29180,XH
: POKE 29181,256 * (FIRST / 256 - XH)
-----
2218 XH = INT (LAST / 256)
: POKE 29182,XH
: POKE 29183,256 * (LAST / 256 - XH)
-----
2220 PRINT D$"BSAVE ";F$;" .PICS,A29:80,L7004"
-----
2225 F$ = F$ + ".FRAMES"
-----
2230 PRINT D$"OPEN";F$
: PRINT D$"DELETE";F$
: PRINT D$"OPEN";F$
: PRINT D$"WRITE";F$
-----
2235 PRINT COUNT
-----
2240 FOR Z1 = FIRST TO LAST
: FRAME = Z1
: GOSUB 9000
: IF TEST THEN PRINT Z1
-----
2245 NEXT Z1
-----
2250 PRINT D$"CLOSE";F$
-----
2255 HOME
: VTAB 11
-----
2260 INPUT "DO YOU WANT TO NAME THESE FRAMES NOW TYPE Y FOR YES N FOR N."
: IN$
-----
2270 IF IN$ = "Y" OR IN$ = "y" THEN PRINT D$"RUN NAME FRAMES"
-----
2290 HOME
: END
-----
2300 REM
(CJ)

```

```

(cj)*LOAD A FILE
(cj)
-----
2305 PRINT
   : PRINT
   : PRINT "OMIT '.PICS' SUFFIX IN FILENAME."
   : PRINT
-----
2310 INPUT "NAME OF FILE TO LOAD :";F$
-----
2320 PRINT D$"BLOAD";F$;".PICS,A29180"
-----
2325 FIRST = 256 * PEEK (29180) + PEEK (29181)
-----
2326 LAST = 256 * PEEK (29182) + PEEK (29183)
-----
2330 PRINT D$"OPEN";F$;".FRAMES"
   : PRINT D$"READ";F$;".FRAMES"
-----
2340 INPUT COUNT
   : PRINT D$"CLOSE";F$;".FRAMES"
-----
2350 RETURN
-----
6000 REM
(cj)
(cj)*GET A RETURN
(cj)
-----
6010 GET A$
   : IF ASC (A$) < > 13 THEN 6010
-----
6020 PRINT
   : RETURN
-----
7000 REM
(cj)
(cj)*ADD A PICTURE
(cj)
-----
7002 COUNT = COUNT + 1
-----
7005 GOSUB 9000
   : IF TEST THEN RETURN
-----
7010 POKE (YTE, PEEK (BYTE) + 2 * BIT
-----
7020 IF FRAME > LAST THEN LAST = FRAME
-----

```



```

7025 IF FRAME < FIRST THEN FIRST = FRAME
-----
7030 RETURN
-----
8000 REM
(cj)
(cj)"DELETE A PICTURE
(cj)
-----
8005 GOSUB 9000
      : IF NOT (TEST) THEN RETURN
-----
8007 COUNT = COUNT - 1
-----
8010 T1 = PEEK (BYTE) - 2 ^ BIT
-----
8020 IF T1 < 0 THEN STOP
-----
8030 POKE BYTE,T1
-----
8040 IF FRAME = LAST THEN D = - 1
      * : GOTO 8065
-----
8050 IF FRAME = FIRST THEN D = 1
      * : GOTO 8065
-----
8060 RETURN
-----
8065 F1 = FRAME
      : IF LAST = FIRST THEN LAST = 0
      * : FIRST = 56001
      * : RETURN
-----
8070 FRAME = FRAME + D
      : GOSUB 9000
      : IF NOT (TEST) THEN 8070
-----
8075 IF D = - 1 THEN LAST = FRAME
      * : FRAME = F1
      * : RETURN
-----
8080 IF D = 1 THEN FIRST = FRAME
      * : FRAME = F1
      * : RETURN
-----
8085 STOP
-----
9000 REM
(cj)
(cj)"TEST PICTURE
(cj)

```

