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ABSTRACT

In an effort to provide the National Archives and Records Service and other archives and research libraries with guidelines to assist them in the selection of microfilm readers suitable for use with microfilm copies of archival or manuscript materials, provide manufacturers with data to improve their product, and provide the Library Technology Program (ALA) and the National Reprographic Center for documentation information that would serve as a check in their own technical evaluations, eight commercially available models of 35mm roll microfilm readers were tested. As much as possible the most favorable lighting and furniture arrangements were provided for each machine. Readers were cleaned daily and checked regularly to assure proper functioning. Participants were selected at random from the user population and asked to fill out a questionnaire after using each reader. Findings concerning loading, focusing, screen illumination and other characteristics of machine use are presented, along with data on comparative performance, specifications of each reader tested and a sample questionnaire. (Author/KE)

User Evaluations of Microfilm Readers For Archival and Manuscript Materials

National Archives and Records Service
General Services Administration
Washington, DC 20408
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User Evaluations of Microfilm Readers

For Archival and Manuscript Materials

This study was initiated at the suggestion of the National Archives Advisory Council. The Council, the National Archives and Records Service, and other archives and research libraries have been concerned with the need for the best possible microfilm readers. The discontinuance of the manufacture of the Recordak MPE Microfilm Reader, used extensively in archives and libraries, made the situation a critical one. As the need for additional readers grew, NARS was concerned with selecting the best possible reader for purchase. It was felt that the valuable technical and scientific evaluations of microfilm readers produced by the Library Technology Program of the American Library Association and the National Reprographic Center for Documentation did not fully take into account user preferences. It was hoped that user evaluations would serve several purposes:

(1) to provide NARS and other archives and research libraries with guidelines to assist them in the selection of microfilm readers,

(2) to provide manufacturers of microfilm readers with data to improve their product, and

(3) to provide the Library Technology Program of the American Library Association and NRCd with information that would serve as a check on their own technical evaluations.

These user evaluation tests were developed and conducted under the direction of Albert H. Leisinger, Jr., of the National Archives and Records Service. A small ad hoc advisory committee was invaluable in developing the questionnaire, in overcoming various technical and logistical problems, and above all, in advising how the tests could be conducted in as objective a way as possible. This group consisted of.

Thomas Bagg - The National Bureau of Standards

Forrest F. Carhart, Jr. - Library Technology Program, American Library Association

Herbert D. Harback - Federal Supply Service, General Services Administration

Miss Loretta Kiersky - Publications Committee, National Microfilm Association

Charles LaHood - Photoduplication Service, The Library of Congress

James Walker - Central Reference Division, National Archives and Records Service

Tom Gedosch, Don Schewe, and Peggy Sawyer of the National Archives and Records Service staff prepared the readers for testing, administered the tests, tabulated the responses, and prepared the findings. Their assistance is most gratefully acknowledged.

For this study eight models of 35 mm. roll microfilm readers were tested. Six of these were especially obtained for the study. Of these six, one was provided by the Library Technology Program of the American Library Association (the Recordak Motormatic MPG); two were purchased by NARS (the LMM Superior and Information Design's Model 201); and three were furnished by distributors (two of these were provided by Xerox University Microfilms (their models 1414 and 2240M) and one by Itek Business Products (the Autofocus reader)). The Autofocus reader supplied was not a new machine. The two other readers tested were also used machines, the Recordak MPE and the Recordak Model C. The MPE was one of the newest in use in our Microfilm Reading Room; the Model C, a late model, was provided by a Division of NARS. Although the MPE and C readers are no longer manufactured these are still widely used and it was felt that they would provide a good basis for comparison in this and future tests.

The testing was conducted in a quiet section of the Microfilm Research Room of the National Archives. As much as possible the most favorable ambient lighting conditions were provided for each machine. When needed, tables and chairs of different heights were used to maximize machine performance. As much as possible, also, the machines were arranged so that motor driven ones would alternate with hand operated ones and horizontal and vertical screens would alternate. The participants in the tests used, with few exceptions, the microfilm rolls they were searching. In a few cases participants used two rolls of microfilm that were preselected to present a number of reading problems frequently encountered by users of filmed copies of archival or manuscript materials.

Each reader was cleaned daily, covered during extended periods when not in use, and checked regularly to assure proper functioning. Mr. Walter McNutt, Chief of the Document Reproduction and Preservation Branch of NARS, compiled basic data and comments on each reader tested. His observations are contained in Appendixes A through F. These cover all readers now on the market but not the Recordak MPE and Model C readers which are no longer in production.

