THE MEASUREMENT OF SCENIC PREFERENCES:
A CASE STUDY IN ALASKA

by

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THE MEASUREMENT OF SCENIC PREFERENCES: A CASE STUDY IN ALASKA

ABSTRACT: The semantic differential technique was used to quantify four interest groups' perceptions of twenty-six Alaskan scenes. The scenes represented both panoramic views and views of Mount McKinley from different sites in south-central Alaska. The perceptions were measured on six semantic scales ("ugly-beautiful", "dislike-like", "unpleasant-pleasant", "unstimulating-stimulating", "level-mountainous", and "monotonous-varied"), and the responses enabled analysis of both scenes and sites in terms of preferences. Results show that views of Mount McKinley were without exception the more preferred. Statistical analysis utilizing Kendall's coefficient of concordance (W) indicated significant agreement between the interest groups in both the site rankings and rankings of views of Mount McKinley.

INTRODUCTION

Quantification of the landscape is becoming a very necessary and useful component in land management decisions. The need to consider the visual resources in land use planning has only recently been fully realized. However, obstacles remain. By its very nature, scenic beauty is difficult if not impossible to quantify. As yet, there are no widely accepted methods for measuring scenic beauty. Efficient land use management demands a workable model so that the manager can identify and inventory the visual resource, as well as predict changes in it due to management decisions. Also, the ability to measure scenic beauty in economic terms is needed in order to directly compare economic benefits with potential losses of scenic beauty.

Workable techniques of landscape evaluation will eventually be developed and accepted if they are based on sound principles of human psychology and landscape design and if their capabilities and limitations are realized.

> Beauty, whether it is man-made or natural, can never be accurately measured. There is no reason, however, why it should not be modeled. By defining the variables associated with an object and a subject's perception of it, a reasonable understanding of aestheticism may be obtained (Coomber and Biswas, 1973, p. 35).

This research project is concerned with measuring people's perceptions and preferences of selected Alaskan scenes. This quantification enables a ranking of the scenes based on perceived aesthetic beauty. The theory and various components of the methodology are discussed, as well as the current techniques from which they were borrowed.

PROJECT BACKGROUND

An outdoor recreational development has been proposed for Denali State Park, which is situated just south of Mount McKinley in south-central Alaska. Reasons for this project are several and will only be briefly mentioned here.

This development could open up new land for recreational opportunity, provide another view of Mount McKinley, and fulfill the need for an alternative to Mount McKinley National Park. Currently the National Park is the only large developed recreational area in the Alaska Range. It encloses fragile ecosystems and is operated as a wilderness Park. Approximately 400,000 visitors annually enter the Park, causing tremendous overcrowding which threatens to seriously damage the Park's natural environments as well as diminish the quality of visitors' experiences (Brown, 1979). Over thirty percent of the Park's campground users are from Anchorage, Alaska's largest city (Brown, 1979). A recreation development in Denali State Park would reduce travel time from Anchorage by more than half. This development would also open up a relatively untouched area for recreational opportunities. The population of south-central Alaska has experienced remarkable increases, and such a development could ease recreational crowding throughout the region.

The physical siting of such a facility is quite limited due to the terrain along the south side of the Alaska Range. The site must be located on dry and stable land, and access should not be exceedingly costly. The third determinant, and most important to the Alaska State Division of Parks, is that the site have a substantial view of Mount McKinley (elevation 20,320 ft.). A site on the south side of the Range would also afford a good view of two other large mountains that are part of the Mount McKinley Massif. These mountains, Mount Foraker (17,400 ft.) and Mount Hunter (14,570 ft.), are not noticeable from the north side of the Alaska Range.

In 1979, the state agency did tentatively select a location near Long Creek above the Tokositna River, after considering several other sites. No research was conducted to determine the aesthetic appeal of the views from the various sites. Only subjective judgement was used in deciding where the most scenic views of Mount McKinley were, and planning decisions have been based on those judgements. A significant miscalculation of perceived scenic beauty could result in much lower public usage than anticipated.