```

-----
9010  BYTE = ADDR + INT (FRAME / 8)
-----
9020  BIT = INT ((FRAME / 8 - INT (FRAME / 8)) * 8 + .05) * SGN (FRAME / 8)
-----
9030  T1 = PEEK (BYTE)
      : IF T1 = 0 THEN 9080
-----
9050  FOR Z = 0 TO BIT
-----
9060      T1 = INT (T1)
      : T1 = T1 / 2
      : NEXT
-----
9070  IF INT (T1) < > T1 THEN TEST = 1
      * : RETURN
-----
9080  TEST = 0
      : RETURN
-----
9500  REM
      (cJ)
      (cJ)*REVIEW FRAMES
      (cJ)
-----
9510  GOSUB 9000
      : IF TEST THEN RETURN
-----
9520  FRAME = FRAME + D
      : IF (FRAME < FIRST) THEN FRAME = FIRST
      * : GOTO 9540
-----
9525  IF (FRAME > LAST) THEN FRAME = LAST
      * : GOTO 9540
-----
9530  GOSUB 9000
      : IF NOT (TEST) THEN 9520
-----
9540  C$ = "SEARCH FRAME " + STR$(FRAME) + " SEARCH"
      : RETURN
-----
10000 REM "INITIALIZE"
-----
10001 HOME
      : C$ = "VIDEO BROWSER PROGRAM"
      : GOSUB 20000
-----
10002 PRINT
      : C$ = "DEVELOPED AS PART OF"

```

```

-----
: GOSUB 20000
-----
10003 PRINT
: C$ = "THE EXPERIMENTAL SOFTWARE PROJECT"
: GOSUB 20000
-----
10005 VTAB 18
: C$ = "INITIALIZING ARRAY"
: GOSUB 20000
-----
10006 PRINT
: C$ = "THIS WILL TAKE ABOUT ONE MINUTE"
: GOSUB 20000
-----
10010 A = ADDR
: B = A + 7000
-----
10020 FOR Z = A TO B STEP 2
: POKE Z,0
: POKE Z + 1,0
: NEXT
-----
10030 & "SEARCH FRAME 1 SEARCH"
-----
10100 HOME
: C$ = "VIDEO BROWSER PROGRAM"
: GOSUB 20000
-----
10102 PRINT
: C$ = "ALLOWS YOU TO SELECT PICTURES"
: GOSUB 20000
-----
10104 PRINT
: C$ = "FROM A VIDEO DISK FOR USE WITH"
: GOSUB 20000
-----
10105 PRINT
: C$ = "THE TALKING TEXT EDITOR PROGRAM."
: GOSUB 20000
-----
10110 C$ = "DESIGNED BY W. PATRICK DICKSON"
: PRINT
: PRINT
: GOSUB 20000
-----
10120 C$ = "PROGRAMMED BY DAN JATNIEKS"
: PRINT
: PRINT
: GOSUB 20000
-----

```

```

10130 PRINT
      : PRINT
-----
10135 C$ = "VERSION: JULY 15, 1986"
      : GOSUB 20000
-----
10140 C$ = "(C) 1984, 1986"
      : GOSUB 20000
      : PRINT
-----
10141 C$ = "BY THE BOARD OF REGENTS OF THE"
      : GOSUB 20000
      : C$ = "UNIVERSITY OF WISCONSIN-MADISON"
      : GOSUB 20000
-----
10150 GOSUB 20100
-----
10200 HOME
      : PRINT
      : PRINT "      THIS PROGRAM IS DESIGNED TO ALLOW"
      : PRINT "A USER TO BROWSE THROUGH A VIDEODISK ANDSELECT THE PICTURES THAT"
      : PRINT "ARE OF"
      : PRINT "INTEREST. THE PROGRAM WRITES A FILE"
-----
10210 PRINT "THAT CONTAINS THE FRAME NUMBERS OF THE"
      : PRINT "SELECTED IMAGES."
-----
10250 PRINT
      : PRINT "      THE PROGRAM BEGINS WITH FRAME 1."
      : PRINT "USE THE RIGHT ARROW TO BROWSE THROUGH"
      : PRINT "THE PICTURES. USE THE LEFT ARROW TO"
      : PRINT "BACK UP. PRESS ANY OTHER KEY KEEP A"
-----
10260 PRINT "PICTURE IN YOUR FILE."
      : PRINT
      : PRINT
-----
10270 PRINT "      -> BROWSE FORWARD"
      : PRINT "      <- BROWSE BACKWARD"
      : PRINT "      ANY OTHER KEY TO GO TO MENU."
-----
10280 GOSUB 20100
-----
10290 HOME
      : VTAB 11
      : PRINT "WOULD YOU LIKE TO LOAD AN EXISTING"
      : PRINT "FILE ? (Y/N) -->";
      : GET A$
      : PRINT A$
      : IF A$ = "Y" OR A$ = "y" THEN 2300

```