Although maintenance records for each machine were kept and timers attached to each in an attempt to determine the frequency and extent of maintenance problems and bulb life, no significant conclusions were reached. This was due primarily to the relatively short period in which the tests were conducted and certain technical difficulties encountered with the timers.

The frame of reference within which these tests were designed and conducted should be borne in mind by the reader of this report. The tests were intended to evaluate preferences of users working with microfilm copies of archival or manuscript materials. These were quite frequently handwritten documents of varying sizes that were filmed at different film placements and at varying reduction ratios. The user, generally, was not concerned with the retrieval of a specific, numbered frame on the film he was searching. He was not using film of printed books, newspapers or periodicals. One result of this was that certain readers which are acceptable for one or more of the above uses did not rate as well as they might have. These tests, therefore, should not rule out consideration by purchasers of readers designed for purposes other than the viewing of archival or manuscript materials. User preferences, moreover, have no apparent relationship to the durability of a machine, to the availability of service facilities and spare parts, and to the cost of a reader.

The participants were volunteers from the general public and from the NARS staff. During the two and one-half weeks of testing, searchers working in the Microfilm Research Room and NARS staff members were invited to participate. Participants were selected to provide as random a sample as possible, and yet have a sampling representative of the population which uses microfilm readers. To accomplish this, the personnel administering the test made an estimate of the age of each participant. These were then divided into three broad categories of searchers which it was felt were representative of the three age groups using microfilm at the National Archives: those under 30; those between 30 and 60; and those over 60. Of the 101 people tested, 33 fell into the first category, 38 into the second, and 30 into the third. As much as possible, members of the general public were used in preference to NARS staff members: 76 of the 101 participants were searchers and 25 staff members. Although the test was designed to be taken by novices and experienced microfilm reader users alike, the participants were predominantly experienced users. Of the people who responded to the question on the Evaluation Comparison Sheet (See Appendix I) as to how many times during the past year they had used a microfilm reader, 71.7 per cent had used a reader more than ten times.

Each participant in the test was asked to spend at least twenty minutes with each reader, and then to complete a questionnaire for each machine used (See Appendix H). When the user finished working with all readers,

he was asked to fill out an Evaluation Comparison Sheet (See Appendix I). Because it was felt that the reader chosen should require the least amount of instruction to operate, loading instructions were placed beside each machine, and the personnel administering the test did not assist the users in loading the machine unless asked to do so.

All brand names were blocked off on the readers, and replaced with designations "A" through "H". To evaluate the effect of corrective lenses on user preference, the participants were asked to indicate if glasses were worn, and if they were a special type (See Appendix H).

While the participants were generally cooperative and helpful, some did not use all eight machines, some finished their work before using all eight machines, and some could not complete the test because a machine was out of order or someone else was using it. Out of fairness to machines not used by a particular participant, only those responses where four or more machines were used were tabulated in this study. Of the 101 people who participated in the test, 80 completed using four or more readers, and 64 completed using all eight. Because participants started at different readers and progressed through the sequence in the same order, approximately the same number of responses were received for each machine. In the tabulations the numbers represent the percentage of responses to each question which fell into the indicated category.

This study in draft form was sent for comment to members of the National Archives Advisory Council, to the ad hoc advisory committee, and to all the firms whose equipment was evaluated. No firm objected to the publication of this study; a few wanted their comments included - this was done. Some sent representatives to examine the completed questionnaires; others requested copies. It is hoped that this interest in these user evaluations will result in the production of improved readers, a major objective of the evaluations.

It is suggested that the readers of this study consult the questionnaire (Appendix H) and the evaluation comparison sheet (Appendix I) before reading the findings.

READER CONVERSION TABLE

READER	MANUFACTURER AND MODEL	LIST PRICE (FOB)
A	Kodak Recordak C	1
B	Information Design, Inc. 201	$ 960[2]
C	Kodak-Recordak Motormatic MPG	$1525[3]
D	Xerox (University Microfilms) 1414	$ 340[2]
E	Kodak Recordak MPE	1
F	Library Microfilm and Materials Co. LMM Superior A-B/S-8E	$1295
G	Xerox (University Microfilms) 2240M	$ 239
H	Itek Autofocus	$2460[4]

1. This reader has been discontinued
2. Manual operation
3. Includes 19X lens
4. Foot control cost an additional $80

FINDINGS

QUESTION 1a: Film loading and unloading.