PROJECT OBJECTIVES

There are several objectives to this study of aesthetic preferences.

1) The principal objective is to compare views of Mount McKinley from each potential development site, as well as from some popular vantage points.
2) A second, similar objective is to compare overall views from each potential site.
3) A third objective of lesser importance is to see if much variance exists between preferences of different interest groups.

REVIEW OF CURRENT LANDSCAPE RATING MODELS

To better understand the methodology of the Mount McKinley preference study, it is best to first review various techniques already developed and tested. Studies are theoretically either subjective or objective, but most studies fall somewhere in between the two, borrowing qualities or techniques from both. Rare is the totally objective study, no matter how much the developer attempts to eliminate personal bias.

Subjective Models

Subjective models are characterized by assumptions made by the developers concerning people's preferences. Generally, these models are based on the premise that certain components of the landscape are aesthetically more pleasing than others, and the presence of these qualities within a landscape will increase its scenic beauty. For example, Leopold (1969) assumed that large, fast-flowing rivers were more scenic than small, placid streams.

Other subjective models delve more into the abstract qualities of a landscape, such as its vividness, unity, and variety. These models also rely on the developer's criteria for aesthetic beauty as well as the field observer's perceptions of the landscape. In these models, the scenic beauty of landscapes are usually defined in general terms (e.g. low, medium, or high scenic beauty). These models are probably most suitable when the visual resources of large areas of land must be inventoried. The U.S. Forest Service and U.S. Bureau of Land Management employ these techniques in order to better recognize the scenic resources of the lands they administer. Knowledge of the visual resources within a given area helps determine which land-use activities are compatible (U.S. Forest Service, 1973). Highway studies may employ these systems in order to determine and identify both the general scenic quality and special visual features of proposed routes (Jones et al., 1976; Alaska Department of Natural Resources, 1978).

Objective Models

Objective models generally employ some type of survey of people in order to determine landscape preferences. The optimal survey elicits on-site responses, but this is generally impractical. Therefore, most objective studies rely on either slide transparencies or photographic prints to represent the landscape, and in a few cases these results are then compared to on-site responses.

Many studies using slides employ the semantic differential to elicit the viewers' responses. Since the semantic differential technique was selected as part of this study's methodology, this tool will be quickly described.

The semantic differential was developed by Osgood et al. (1957) as a method of measuring perception within a semantic space. The semantic differential consists of a set of scales, and "each semantic scale represents a straight line function that passes through the origin of this [semantic] space, and a sample of these scales then represents a multidimensional space" (Osgood et al., 1957, p. 25). Each scale is bounded by a set of bipolar adjectives (e.g. "ugly-beautiful", "hot-cold", etc.). Upon being presented a stimulus, either conceptual or real, the respondent marks an "X" on the scale according to his or her feelings about the stimulus. An example of the semantic differential scale is shown below, where A and A' represent a set of bipolar adjectives.

A $\underline{\ 1\ }$: $\underline{\ 2\ }$: $\underline{\ 3\ }$: $\underline{\ 4\ }$: $\underline{\ 5\ }$: $\underline{\ 6\ }$: $\underline{\ 7\ }$ A'

A mark in space 1 or 7 represents a feeling of extremely A or A', a mark in 2 or 6 represents moderately A or A', and a mark in 3 or 5 represents slightly A or A'. An answer in space 4 at mid-scale represents equally A and A', or neither A or A'. These responses are then quantified and collated by the researcher for analysis.

There are several notable objective rating techniques worth mentioning. As noted before, several rely on the semantic differential. The number of scenes rated and the number of semantic scales used depend largely on the objectives of the researcher. In order to compare similarities in people's reactions to color slides, photographs, and the actual outdoor scenes, Shafer and Richards (1974) measured a wide range of perceptions using twenty-seven bipolar adjectives. In another study, Zube (1973) used landscape drawings and similar slides of actual scenes to determine preferences of various landscape components and the feasibility of using drawings in place of photos. (The drawings were found to be unreliable as a substitute).

