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ABSTRACT

The project consisted of making a multi-level teaching film titled "Rocks and Minerals of the Ouachita Mountains," which runs for 25 minutes and is in color. The film was designed to be interesting to earth science students from junior high to college, and consists of dialogue combined with motion pictures of charts, sequential diagrams, outcrops, and aerial views. The film was produced inexpensively and "the variety of illustration types used in this film is believed to be somewhat unique and represents a different approach to educational films about geology." The film was rated by groups of earth science students, college, high school, and junior high. Both the rating questionnaire and the resulting data are included in the report showing generally a positive response to the film. A list of general suggestions in making geology films is provided. (PR)

FINAL REPORT

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THE DEVELOPMENT OF MULTI-LEVEL AUDIO-VISUAL TEACHING AIDS FOR EARTH SCIENCE

William D. Pitt (Project Director)
Geology Department, Eastern New Mexico University
Portales, New Mexico 88130

November 25, 1970

U. S. DEPARTMENT OF
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Acknowledgments

The writer wishes to acknowledge the help especially of Mr. Pat Chandler, photographer and chief film editor. Mr. Chandler put many hours into this film; whatever merit the film has is largely his doing. I wish to acknowledge the help also of the late Skeets Burns and Mr. Larry Valliere, who helped to prepare charts and also painted several pictures that we used in this film. Mr. Joe Place, Director of the Audio-Visual Department at Eastern New Mexico University, made his facilities for making this film completely available to us; and he also helped us many times in our work. Mr. Mark Nero also made some real contributions to the editing of this film and in taking some of the close-ups. Finally— although I realize it may not be proper to do so—I wish to acknowledge the more-than-usual helpfulness of the Research Director, Dr. Harold Harwell; for he not only answered all letters promptly, but he also made a more-than-normal effort to be helpful in other ways.

May I express to him and to others my apology and my regret for the long delay in completing this project!

Introductory Section

Summary

Procedural History: Our attempt to accomplish our objectives.- This project consisted of developing a multi-level teaching film about the Rocks and Minerals of the Ouachita Mountains. Originally the entire deformational history was planned to be put into the film, but it soon became evident that the film coverage had to be restricted. The filming of significant outcrops within the Ouachita System (Ouachita Mountains of Oklahoma and Arkansas and the Marathon Mountains of Western Texas) was accomplished first. The text of the film was written next. Charts, maps and paintings then were drawn, including some sequential charts and diagrams made for the sake of clarity. These were used, along with rock and mineral specimens, to film close-ups. During this first year serious delays were encountered: our artist, Skeets Burns died; and our first editor, Mark Nero, completed only the first film-copy. Numerous mistakes and obvious omissions were found in this first copy; and in spite of numerous promises to the contrary, Mr. Nero never returned to the job of making the necessary changes in the film. Last June, however, Mr. Pat Chandler, our chief photographer, took over the job of editing the film.

Final Editing.- Mr. Chandler and I began our editing work by viewing the film many times in order to determine (1) what needed to be added for clarification; (2) what should be deleted. We then examined all the film footage available, ear-marking footage suitable for, or possibly suitable for, splicing. A number of charts, some new ones and some re-drafted ones, were made. We took more film of these charts, and some footage of rock specimens. Then we re-spliced, in the correct order, all our film footage, making sure that each splice was long enough for the time slot in the film. We had to be careful about the timing because all our splicing had to fit the dialogue, which was already "set" in the film and could not be easily changed. The final editing job was done at the Western Cine Film Company in Denver. There Mr. Chandler supervised the splicing of all the inserts. All went well except that one serious error was made; a sequence of rocks announced in the film as "flysch" sediments (thin beds of sandstone and shale) was not "flysch". This error, however, was not serious in one sense: the average student would not know that the beds shown were not "flysch".

Significant Findings.- I believe that the significant findings include the following: (1) That it is possible for an amateur to make an interesting geologic film if he works at it—one that is interesting to earth science students of any age (this fact was demonstrated by way of student evaluations); (2) The variety of illustration types used in this film is believed to be somewhat unique and represents a different approach to educational films about Geology. It is hoped that other geologists might derive some ideas about illustrations in geologic films by seeing this film; (3) It is believed that this film demonstrates the fact that effective educational geologic films can be produced inexpensively.