The possible responses on this question were Easy, Satisfactory, and Difficult. The responses indicated for each machine were as follows:

TABLE I

Film Loading and Unloading
Percentage of Responses for each Reader

READER	EASY	SATISFACTORY	DIFFICULT
A	20.0	70.0	10.0
B	45.6	50.6	3.8
C	8.8	16.2	75.0
D	7.2	25.0	67.8
E	22.7	68.0	9.3
F	19.2	42.5	38.3
G	9.5	55.4	35.1
H	27.6	50.0	22.4

Participants in the oldest age group and those who had not used a reader more than ten times in the preceeding year tended to mark all machines uniformly more difficult in loading. The high preponderance of "difficult" responses for reader C reflects the failure of the self-loading mechanism; personnel administering the test had to load this machine for more than half of the participants. There was no significant variation for those who wore glasses.

QUESTION 1b: Film winding and unwinding.

The possible responses on this question were Easy, Satisfactory, and Difficult. The responses indicated were as follows:

TABLE II

Film Winding and Unwinding
Percentage of Responses for each Reader

READER	EASY	SATISFACTORY	DIFFICULT
A	29.1	64.6	6.3
B	46.1	53.9	0
C	35.0	60.0	5.0
D	11.2	58.9	29.9
E	26.7	66.7	6.6
F	46.4	46.4	7.2
G	15.3	66.7	18.0
H	44.4	51.7	3.9

For an explanation of the high proportion of "difficult" responses on reader D see Appendix C. The film advance nob on reader G was initially stiff and difficult to operate, but became progressively easier to operate as the machine was used more.

QUESTION 1c: Focusing.

The possible responses on this question were Easy, Satisfactory, and Difficult. The responses indicated for each machine were as follows:

TABLE III

Focusing
Percentage of Responses for each Reader

READER	EASY	SATISFACTORY	DIFFICULT
A	36.8	55.7	7.5
B	84.8	12.7	2.5
C	53.8	41.2	5.0
D	24.5	68.7	6.8
E	15.0	63.7	21.3
F	8.2	21.8	70.0
G	20.2	52.8	27.0
H	35.1	54.4	10.5

Responses to this question for bifocal and trifocal wearers were tabulated, and are as follows:

TABLE IV

Focusing
Percentage of Responses for each Reader
(Bifocal and Trifocal Wearers)

READER	EASY	SATISFACTORY	DIFFICULT
A	24.0	68.0	8.0
B	69.9	26.9	3.2
C	46.1	42.9	11.0
D	13.0	65.2	21.8
E	4.0	76.0	20.0
F	7.7	19.2	73.1
G	00.0	52.6	47.4
H	30.0	65.0	5.0

Although responses by bifocal and trifocal wearers were lower for each machine except the E and H, the G reader showed a marked increase from 27 percent to 47.4 percent of the participants responding that it was difficult to focus. No wearer of bifocals or trifocals found the G reader easy to focus.

QUESTION 1d: Scanning.

The possible responses to this question were Easy, Satisfactory, and Difficult. The responses indicated for each machine were as follows:

TABLE V

Scanning
. Percentage of Responses for each Reader

READER	EASY	SATISFACTORY	DIFFICULT
A	67.1	26.6	6.3
B	59.8	36.4	3.8
C	51.2	46.3	2.5
D	14.4	30.5	55.1
E	57.1	36.4	6.5
F	58.6	35.7	5.7
G	9.5	27.0	63.5
H	36.3	38.2	25.5

There was no significant variation in responses because of age or the wearing of glasses. However, participants who used census microfilm tended to rate all machines lower than those using other materials.

QUESTION 1e: Image Rotation.

The possible responses to this question were Easy, Satisfactory, and Difficult. The responses indicated for each machine were as follows:

TABLE VI

Image Rotation
Percentage of Responses for each Reader

READER	EASY	SATISFACTORY	DIFFICULT
A	17.9	37.7	59.8
B	91.0	9.0	00.0
C	91.3	7.5	1.2
D	3.0	17.9	79.1
E	17.5	56.8	25.7
F	18.6	27.1	54.3
G	10.9	17.9	71.2
H	66.0	28.2	5.8

For an explanation of the disproportionately high "difficult" responses for machines D, F, and G, see Appendixes C, D, and E. To rotate the image on both machines A and E, it is necessary for short people to stand up, which may account for the "difficult" responses on those machines.

QUESTION 2: Focusing was required.

The possible responses to this question were Frequently, Occasionally, and Rarely. It should be noted that in this instance the most desirable response was located in the right column, rather than the left. The responses indicated for each machine were as follows:

TABLE VII

Focusing was Required
Percentage of Responses for each Reader

READER	FREQUENTLY	OCCASIONALLY	RARELY
A	2.5	37.5	59.8
B	2.5	26.6	70.4
C	9.0	37 2	53.8
D	4.4	30.9	64.7
E	00.0	48.4	51.3
F	5.8	33.3	60.9
G	11.1	47.2	41.7
H	12.7	40.0	47.3

The responses were tabulated for bifocal and trifocal wearers, and, although they tended to rate each machine more harshly on the number of times it required focusing, there was no significant difference in the relative ratings of the machines. The responses also indicated that persons using census microfilm tended to focus less than other types of microfilm. Again this was relative to the microfilm, and not to a particular machine.