```
-----  
10300 RETURN  
-----
```

```
20000 HTAB (20 - LEN (C$) / 2)  
: PRINT C$  
: RETURN  
-----
```

```
20100 VTAB 23  
: C$ = "PRESS RETURN TO CONTINUE"  
: GOSUB 20000  
: POKE - 16368,0  
-----
```

```
20110 IF PEEK ( - 16384) ( > ) 141 THEN 20110  
-----
```

```
20120 POKE - 16368,0  
: RETURN  
-----
```

NAME FRAMES PROGRAM

Appendix C

```

-----
2   REM -----
-----
4   REM   NAME FRAMES PROGRAM
-----
6   REM -----
-----
10  D$ = CHR$ (4)
-----
12  PRINT D$"BRUN VIDEO.CODE"
    : POKE 9,3
-----
20  HOME
    : C$ = "NAME FRAMES PROGRAM"
    : GOSUB 20000
-----
22  PRINT
    : C$ = "DEVELOPED AS PART OF"
    : GOSUB 20000
-----
24  PRINT
    : C$ = "THE EXPERIMENTAL SOFTWARE PROJECT"
    : GOSUB 20000
-----
26  PRINT
    : PRINT
    : C$ = "DESIGNED BY PATRICK DICKSON"
    : GOSUB 20000
-----
28  PRINT
    : C$ = "PROGRAMMED BY DAN JATNIEKS"
    : GOSUB 20000
-----
30  PRINT
    : C$ = "VERSION: JULY 15, 1986"
    : GOSUB 20000
-----
31  PRINT
    : PRINT
    : PRINT
-----
32  PRINT
    : PRINT "PLEASE WAIT ABOUT ONE MINUTE."
-----
40  & "PLAY WAIT 150"
-----
42  & "STEPFWD"
-----

```

```

50  HOME
    : C$ = "NAME FRAMES PROGRAM"
    : GOSUB 20000
-----
51  PRINT
    : PRINT
-----
52  PRINT "THIS PROGRAM ALLOWS YOU TO NAME"
-----
54  PRINT
    : PRINT "PICTURES PREVIOUSLY SELECTED WITH"
-----
56  PRINT
    : PRINT "THE VIDEO BROWSER PROGRAM."
-----
58  PRINT
    : PRINT "SUCH PICTURE SETS APPEAR IN THE DISK"
-----
60  PRINT
    : PRINT "CATALOG AS TWO FILES WITH SUFFIXES"
-----
62  PRINT
    : PRINT "OF '.PICS' AND '.FRAMES'."
-----
64  GOSUB 20100
    : HOME
-----
66  PRINT
    : PRINT "ENTER THE PICTURE FILE NAME BELOW"
-----
68  PRINT
    : PRINT "WITHOUT A SUFFIX AND PRESS RETURN."
-----
70  PRINT
    : PRINT "WHEN THE PROGRAM PAUSES,"
-----
72  PRINT
    : PRINT " ALWAYS PRESS RETURN TO GO ON"
-----
74  PRINT
    : PRINT
    : PRINT
    : PRINT
-----
80  INPUT "FILE NAME: ";F$
-----
90  F$ = F$ + ".FRAMES"
-----
100 PRINT D$"OPEN";F$
    : PRINT D$"READ";F$

```