Daniel et al. (1976) used the theory of signal detectability to create a model for determining landscape beauty independent of observer judgemental criteria. Signal detectability is a "psychophysical measurement model that explicitly distinguishes between the observer's sensitivity and his criterion state. Each of these constantly varies" (Daniel et al., 1973, p. 330). This model, known as the Scenic Beauty Estimation (SBE) model, used a ten-point scale to measure one's preference for each scene. By adjusting the observers' ratings to take into account the effect of differing judgemental criteria, scenic beauty values were calculated. Extensive comparisons with on-site testing have tended to comfirm the SBE model's accuracy.

One of the most intriguing techniques to quantify scenic beauty was developed by Shafer and Mietz (1970). They developed a multiple regression equation to calculate scenic beauty. This equation was generated by analysis of people's reactions to photographs of outdoor scenes. The variables within the equation were perimeter and area measurements of eight zones within a photo (e.g. area of water, perimeter of sky, perimeter of immediate trees and shrubs, etc.). Using this equation it was possible to calculate the scenic beauty of any scene represented in a photograph. "Multiple regression is particularly appropriate to the analysis of landscape preference because it takes into account not only the changes in a given landscape variable, but also the many subtle and unsuspected interactions with other variables in the models" (Brush and Shafer, 1975, p. 182).

One other technique that could be mentioned measures viewers' response times to slides of natural scenes (Evans and Zube, 1975). The developers discovered that subjects responded faster to scenes of very high or low scenic beauty.

SELECTION OF A MODEL FOR MEASURING AESTHETIC PREFERENCES

It was decided to use an objective technique for measuring scenic preferences, since it seems best suited for measuring people's perceptions.

The semantic differential technique was chosen, since it can measure people's responses in several semantic dimensions, and is well accepted as a tool for measuring perceptions (Larsen, 1979). The semantic differential is easy to apply and interpret, and it doesn't need an elaborate computer program to compute the results. In many cases utilizing the semantic differential, factor analysis is employed in order to identify individual factors that create the greatest variations in preferences. Factor analysis was not used in this study because its results were not necessary to fulfilling the research objectives.

Color slide transparencies were selected to represent the scenes because they were cheaper than photographs and had projection capabilities to groups of viewers. On-site testing with the semantic differential was, of course, impossible, since groups of respondents would have had to be transported to each site, and during clear weather.

It has generally been shown that a slide can imitate an actual scene fairly well provided that it depicts most of the variety of an actual scene (Shafer and Richards, 1974). Kaplan (1975, p. 93) stated that:

> . . . the spatial interpretations that participants make of two-dimensional photographs in our research and in other studies is hardly surprising. The perceptual apparatus is highly biased toward spatial interpretations, and people in our society have extensive experience with photographs as representations of the three-dimensional world. To criticize photographs as artificial and inadequate in landscape research is to fail to appreciate the nature of human perceptual mechanisms.

Other studies (Howard et al., 1972; Shafer and Richards, 1974) have shown that responses to slides tend to have more of a negative reaction than on-site responses.

It was decided to see if much variation in preferences existed between different interest groups. Previous research has indicated that it does not (Arthur, 1975; Zube, 1973; Craik, 1972). For example, Daniel and Boster (1976) found similar preferences between preservation and development-oriented groups when they were shown results of different tree harvesting methods.

METHODOLOGY

Views of Mount McKinley and overall panoramic views were analyzed and compared from six locations (Figure 1). These sites were located at:

A) south Curry Ridge;

B) above Byers Lake;

C) Long Creek, above the Tokositna River;

D) Long Point, in the Peters Hills;

E) Indian Ridge; and

F) Wonder Lake, in Mount McKinley National Park.

Sites A through E were within Denali State Park. The site at Wonder Lake was also sampled to see how it compared with the other sites on the south side of the Alaska Range. Two popular views of Mount McKinley, located at Ruth Glacier Overlook near site A and at Stony Point in the National Park were also sampled in order to be compared with the views of Mount McKinley from the six other sites.