QUESTION 3: Controls were located making use.

The possible responses to this question were Easy, Satisfactory, and Difficult. The responses indicated for each machine were as follows:

TABLE VIII

Controls were Located Making Use
Percentage of Responses for each Reader

READER	EASY	SATISFACTORY	DIFFICULT
A	21.5	64.5	14.0
B	83.3	16.7	00.0
C	68.3	30.5	1.2
D	13.1	24.6	62.3
E	10.8	63.5	25.7
F	19.2	29.6	51.2
G	15.3	52.8	31.9
H	49.1	45.4	5.5

QUESTION 4: The size of the screen was.

The possible responses to this question were Satisfactory, Adequate, and Unsatisfactory. It should be noted that unlike previous questions, Satisfactory in this instance is the most favorable response. For data on the dimensions of the screens, see Appendixes A through F. The responses indicated for each machine were as follows:

TABLE IX

The Size of the Screen Was
Percentage of Responses for each Reader

READER	SATISFACTORY	ADEQUATE	UNSATISFACTORY
A	89.9	10.1	00.0
B	97.5	2.5	00.0
C	67.5	30.0	2.5
D	10.1	17.5	72.4
E	75.4	22.0	2.6
F	90.0	8.8	1.2
G	5.5	12.3	82.2
H	12.5	37.5	50.0

This question was also tabulated for persons wearing bifocals and trifocals, and the results are as follows:

TABLE X

The size of the Screen Was
Percentage of Responses for each Reader
(Bifocal and Trifocal Wearers)

READER	SATISFACTORY	ADEQUATE	UNSATISFACTORY
A	92.0	8.0	00.0
B	96.0	4.0	00.0
C	68.0	32.0	00.0
D	16.0	8.0	76.0
E	68.0	24.0	8.0
F	88.0	12.0	00.0
G	00.0	00.0	100.0
H	10.0	35.0	55.0

QUESTION 5: Screen illumination was.

The possible responses to this question were Good, Fair, and Poor. The responses indicated for each machine were as follows:

TABLE XI

Screen Illumination Was
Percentage of Responses for each Reader

READER	GOOD	FAIR	POOR
A	74.7	21.5	3.8
B	68.5	30.1	1.4
C	45.0	40.0	15.0
D	90.6	9.4	00.0
E	79.9	14.9	5.2
F	83.3	16.7	00.0
G	30.0	55.6	14.4
H	46.4	51.8	1.8

Responses to this question by bifocal and trifocal wearers were tabulated, but showed not significant variation from the above figures.

QUESTION 6: I found using this reader to be.

The possible responses to this question were Comfortable, Satisfactory, and Uncomfortable. It should be pointed out that Satisfactory is again the middle choice, unlike its position on question 4. The responses indicated for each machine were as follows:

TABLE XII

I Found Using this Reader to be
Percentage of Responses for each Reader

READER	COMFORTABLE	SATISFACTORY	UNCOMFORTABLE
A	31.9	50.0	18.1
B	62.3	31.1	6.6
C	22.4	70.4	7.2
D	5.6	31.9	62.3
E	32.5	50.0	17.5
F	52.9	30.0	17.1
G	3.9	39.9	56.2
H	21.4	60.7	17.9

QUESTION 7: In general, I found this reader.

The possible responses to this question were Highly Satisfactory, Satisfactory, and Unsatisfactory. The responses indicated for each machine were as follows:

TABLE XIII

I found this Reader
Percentage of Responses for each Reader

READER	HIGHLY SATISFACTORY	SATISFACTORY	UNSATISFACTORY
A	23.8	63.7	12.5
B	68.2	28.1	3.7
C	12.2	76.7	11.1
D	5.8	23.2	71.0
E	25.7	64.9	9.4
F	19.2	58.9	21.9
G	1.3	26.0	72.7
H	10.8	67.7	21.5

The answers to questions 8, 9, and 10 of the questionnaire could not, of course, be tabulated. These questions were, as follows:

8. What features of this reader pleased you most?

9. What features annoyed you most?

10. Do you have any specific recommendations to improve this reader?

Those interested in the answers for any reader, or for all readers, may consult the original questionnaires.