```

-----
110  INPUT L
      : DIM FR(L),NAM$(L)
-----
120  FOR Z = 1 TO L
      : INPUT FR(Z)
      : NAM$(Z) = ""
      : NEXT
-----
130  PRINT D$"CLOSE";F$
-----
140  GOSUB 600
-----
200  HOME
      : Z = 1
-----
210  GOSUB 500
      : Z = Z + 1
      : IF Z <= L THEN 210
-----
300  HOME
      : PRINT
-----
310  FOR Z = 1 TO L
      : T$ = " " + STR$(Z)
      : PRINT RIGHT$(T$,2);". ";NAM$(Z)
      : NEXT Z
-----
320  PRINT
      : INPUT "WANT TO CHANGE ANY NAMES? (Y/N) :";I$
-----
330  IF I$ = "Y" OR I$ = "y" THEN 340
-----
335  IF I$ = "N" OR I$ = "n" THEN 400
-----
337  GOTO 320
-----
340  INPUT "ENTER FRAME TO CHANGE :";Z
      : GOSUB 500
      : GOTO 300
-----
400  PRINT
      : PRINT "ENTER A FILE NAME FOR THESE PICTURES"
      : PRINT
      : INPUT "FILE NAME. ";F$
-----
405  F$ = F$ + ".FRAMES.NAMED"
      : PRINT D$"OPEN";F$
      : PRINT D$"WRITE";F$
-----

```



```

410 PRINT L
-----
420 FOR Z = 1 TO L
      PRINT FR(Z)
      PRINT NAM$(Z)
    NEXT Z
-----
430 PRINT D$"CLOSE";F$
      PRINT
-----
440 HOME
      PRINT "YOU HAVE NOW NAMED THE PICTURES IN"
-----
442 PRINT
      PRINT "YOUR FILE AND SAVED THE NAMED FILE."
-----
444 PRINT
      PRINT "YOU MAY STOP AT THIS POINT AND RETURN"
-----
445 PRINT
      PRINT "LATER BY RUNNING THE 'TALKING TEXT"
-----
446 PRINT
      PRINT "EDITOR' PROGRAM AND NAMING YOUR"
-----
447 PRINT
      PRINT "PICTURE FILE."
-----
448 PRINT
      PRINT "OR YOU MAY GO DIRECTLY INTO THE"
-----
449 PRINT
      PRINT "TALKING TEXT EDITOR NOW AND WRITE"
-----
450 PRINT
      PRINT "A STORY USING THE PICTURES."
-----
452 GOSUB 20100
      HOME
-----
456 PRINT
      PRINT "IF YOU WANT TO USE THE TEXT EDITOR NOW,"
-----
458 PRINT
      PRINT "TYPE 'Y' BELOW."
-----
460 PRINT
      PRINT
      INPUT "USE TEXT EDITOR NOW? (Y/N) ";I$
-----

```

```

462  IF I$ < > "Y" AND I$ < > "y" THEN END
-----
470  PRINT D$"RUN TALKING TEXT EDITOR"
-----
500  HOME
      : VTAB 11
      : PRINT "SETTING FRAME ";Z
-----
505  PRINT "PRESS 'RETURN' WHEN DONE VIEWING."
-----
510  C$ = "SEARCH FRAME " + STR$(FR(Z)) + " SEARCH"
-----
525  & C$
-----
530  & "FLIP"
-----
540  GET I$
      : IF ASC (I$) < > 13 THEN 540
-----
550  & "FLIP"
-----
551  PRINT
      : PRINT
-----
552  INPUT "WANT TO KEEP THIS PICTURE? (Y/N) ";I$
      : IF I$ = "Y" OR I$ = "y" THEN 560
-----
553  IF I$ < > "N" AND I$ < > "n" THEN 552
-----
555  FOR Z1 = Z + 1 TO L
      : FR(Z1 - 1) = FR(Z1)
      : NAM$(Z1 - 1) = NAM$(Z1)
      : NEXT
      : L = L - 1
      : Z = Z - 1
      : RETURN
-----
560  PRINT
      : PRINT "ENTER NAME FOR THIS FRAME"
      : PRINT
      : INPUT "NAME: ";NAM$(Z)
-----
565  NAM$(Z) = LEFT$(NAM$(Z),18)
-----
570  RETURN
-----
600  & "FLIP"
-----
605  FOR Z = 1 TO L

```