Scene Sampling Procedure

Field work for this research was conducted during August, 1979. A

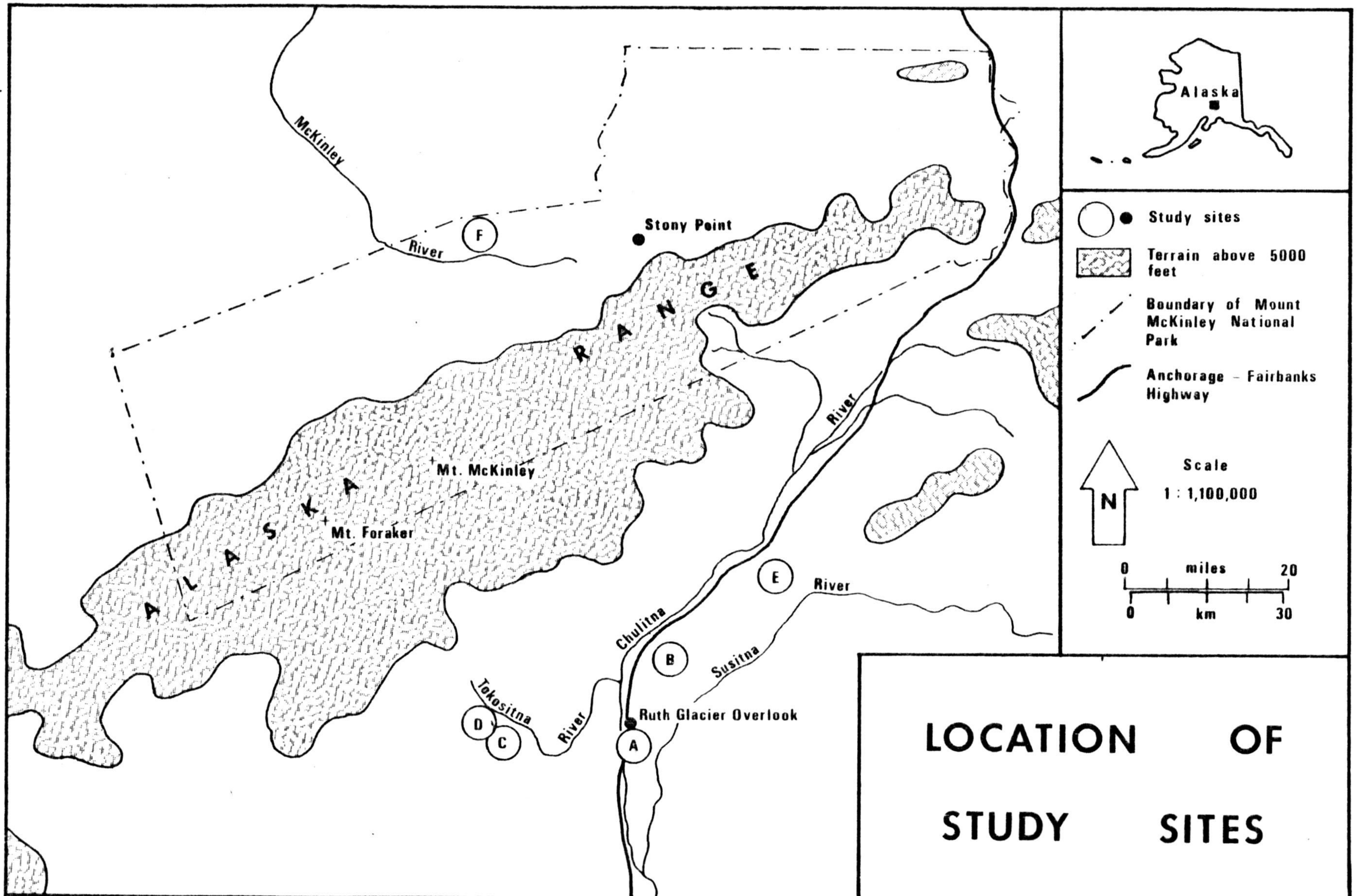
McKinley
River
Stony Point
F
A L A S K A
R A N G E
Mt. McKinley
Mt. Foraker
River
Chulitna
E
River
B
Susitna
Tokositna
River
Ruth Glacier Overlook
D
C
A
Alaska
Study sites
Terrain above 5000 feet
Boundary of Mount McKinley National Park
Anchorage - Fairbanks Highway
N
Scale
1 : 1,100,000
0
miles
20
0
km
30
LOCATION OF STUDY SITES