64 participants responded to the question on the Evaluation Comparison Sheet "I found the _____ (letter) reader to be the best reader." These responses were as follows:

READER	A	B	C	D	E	F	G	H
NUMBER	7	36	5	1	5	8	1	1

In percentages, these figures break down as follows:

READER	A	B	C	D	E	F	G	H
PERCENTAGE	10.9	56.3	7.8	1.5	7.8	12.7	1.5	1.5

Where participants marked the same machine in both the best reader category and under the Very Satisfactory column on the Evaluation Comparison Sheet, the Very Satisfactory column response was disregarded. Expressing the responses on the Evaluation Comparison Sheet as a percentage of responses in each category for each machine, the results are as follows:

TABLE XIV

Responses to the Evaluation Comparison Sheet

READER	BEST	VERY SATISFACTORY	SATISFACTORY	UNSATISFACTORY
A	11.3	38.7	32.3	17.7
B	56.9	33.9	7.9	1.3
C	8.0	15.9	57.1	19.0
D	1.6	4.9	25.8	67.7
E	7.6	35.4	34.5	22.8
F	13.5	6.0	53.5	27.0
G	1.8	00.0	10.9	87.3
H	1.8	20.5	53.7	24.0

The responses on the Evaluation comparison sheet were tabulated for bifocal and trifocal wearers. The results are as follows:

TABLE XV

Responses to the Evaluation Comparison Sheet
(Bifocal and Trifocal Wearers Only)

READER	BEST	VERY SATISFACTORY	SATISFACTORY	UNSATISFACTORY
A	19.0	38.0	24.)	19.0
B	38.0	47.5	14.5	00.0
C	9.5	9.5	61.8	19.2
D	00.0	4.8	9.5	85.7
E	19.0	47.5	14.2	19.3
F	14.2	00.0	57.0	28.8
G	00.0	00.0	00.0	100.0
H	00.0	14.2	52.3	33.5

The responses on the Evaluation Comparison Sheet were tabulated for persons who had used a microfilm reader more than ten times and less than ten times. The results are as follows:

TABLE XVI
Responses to the Evaluation Comparison Sheet
(Persons Who Had Used a Reader Less than 10 Times)

READER	BEST	VERY SATISFACTORY	SATISFACTORY	UNSATISFACTORY
A	00.0	19.0	50.7	30.3
B	64.3	14.3	14.3	7.1
C	20.0	13.3	46.7	20.0
D	00.0	00.0	26.7	73.3
E	7.1	21.4	42.8	28.7
F	14.3	7.1	35.7	42.9
G	7.1	00.0	14.3	88.6
H	00.0	20.0	50.0	30.0

TABLE XVII
Responses to the Evaluation Comparison Sheet
(Persons Who Had Used a Reader More than 10 Times)

READER	BEST	VERY SATISFACTORY	SATISFACTORY	UNSATISFACTORY
A	17.5	45.0	25.0	12.5
B	55.9	34.9	6.9	2.3
C	2.4	16.7	59.5	21.4
D	00.0	2.5	22.5	75.0
E	9.8	43.9	26.8	19.5
F	15.0	5.0	55.0	25.0
G	00.0	00.0	7.9	92.1
H	2.5	17.5	55.0	25.0

The responses on the Evaluation Comparison Sheet were also tabulated on the basis of the age classifications assigned by the personnel administering the test. The results are as follows:

TABLE XVIII
Responses to the Evaluation Comparison Sheet
(Participants Under 30)

READER	BEST	VERY SATISFACTORY	SATISFACTORY	UNSATISFACTORY
A	20.0	26.7	33.3	20.0
B	65.3	35.7	00.0	00.0
C	13.3	20.0	60.0	6.7
D	00.0	00.0	40.0	60.0
L	00.0	23.1	53.8	23.1
F	7.1	00.0	71.7	21.2
G	8.3	00.0	33.3	58.4
H	00.0	27.4	36.3	36.3

TABLE XIX
Responses to the Evaluation Comparison Sheet
(Participants 30-60)

READER	BEST	VERY SATISFACTORY	SATISFACTORY	UNSATISFACTORY
A	4.2	41.7	41.7	12.4
B	64.0	28.0	8.0	00.0
C	4.2	12.4	54.2	29.2
D	4.2	4.2	25.0	66.6
E	00.0	41.6	29.2	29.2
F	17.4	8.7	43.5	30.4
G	00.0	00.0	4.5	95.5
H	4.8	14.3	52.4	28.5

TABLE XX
Responses to the Evaluation Comparison Sheet
(Participants Over 60)

READER	BEST	VERY SATISFACTORY	SATISFACTORY	UNSATISFACTORY
A	17.8	41.1	23.3	17.8
B	41.6	41.6	10.9	5.9
C	5.9	10.9	64.7	18.5
D	00.0	00.0	6.3	93.7
E	18.5	62.9	9.3	9.3
F	18.8	00.0	50.0	31.2
G	00.0	00.0	00.0	100.0
H	00.0	18.8	68.8	12.4