```

610   C$ = "SEARCH FRAME " + STR$ (FR(Z)) + " SEARCH"
-----
620   & C$
-----
640   GET I$
      :   IF ASC (I$) < > 13 THEN 640
-----
660   NEXT Z
-----
665   & "FLIP"
-----
670   RETURN
-----
20000 HTAB (20 - LEN (C$) / 2)
      : PRINT C$
      : RETURN
-----
20100 VTAB 23
      : C$ = "PRESS RETURN TO CONTINUE"
      : GOSUB 20000
      : POKE - 16368,0
-----
20110 IF PEEK ( - 16384) < > 141 THEN 20110
-----
20120 POKE - 16368,0
      : RETURN

```

Research Staff

LEARNING AND DEVELOPMENT AREA

B. Bradford Brown
Assistant Professor
Educational Psychology

Anne M. Donnellan
Associate Professor
Studies in Behavioral
Disabilities

William Epstein
Professor
Psychology

Arthur M. Glenberg
Associate Professor
Psychology

William M. Reynolds*
Professor
Educational Psychology

Laurence Steinberg*
Professor
Child and Family Studies

CLASSROOM PROCESSES AREA

Thomas P. Carpenter
Professor
Curriculum and Instruction

Elizabeth H. Fennema
Professor
Curriculum and Instruction

Penelope L. Peterson
Professor
Educational Psychology

SCHOOL PROCESSES AREA

William H. Clune**
Professor
Law

Gary D. Gaddy*
Assistant Professor
Journalism and Mass
Communication

Adam Gamoran*
Assistant Professor
Sociology

Carl A. Grant
Professor
Curriculum and Instruction

Herbert J. Klausmeier
Founding WCER Director and
V.A.C. Henmon Professor
Educational Psychology

Mary H. Metz*
Associate Professor
Educational Policy Studies

Fred M. Newmann*
Secondary Center Director and
Professor
Curriculum and Instruction

P. Martin Nystrand*
Associate Professor
English

Janice H. Patterson**
Assistant Scientist

Allan J. Pitman
Lecturer
School of Education
Deakin University

Stewart C. Purkey**
Assistant Professor
Lawrence University

Thomas A. Romberg
Professor
Curriculum and Instruction

Richard A. Rossmiller*
Professor
Educational Administration

Robert A. Rutter*
Assistant Scientist

Gary G. Wehlage*
Professor
Curriculum and Instruction

Kenneth M. Zeichner+
Associate Professor
Curriculum and Instruction

SOCIAL POLICY AREA

William H. Clune**
Professor
Law

W. Lee Hansen°
Professor
Economics

Carl F. Kaestle
Professor
Educational Policy Studies
and History

Joseph F. Kauffman°
Professor
Educational Administration

Cora B. Marrett*
Professor
Sociology and Afro-American
Studies

Michael R. Olneck
Associate Professor
Educational Policy Studies and
Sociology

Thomas A. Romberg
Professor
Curriculum and Instruction

Francis K. Schrag*
Professor
Educational Policy Studies

Marshall S. Smith**
WCER Director and Professor
Educational Policy Studies
and Educational Psychology

Jacob O. Stampen°
Assistant Professor
Educational Administration

Research Support Staff

Jacob Ivanson
Statistical Data Analyst

Janice Gratch
Project Specialist

Susan D. Pittelman
Project Coordinator

Deborah M. Stewart
Administrative Program Manager

Dan G. Woolpert
Program Coordinator

*affiliated with the National Center on Effective Secondary Schools, University of Wisconsin-Madison
#affiliated with the Center for Policy Research in Education, Rutgers University
°affiliated with the Center on Postsecondary Management and Governance, University of Maryland
+affiliated with the Center on Teacher Education, Michigan State University