FIGURE 1

summer month was chosen since this is when the vast majority of outdoor recreation occurs in Alaska. It also reduces the ephemeral effects, such as clouds, which seem to be constantly present in some form up until mid-August.

As mentioned earlier, it was decided to use color slides for the testing. A 35 mm camera and 50 mm lens were used with no filter attachments. The photos were taken between 1000 and 1530 hours in order to reduce the influence of shadowing and severe frontlighting and backlighting. An attempt was made to photograph only during sunny and clear weather in order to eliminate the presence of clouds. There was fairly good success in this respect, especially considering the Alaskan climate. Immediate foreground in the photos (i.e. "framing the photo") was avoided, since this can enhance or hide a view by sidestepping a few feet. Any development occurring on the site would remove any obstruction and create its own immediate foreground.

A systematic sampling technique was used in order to obtain the best panoramic representation. After centering one photograph on the Mount McKinley Massif, the camera was rotated 90^{0} and another photo was taken. By following this procedure two more times, a total of four photos were taken, each at right angles to the next. This represented approximately 184^{0} (4×46^{0}) of the 360^{0} of the panoramic view. These photos appeared to be fairly representative of the total view. This procedure was conducted at each site.

<u>Respondents</u>

Four groups of people were selected for the main testing. This was done to see if any significant variance existed between them. As stated earlier, research so far has not found significant dissimilarities. Groups tested were:

1) Rock and Gem Club, Corvallis, Oregon (n=28). Members collect and trade precious and semi-precious gems and stones, and take occasional field trips to rock-hounding areas and other points of interest. This group is composed primarily of middle-aged couples.

2) Good Sam Clubs of Albany and Corvallis, Oregon (n=35). These clubs consist of people who travel extensively, visiting recreational areas and developments. The membership is composed primarily of middle-aged, retired couples.

3) Outdoor Program, Oregon State University, Corvallis (n=19). This is not a formal group per se. It is composed of students who have an interest in hiking and backpacking.

4) Introductory geography class at Oregon State University, Corvallis (n=23). This is an undergraduate class and is composed mainly of freshmen and sophomores. Backgrounds vary, but most are enrolled in either the Schools of Engineering or Business.

The Questionaire

Semantic differential scales were selected for the questionaire. Only six adjective pairs were used. Kaplan (1972) suggested that a "halo effect" occurs if there are too many scales per item. With a large number of scales, there is a tendency to rate the item high or low on all the scales.

A seven-point scale was used for two reasons: 1) an odd number allows the subject to noncommittal; and 2) Osgood et al. (1957) found that with a seven-point scale, answers are evenly distributed over the entire range. The six bipolar adjectives used were "ugly-beautiful", "dislike-like", "level-mountainous", "unpleasant-pleasant", "unstimulating-stimulating", and "monotonous-varied." These adjectives were selected from a pre-test which involved ten pairs. The final adjectives were chosen on the basis of the lowest intercorrelations and standard deviations. The words were randomized for each slide in order to reduce the "halo effect" and force the respondent to think about each descriptor.

The Slide Presentation

At the start of the slide show, each group was shown how to use the semantic differential. Three sample slides were shown at the start of the program to orient the viewers with the technique, the adjectives, and the types of scenes. Roughly thirty to sixty seconds were allowed per slide. As the show progressed and repondents became accustomed to the scales and scenes, viewing time decreased. The twenty-six slides were randomized for each show.