APPENDIX A

Information on Reader B

1. Film formats accommodated: 16 and 35 mm microfilm.
2. Type of design: Desk top model
3. Size of Reader: a. Height: 38 inches
   b. Width: 25 inches
   c. Depth: 30 inches
4. Weight: 100 pounds (shipping weight)
5. Type of Screen: a. Projection: rear
   b. Size: 24 x 24 inches
   c. Color: neutral
   d. Type: translucent
   e. Angle of inclination: three degrees from vertical towards the reader
   f. Center of height above base: 22 inches
6. Magnification: 18x
7. Film Transport Mechanism: manual
8. Image rotation: 360 degrees continuous
9. Maintenance and Operating Instructions:

   Detailed maintenance instructions are included with each machine. Glass surfaces are accessible for cleaning, and the flats separate to allow cleaning. Mirrors are front surfaced, which requires special care in cleaning. Bulb may be replaced by removal of the optical unit and lifting the glass flat.

10. Characteristics of Film Feed:

    The film is guided by two tapered rollers which only touch the edge of the microfilm. Glass flats are continuously separated when film is in motion, and film does not touch glass while in motion.

11. Remarks:

Location of all optical adjustments in the optical units places all controls directly in front of the operator during use. The open optical system allows considerable dust to accumulate on glass surfaces.

APPENDIX B

Information on Reader C

1. Film formats accommodated: 16 and 35 mm microfilm and microfiche with an adapter

2. Type of design: Desk top model

3. Size of Reader: a. Height: 25 3/4 inches

   b. Width: 22 7/8 inches

   c. Depth: 32 inches

4. Weight: 70 pounds

5. Type of Screen: a. Projection: rear

   b. Size: 15 x 15 inches

   c. Color: neutral

   d. Type: translucent

   e. Angle of inclination: 14° degrees from vertical away from the reader

   f. Center height above base: 17 inches

6. Magnification: Available with interchangeable lenses which provide 19 or 23 power magnification.

7. Film Transport Mechanism: Motor driven and self threading

8. Image rotation: 360 degrees continuous

9. Maintenance and Operating Instructions:

   Detailed maintenance instructions are included with each machine. Glass surfaces are accessible for cleaning, but the glass flats, which snap out of the machine, are not easily separated for cleaning. Replacement of the projection lamp requires snapping the lamphouse cover out of place, which then provides ready access to the lamp.

10. Characteristics of film feed:

The emulsion surface of the microfilm is in continuous contact with two rollers and one glass flat during winding. The self loading mechanism will not work unless the end of the microfilm is cut squarely and is not bent or folded.

11. Remarks:

The exhaust fan blows out air continuously on the left side of the machine. This will pose difficulties for left-handed people and for areas where machines are used in close proximity to one another. This machine is quite noisy, particularly during film loading. Self loading feature also proves to be a handicap if it does not work and the film has to be loaded manually.

APPENDIX C

Information on Reader D

1. Film formats accommodated: 16 and 35 mm microfilm, and microfiche.
2. Type of design: Desk top model
3. Size of Reader: a. Height: 23 1/2
   b. Width: 15 inches
   c. Depth: 18 5/8 inches
4. Weight: 45 pounds
5. Type of Screen: a. Projection: rear
   b. Size: 14 x 14 inches
   c. Color: neutral
   d. Type: translucent
   e. Angle of inclination: 12 degrees from vertical towards the reader
   f. Center height above base: 16 inches
6. Magnification: 18x
7. Film Transport Mechanism: Motor driven with detachable handles provided for manual operation.
8. Image rotation: 90 degrees
9. Maintenance and Operating Instructions:

   Detailed, well illustrated maintenance instructions are included with each machine. All glass surfaces are accessible for cleaning. The machine must be tipped on its side and a metal plate removed to replace the bulb.

10. Characteristics of film feed:

Glass flats are opened manually to allow film loading. However, the flats remain closed during operation to maintain continuous focus. At all operating speeds the film is constantly in contact with two rollers, and both sides of the film are in contact with the glass flats.

11. Remarks:

Location of the film transport mechanism under the hooded screen makes loading film and manual operation difficult. 90 degree rotation of the film transport mechanism allows 90 degree rotation of the image. If the image is upside down, spools must be reversed to right the image. After one hour of operation the control for motorized operation of the film feed mechanism would no longer react quickly enough to allow fine positioning of the image on the screen. Slow scanning was impossible using motorized drive, and scanning and fine positioning could only be accomplished manually.