Introduction

The purpose of this project was to develop a multi-level teaching film of the Ouachita Mountain area, a film that would appeal to, and also serve as a teaching device for, several age groups. It was believed that two dialogues would be made in order to widen the appeal of the film. Although much thought and dialogue-writing, and some film footage was devoted to the idea of depicting the deformational history of the area of the Ouachita Mountain "system", it became evident soon that the uniqueness of this system, and why it is considered a unified system, would have a wider appeal. So the film dialogue and film evolved into one whose main object was to interest the high school Earth Science student. Phenomena in this area were explained and illustrated by motion pictures of charts, sequential diagrams, outcrops, and aerial views.

Methods

Because this effort was my first in making a film, we learned much by trial-and-error. Methods we employed I shall describe in the order of doing, which order and method I would change when making another film.

Initial Filming.- The first filming was done while I was planning to depict the entire deformational history of the Ouachita Mountains. It soon became evident that a film about the rocks and minerals would have a greater appeal to high school Earth Science students, and that a deformational-history film of any kind should involve one "problem" area only. Our photographer and I, however, toured the Ouachita Mountain area and filmed key outcrops and vistas of the area we thought would be useful.

Editing First-film Version.- Writing a script was my first task in beginning to splice together the film. The script served as a guide to the splicing of film already taken, to the making and filming of charts and diagrams, and to the collecting and filming rock specimens. My thought then was to give the editor a "free hand", injecting my advice mostly only when it was sought. At least with this particular editor, Mr. Mark Nero, this "freedom" for him turned out to be a mixed blessing: in some of his filming and splicing and his creation of certain charts and diagrams he initiated several fine sequences. Mr. Nero hired an excellent narrator and also furnished some excellent background music. However, he also made several glaring omissions and errors that were caught only after the first film version was completed.

Editing Second-film Version.- The changes that were made had to be done within the framework of the narration; it was therefore concluded that future films should have pauses in the narration so that one could splice the narration tape itself at specified points. Also, the narrator himself should be available to make narration splice-ins later, as needed.

The methods that Mr. Pat Chandler and I employed in this final film revision were as follows: We examined the first version of the film very carefully, taking notes in which we listed all jobs to be done. These jobs were:

(a) changing the timing of a sequence of outcrops to fit exactly the dialogue
(b) re-drawing several charts and filming them.
(c) re-filming several charts
(d) replacing film with more suitable footage.
(e) adding or taking away footage so that the film would fit the dialogue.
(f) splicing together all film footage in the correct splicing-order, so that Mr. Chandler could make final splicing efficiently (in Denver). (Mr. Joseph Place's audio-visual department was most helpful to us in making these changes.)

Mr. Chandler's work of doing the final splicing went well at the Western Cine Company in Denver except for one of the last splicings: he spliced in the incorrect film for a rock type called "flysch"; this mistake points out the fact that the geologist should also be present at the "final" splicing.

Findings and Analysis

Results

Our Goals: Were They Reached? - The goals of this film project were: (1) To depict the geology, or an aspect of it, of a well-known mountain range; (2) To depict it in such a way that it would interest all Earth Science students - high school, junior high school and college students. These goals are challenging ones. A geological film, the professional film-makers tell us, is the most difficult film to make interesting.

The results of this project consist of (1) the film produced; (2) film appraisal; and (3) the experience gained from making that film which might help others in making a similar one. The contents of the film and Items (2) and (3) will be discussed next.

(1) The Film Produced: Summary of Motion-Picture Film.-

Title: "Rocks and Minerals of the Ouachita Mountains"

Film: 16 mm, color, 25 minutes, with narration and background music

Brief content description: Structure and meaning of the Ouachita System, from western Arkansas through Oklahoma and southwest across Texas. Similarity of rock types across this large, linear area is demonstrated. Unique rocks and minerals of this system are described.

Audience: Earth Science students (and general audience) of high school, junior high school and college age.

Rental: Audio-Visual Department, Eastern New Mexico University, Portales, New Mexico 88130

Purchase: Western Cine' Film Company, Denver, Colorado
Price: $65

(2) Film Appraisal: Appraisal of Result (that of the writer).-
It was decided that the audiences would be more interested in the uniqueness of the rocks and minerals of the Ouachita System, rather than in the geological problem areas, where the geology is somewhat obscure (partly because it is almost entirely tree-covered).