Data Reduction and Analysis

Each viewer's response was converted to a score corresponding to the seven-point scale of the differential. Then viewers' responses within each interest group were combined as a whole, and an average score was computed for each adjective for each scene. This yielded the scene scores for each group.

Site scores were calculated for each interest group by combining each scene within a site. The scene scores for each adjective were averaged together, and the result was one adjective score for each site.

Group comparisons were done primarily by ranking the individual scores for each group. To accomplish this, a score was calculated for each scene by averaging individual values for the adjectives "beautiful", "like", "pleasant", "stimulating", and "varied." The rationale for this is that, generally, the more a scene relates to any of these adjectives, the higher its preference score. Therefore, this study attempted to measure preference as it related to a scene's beauty, likability, pleasantness, stimulation, and variety. It is generally agreed that the more a scene has of any of these qualities, the higher its preference. The amount of variety in a scene is a more abstract quality, yet it is desirable in a landscape (Litton, 1972). The adjective pair "level-mountainous" was not included in the scene's average score because it did not indicate preference. This adjective was rated in order to get an idea of the viewer's perceptions of the relief viewed.

Each of the other five adjectives was being rated equally in this study, since weighting would prejudice the results. As yet, no set procedure exists for weighting. This should be kept in mind when looking at the results. One more very important point to make is that, in this study, preference was measured on the five previously mentioned qualities. Other adjective modifiers could also have been used (e.g. "exhilarating", "interesting") and responses to those would modify the results.

Sites were ranked within each interest group by ranking within each adjective. These ranks were then averaged for each scene, and ranks were assigned from low to high; low scores indicate greater preferences. Any very close totals were tabulated as ties. This process yielded an average rank for each site within a group.

Ranking the views of Mount McKinley for each group was accomplished by ranking the mean scores within each adjective. These ranks were averaged for each view of the mountain, and ranks were assigned from low to high.

The amount of agreement between the different groups was measured by comparing their respective rankings. Statistical analysis of ranked data is a relatively simple means of evaluation, but can be quite effective (Hammond and McCullagh, 1974). Kendall's coefficient of concordance, which is designated as W, is a nonparametric statistic, used because it measures the strength of agreement between more than two sets of rankings. Values of W range from 0 (no agreement) to 1 (total agreement). A chi-square value (X^2) can be computed from the W value and compared for significance with tabulated X^2 values.

The amount of agreement between groups was measured primarily by comparing their respective rankings of scenes. The amount of intergroup agreement was also calculated for site rankings and Mount McKinley view rankings.

Standard deviations were generated for each group's responses to quickly determine if any scenes or adjective descriptors produced wide variations in response. A consistently wide variation in adjective response could have been due to many or vague interpretations of the adjective, and a consistently wide variation in response for a given scene would probably point to many different or confusing perceptions of that scene.

RESULTS

Individual scene scores were generated and tabulated for each group (Tables 1 through 4). The scenes were separated into blocks of four, each block representing the four views from a particular site. Scenes 1 through 4 were from site A, 5 through 8 were from site B, 9 through 12 were from site C, 13 through 16 were from site D,