APPENDIX D

Information on Reader F*

1. Film formats accommodated: 16 and 35 mm microfilm
2. Type of Design: Floor model in a self contained carrel
3. Size of Reader: a. Height: 60 inches
   b. Width: 48 inches
   c. Depth: 30 inches
4. Weight: 200 pounds
5. Type of Screen: a. Projection: Direct
   b. Size: 22 1/2 x 24 1/2 inches
   c. Color: white
   d. Type: Opaque
   e. Angle of inclination: 85 degrees from vertical away from the reader.
6. Magnification: variable (17.5x, 19.5x and 22x) by moving a mirror on the top of the carrel
7. Film transport mechanism: motorized
8. Image rotation: 180 degrees
9. Maintenance and Operating Instructions:

   Detailed maintenance instructions are included with each machine. Glass surfaces are accessible for cleaning, but require some agility because of their confined location. The exposed mirror is front surfaced. Lens covers are provided. Bulb replacement requires dismantling of the head, but complete instructions are provided.

10. Characteristics of film feed:

    Film is in continuous contact with two tapered rollers, which touch only the edge of the microfilm, and one glass flat. Motorized drive is sensitive enough to allow scanning at slow speeds.

11. Remarks:

Top mirror is not very secure, as it is mounted on two bars suspended from the top of the carrel. It can be tipped to raise or lower the image on the screen, but it had to be counter-balanced to allow easy use and to keep it from slipping. The image is projected from under the reading surface through a hole in the screen onto a mirror and back onto the screen. Dirt and dust collects on the lenses. Focusing must be done with the screen raised, and image rotation requires lifting the screen and rotating the entire head.

---

* The comments of the manufacturer state:

a) "In actual library use the mirror has never been proven insecure. The amount of friction desired can be easily adjusted. (Would we have known that there was a question . . . we could have readily solved the apparent problem.)"
"Various library situations and preferences call for varying friction - easily accommodated. A balanced position is not intended."

b) "I think it would be only fair to mention that dust falling on the lens can be easily removed."

c) "Focusing must be done with the surface raised, but once focused the image stays in focus. (See instructions: focus on white edge)." Editors note: See Tables III, IV, and VII for user responses.

d) "Under normal conditions (uniform image position) image rotation is normally done by rotating the projection unit after focusing and prior to closing of the reading surface. Occasional rotating can be done by lifting the surface. However, if a non-standard film requires frequent rotation, it can be easily done without lifting the surface by rotating the mounting disc below the tabletop."

e) "The appendix completely omits a feature of the LMM that has been proven very helpful in research libraries in the use of microfilms of manuscripts: the adjustable brightness of illumination. Step 2 is for standard material; Step 1 for use with low background density, and Step 3 for high line density."

APPENDIX E

Information on Reader G

1. Film formats accommodated: 16 and 35 mm microfilm, microfiche, and aperture cards

2. Type of design: Portable desk top reader

3. Size of reader: a. Height: 21 inches

   b. Width: 15 inches

   c. Depth: 10 inches

4. Weight: 15 1/2 pounds

5. Type of Screen: a. Projection: rear

   b. Size: 12 x 12 inches

   c. Color: neutral

   d. Type: translucent

   e. Angle of inclination: 14 degrees from vertical away from reader.

   f. Center height above base: 15 inches.

6. Magnification: 22x

7. Film transport mechanism: Motor driven with detachable handles provided for manual operation

8. Image rotation: image fixed, but machine may be rotated.

9. Maintenance and Operating Instructions:

   Detailed maintenance instructions are included with the machine. Glass surfaces are accessible for cleaning. Bulb changing requires removal of one screw.

10. Characteristics of film feed:

    Film is in continuous contact with two rollers and one glass flat. Drive is sensitive enough to permit low speed scanning, but glass flats do not open at lowest speeds.

11. Remarks:

First machine broke down after one hour of use, and was replaced by a second. Machine makes a loud grinding noise during operation. The operator must be careful to depress the film release bar while scanning slowly, or the film will bind. When operated on its side (the only means of film image rotation), the film binds in the film channel. Magnification is too great to permit viewing a full image on the screen at one time.

APPENDIX F

Information on Reader H

1. Film formats accommodated: 16 and 35 mm microfilm and microfiche with adapter

2. Type of design: Desk top reader

3. Size of reader: a. Height: 24 1/2 inches
   b. Width: 19 5/8 inches
   c. Depth: 32 1/8 inches

4. Weight: 160 pounds

5. Type of screen: a. Projection: rear
   b. Size: 14 x 14 inches
   c. Color: neutral
   d. Type: translucent
   e. Angle of inclination: 7 degrees from vertical away from the reader
   f. Center height above base: 17 inches

6. Magnification: variable from 23x to 36x

7. Film transport mechanism: Motor driven

8. Image rotation: 360 degrees continuous

9. Maintenance and Operating Instructions:

   This was a used machine, and no booklet accompanied it. Glass surfaces accessible for cleaning, except for one of the glass flats. Bulb replacement requires removal of the screen and a snap out cover.