I would rate the film as "fair to good" as far as appealing to high school and college audiences. It is hoped that the results will be positive enough to encourage similar films to be made of other mountain ranges; I am confident that it will.

Film Appraisal: Appraisal of Result (student appraisal).-

Students that aided in the film appraisal consisted of four groups: (1) upper-division geology student; (2) Physical Geology student; (3) Senior High School; (4) Junior High School. Their reactions will be discussed in this order.

(1) Geology-Major student.- (class size: 9) This film was received by the junior-level Geology Major as follows: he thought that the film was interesting, that it represented a real learning experience, and that the numbers of maps and charts in the film was not too great. The film, however, was thought to have introduced too much material in too short a time; so that in places the film was not easy to understand.

Oddly enough, the upper-division Geology student was the only group that thought the film is "too advanced". (Student reaction from classes at Northern Arizona University still pending; further delay in order to receive their reaction is deemed unnecessary.) A more complete student reaction is given in the appendix of this report.

(2) Physical-Geology college student.- (Total number questioned 255) Again, these students believed that the film was interesting (90%) and that the film represents a real learning experience (62%); they also agreed with the upper-division student that there were not too many maps and charts (94%); and like the upper-division student they thought that the film introduced too much material in too short a time (64%); this "too much" reaction, however, apparently did not interfere with the learning experience that the film represents, and they agreed with their upper classmen that the teaching in the film was easy to understand (64%).

(3) Senior High students (group size: 51).- These students also agreed that the film was a learning experience (73%), that the film was easy to understand (71%), interesting (94%), and that there were not too many maps and charts (83%). This group received the film very well in that by percentage-reaction they expressed no negative reaction at all: they liked the dialogue (74%), music (71%), the film length (94%), and they felt that the film did not introduce too much material in too short a time (74%).

(4) Junior High students (group size: 43).- The average Junior High student was stretched a bit to understand the film in that half the group (50%) thought that it was too advanced, and that he thought too much material was introduced in too short a time (62%). Most, however, partly contradicted themselves by agreeing that the illustration and teachings were clear and easy to understand (77%), that the film was interesting (80%), and that there were not too many maps and charts (71%).

(3) Film-making Experience: Advice to other geological-film makers.- We believe that we did not uncover any truly unique methods, but some of our techniques, methods or advice seems useful enough to note down, for others who might also wish to film part of the geology of a mountain range:

(1) A heliocopter is the best method of filming from the air; to get low enough in areas of high relief the wind must be gentle at most.
(2) Zooming with a telescopic lens is generally not effective, nor is "panning". Zooming can be effective if one zooms out, from the close-up position to one that shows the "regional" setting of the outcrop.
(3) The dress of anyone shown in the outcrop should be plain, so that the style will not be a subject of comment ten years from now.
(4) Write the dialogue first. Before this is done one should review the film potential of the area about which he intends to put together a film. Remember the "best" outcrops and vistas in writing the dialogue.
(5) List the scenes to be taken and also the number of seconds that this scene should be showing.
(6) Sequential charts, to show a series of changes in faulting or in landforms for example, need not be animated; that is, a sequence may be shown in as few as two drawings. The drawings, however, should be carefully done because the attitude of the film-maker, whether or not he is earnestly trying to make a good film, is strongly suggested by the quality of his charts and diagrams.
(7) The narrator should not be a geologist or other scientist; a professional narrator will do a much better job.
(8) The background music should be pleasant but not so unique that it is diverting.
(9) Key outcrops to be filmed should be prepared very carefully; that is, all foliage that might interfere with a clear view should be cut down; and the surface of the outcrop should be swept clean.
(10) If possible a professional photographer should be employed. If a geologist does his own shooting he should (1) shoot plenty of footage; and he should know how many seconds he needs for a given scene, (2) avoid where possible zooming and panning.
(11) It is difficult to maintain interest throughout a geological moving picture. If one is going to do this successfully he needs to (a) use outdoor pictures more than maps, drawings, diagrams or cross sections, (b) tell a story of what happened geologically by a series of diagrams showing the story, as well as by what is said in the dialogue.
(12) Any one chart, map or diagram should have very few printed words; students are listening as well as looking and reading.