SCENE	BEAUTIFUL	LIKE	MOUNTAINOUS	PLEASANT	STIMULATING	VARIED	MEAN
1	4.23	4.57	3.09	4.57	3.77	4.11	4.25
2	4.69	4.77	4.57	4.91	4.54	4.51	4.69
3	5.29	5.54	5.00	5.43	4.86	5.20	5.26
4	6.37	6.00	5.49	5.89	5.20	5.86	5.86
5	5.11	5.60	5.85	4.94	4.77	5.03	4.97
6	4.80	4.77	5.11	4.94	4.77	4.74	4.81
7	5.09	4.97	5.20	5.26	4.94	5.11	5.07
8	6.80	6.37	6.29	6.49	6.49	5.80	6.39
9	4.20	4.06	5.66	4.20	4.03	4.23	4.14
10	4.49	4.29	2.97	4.40	4.11	4.17	4.29
11	4.94	4.71	5.68	4.85	4.18	4.88	4.71
12	6.57	6.57	6.69	6.46	6.11	6.26	6.39
13	4.74	4.86	5.60	4.97	4.54	4.46	4.71
14	4.69	4.80	5.77	4.91	4.54	4.80	4.75
15	5.00	5.03	5.06	5.17	4.74	5.06	5.00
16	6.09	6.09	6.49	6.20	5.71	5.69	5.95
17	4.46	4.57	5.57	4.63	4.46	4.57	4.54
18	4.06	4.43	6.34	4.03	4.37	3.86	4.15
19	5.69	5.69	5.71	5.69	5.51	5.46	5.61
20	6.74	6.40	6.03	6.26	6.17	6.17	6.35
21	5.51	5.26	5.46	5.54	5.17	5.14	5.33
22	6.11	5.83	4.34	6.26	5.60	5.74	5.91
23	4.60	4.63	4.54	4.40	3.94	4.20	4.35
24	6.53	6.71	6.44	6.71	6.53	5.74	6.44
25	6.91	6.89	6.43	6.80	6.37	5.74	6.54
26	6.60	6.57	6.23	6.46	6.40	5.89	6.38

TABLE 1. Scene scores for the Good Sam Clubs

SCENE	BEAUTIFUL	LIKE	MOUNTAINOUS	PLEASANT	STIMULATING	VARIED	MEAN
1	4.04	3.54	2.96	4.36	3.21	3.36	3.70
2	4.14	4.39	4.14	4.21	3.61	3.71	4.01
3	4.54	4.68	4.54	4.46	4.00	4.29	4.39
4	6.39	6.68	5.75	6.43	6.39	6.46	6.47
5	4.89	4.97	5.18	5.04	4.75	5.07	4.94
6	4.96	5.00	4.96	4.96	4.32	4.46	4.74
7	4.89	5.11	4.81	5.19	4.44	5.04	4.93
8	6.46	6.50	6.32	6.43	6.29	6.54	6.44
9	3.85	3.96	5.50	3.96	3.71	3.79	3.86
10	4.07	4.22	3.15	4.19	3.89	4.26	4.13
11	4.82	4.79	4.75	4.79	4.50	5.04	4.79
12	6.57	6.43	6.69	6.46	6.32	6.46	6.45
13	4.30	4.07	5.19	4.26	3.93	3.74	4.06
14	4.32	4.50	5.07	4.46	4.00	4.64	4.39
15	4.50	4.50	4.73	4.81	4.04	5.04	4.58
16	6.30	6.37	6.44	6.56	5.96	6.30	6.30
17	4.04	4.30	5.26	3.93	3.67	3.85	3.96
18	3.74	4.33	5.78	4.04	4.19	3.59	3.98
19	5.86	5.57	5.64	5.64	5.39	5.93	5.68
20	6.36	6.50	6.46	6.32	6.50	6.25	6.39
21	5.36	5.21	4.93	5.43	4.96	5.43	5.28
22	5.75	5.86	4.79	5.69	5.54	5.82	5.77
23	3.96	3.70	3.96	4.07	3.19	3.63	3.71
24	6.43	6.29	6.54	6.39	6.18	6.04	6.26
25	6.63	6.48	6.41	6.67	6.07	5.93	6.36
26	6.57	6.54	6.46	6.54	6.43	5.82	6.38