10. Characteristics of film feed:

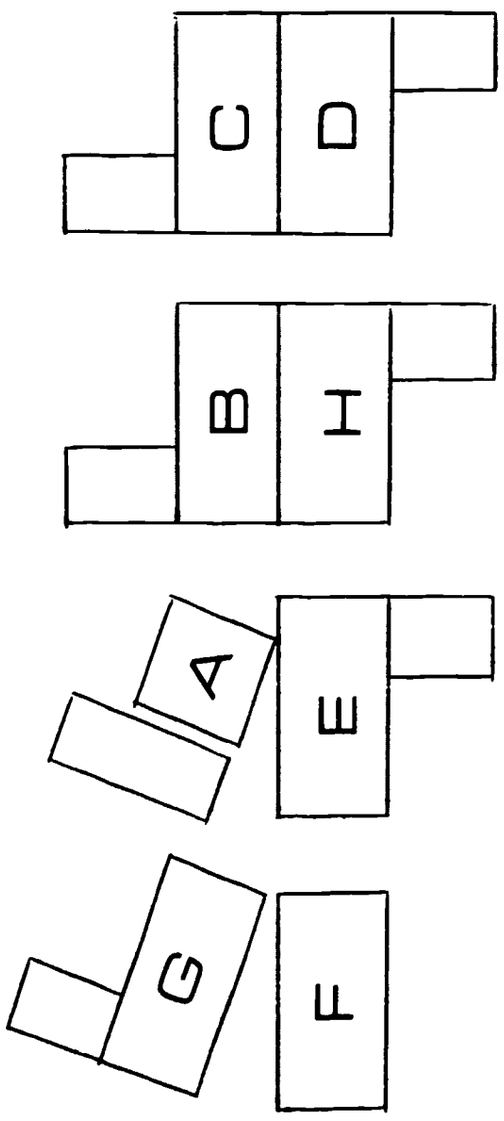
    Film is in continuous contact with two of four metal rollers and one glass flat. Two drive speed controls permit very slow to very rapid scanning. Optional features include a foot pedal for advancing film.

11. Remarks:

Machine is quite noisy. Film magnification and scanning controls require considerable effort to use, and scan control was inoperative during part of this test. Magnification is too great to permit viewing a full sheet on the screen at one time. Rapid rewind results in the film end flying loose and slapping machine before it can be shut off.

APPENDIX G

LAYOUT OF THE MICROFILM READER PROJECT IN THE MICROFILM READER ROOM



APPENDIX H

Reader used ____

QUESTIONNAIRE

The attendant will instruct you in the operation of each machine. He will be available to answer questions. Please use each reader for at least twenty minutes.

Two rolls of microfilm are provided for your use during the testing of these machines. They were selected as examples of the peculiarities of different microfilm materials.

Do you wear glasses: yes [ ] no [ ] Special type? bifocals [ ] trifocals [ ] contacts [ ]

1. Please evaluate the following:

	Easy	Satisfactory	Difficult
a. Film loading and unloading	[ ]	[ ]	[ ]
b. Film winding and unwinding	[ ]	[ ]	[ ]
c. Focusing	[ ]	[ ]	[ ]
d. Scanning	[ ]	[ ]	[ ]
e. Image rotation	[ ]	[ ]	[ ]

2. Focusing was required:	Frequently [ ]	Occasionally [ ]	Rarely [ ]
3. Controls were located making use:	Easy [ ]	Satisfactory [ ]	Difficult [ ]
4. The size of the screen was:	Satisfactory [ ]	Adequate [ ]	Unsatisfactory [ ]
5. Screen illumination was:	Good [ ]	Fair [ ]	Poor [ ]
6. I found using this reader to be:	Comfortable [ ]	Satisfactory [ ]	Uncomfortable [ ]
7. In general I, found this reader:	Highly Satisfactory [ ]	Satisfactory [ ]	Unsatisfactory [ ]

8. What features of this reader pleased you most? _____

_____

9. What features annoyed you most? _____

_____

10. Do you have any specific recommendations to improve this reader? _____

_____

_____

APPENDIX I

EVALUATION COMPARISON SHEET

During the past year, I have used a microfilm reader:

0 to 10 times [ ] more than 10 times [ ]

I found the _____ (letter) reader to be the best reader.

I would rate the remaining reader readers:

Very Satisfactory	Satisfactory	Unsatisfactory
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Comments:

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