(13) As far as I know, no one in this country has employed a mountain range or system as a unified topic for any film. To us it seems a worthy challenge to depict the geology of a given mountain range in such a way that it will stimulate real interest in geology; we have geological experts who know a lot about one or more mountain ranges, areas that represent the most interesting geological "laboratories"; but we still need geologists who are willing to demonstrate, by way of a moving picture, why these areas are interesting and challenging to them. Again, it is hoped that this report and the accompanying film will encourage other geologists to produce good geologic films.

Conclusions and Recommendations

Conclusions

The film about the deformational history of the Ouachita Mountains was not attempted because initial filming experience made it clear to the writer that a "deformational" film would not be "multi-level". I believe that my decision to film the rocks and minerals of the Ouachita Mountains was a good one because the film was fairly well received by students of both high school and college age; the film we produced was multi-level. I believe further that our attempts to make this geological film meaningful and interesting were fairly successful and I conclude with these hopes: that this film will stimulate other geologists to produce films about other mountain ranges, and that my experiences might help them in making such films.

Recommendations

Dissemination.- I would like to recommend that the film copies (6) be sent to Eastern New Mexico University, where I can direct effectively its dissemination to high schools within the Ouachita Mountain area and Marathon Mountains. Furthermore, I intend to send the film to film-review centers who in turn can review the film and advertise the fact that the film can be rented from Eastern or bought from Western Cine Film Company of Denver, Colorado, for the nominal fee of $65.

Need for Geological Films.- Geological films are rarely made to show the geology of a region. It is hoped and recommended that the production of geologic films be encouraged by funding some others of them, especially those that depict the highlights of the geology of regions throughout this country. The excellent films about the geology of the Alp Mountains, produced by the French Academy of Science, we should emulate in this country.

Supplementary Material

The Questionnaire used and the percentage-tabulation for each group is included herein.

PLEASE FILL OUT

Check one choice for each:

I. Group:

_____Junior High School Student

_____Senior High School Student

_____College Student (1st year science)

_____Geology-Major College Student

_____Professional Geologist

II. Generally:

a. The film was too advanced for me. Yes_____No_____

b. The illustrations and the teaching in the film was clear and easy to understand. Yes_____No_____

c. The film was too long. Yes_____No_____

d. The film had too much dialogue for length of film. Yes_____No_____

e. The film was interesting. Yes_____No_____

f. The film introduced too much material in too short a time. Yes_____No_____

g. The film represents a real learning experience. Yes_____No_____

h. There were too many maps and charts. Yes_____No_____

i. The background music was satisfactory. Yes_____No_____

III. In detail, the film showed:

a. recognizable technical errors. Yes_____No_____

(if so, please specify): _____

b. places where dialogue did not fit the visual part. Yes_____No_____

IV. What is your general appraisal of the film (in one or two sentences).

QUESTIONNAIRE PERCENTAGE TABULATION

Geology-Major College Student

Class Size: 9

Question No. II	Yes%	No%
a	82%	18%
b	36%	64%
c	0%	100%
d	18%	82%
e	77%	23%
f	77%	23%
g	84%	16%
h	9%	91%
i	75%	25%

Question No. III		
a	18%	82%
b	25%	75%

QUESTIONNAIRE PERCENTAGE TABULATION

College Student (1st Year Science)

Group Size: 255

Question No. II	~~No %~~ Yes	Yes %
a	44%	56%
b	64%	36%
c	14%	86%
d	30%	70%
e	90%	10%
f	64%	36%
g	62%	38%
h	6%	94%
i	80%	20%

Question No. III		
a	10%	90%
b	16%	84%

QUESTIONNAIRE PERCENTAGE TABULATION

Senior High School Student

Group Size: 51

Question No. II	No %	Yes %
a	82%	18%
b	29%	71%
c	94%	6%
d	74%	26%
e	6%	94%
f	74%	26%
g	27%	73%
h	83%	17%
i	29%	71%

Question No. III		
a	73%	27%
b	74%	26%

QUESTIONNAIRE PERCENTAGE TABULATION

Junior High School

Group Size: 43

Question No. II	~~No~~ Yes %	Yes No %
a	50%	50%
b	77%	23%
c	14%	86%
d	71%	29%
e	80%	20%
f	62%	38%
g	57%	43%
h	29%	71%
i	50%	50%

Question No. III		
a	20%	80%
b	29%	71%