TABLE 2. Scene scores for the Rock and Gem Club

SCENE	BEAUTIFUL	LIKE	MOUNTAINOUS	PLEASANT	STIMULATING	VARIED	MEAN
1	3.74	3.89	2.42	3.95	2.95	2.58	3.42
2	4.42	4.47	3.69	4.63	3.95	3.89	4.27
3	4.74	4.63	4.05	4.84	4.42	4.05	4.54
4	6.00	5.95	5.05	5.89	5.42	5.63	5.78
5	5.53	5.68	4.95	5.47	5.53	5.53	5.55
6	4.42	4.53	4.11	4.37	3.89	4.00	4.24
7	5.11	5.30	4.37	5.00	4.84	4.95	5.04
8	6.74	6.79	6.37	6.58	6.63	6.37	6.62
9	4.42	4.63	4.84	4.21	3.89	3.95	4.22
10	3.63	3.63	3.21	3.74	3.37	3.26	3.53
11	4.16	4.26	4.42	4.16	3.89	4.00	4.09
12	6.21	6.05	6.16	6.11	5.84	5.32	5.91
13	4.89	5.42	4.47	5.32	4.42	4.11	4.83
14	5.26	5.42	4.58	5.32	5.05	5.05	5.22
15	5.21	5.05	4.11	5.21	4.47	4.21	4.83
16	6.00	5.95	6.00	5.00	6.00	5.63	5.92
17	3.89	4.11	4.53	3.79	3.47	3.63	3.78
18	3.74	3.68	5.21	3.58	3.53	3.58	3.62
19	4.37	5.16	3.89	4.63	4.37	4.84	4.67
20	6.53	6.47	5.95	6.32	6.32	6.00	6.33
21	5.42	5.47	4.53	5.53	4.47	5.05	5.19
22	5.26	5.37	3.84	5.32	4.74	4.95	5.13
23	4.00	4.00	3.42	4.11	3.37	3.00	3.69
24	6.79	6.68	6.00	6.63	6.58	6.53	6.64
25	6.26	6.68	5.53	6.05	6.16	5.47	6.13
26	6.00	5.79	5.68	5.63	5.95	5.47	5.77

TABLE 3. Scene scores for the Outdoor Program

SCENE	BEAUTIFUL	LIKE	MOUNTAINOUS	PLEASANT	STIMULATING	VARIED	MEAN
1	4.30	4.09	2.00	4.30	3.30	3.13	3.83
2	4.35	4.26	4.09	4.65	4.00	3.22	4.10
3	4.04	4.26	4.16	4.13	3.87	3.96	4.05
4	6.22	6.22	4.52	6.22	6.26	5.74	6.13
5	4.70	4.39	5.17	4.30	4.09	4.30	4.36
6	4.43	4.52	4.74	4.57	4.74	4.09	4.47
7	4.39	4.22	4.78	4.35	4.22	4.74	4.38
8	6.30	5.91	5.48	6.13	6.17	5.87	6.08
9	4.09	4.13	5.39	4.04	3.57	4.00	3.97
10	3.65	3.48	3.17	3.96	3.00	2.96	3.41
11	3.48	3.61	4.65	3.70	3.65	3.48	3.59
12	6.30	6.39	6.13	6.22	6.43	5.91	6.25
13	4.57	4.61	4.83	4.74	3.91	3.83	4.33
14	5.00	5.00	5.26	4.78	4.83	4.39	4.80
15	4.43	4.09	3.48	4.30	3.65	3.78	4.05
16	5.48	5.96	5.96	5.65	5.83	5.70	5.72
17	3.52	3.83	4.96	3.78	3.30	3.22	3.53
18	3.65	4.35	5.61	4.35	3.87	3.17	3.88
19	4.61	4.70	4.87	4.61	4.35	4.52	4.56
20	5.91	6.26	5.52	5.87	6.22	5.91	6.03
21	4.13	4.30	4.35	4.17	3.87	3.35	3.97
22	5.48	5.39	3.87	5.35	5.30	5.61	5.43
23	3.91	3.39	4.30	4.22	3.17	3.04	3.55
24	6.70	6.70	6.00	6.57	6.52	6.35	6.57
25	6.26	6.39	5.57	6.26	6.30	5.78	6.20
26	6.30	6.30	5.83	6.30	6.43	5.96	6.26

TABLE 4. Scene scores for the Introductory Geography class

17 through 20 were from site E, and 21 were from site F. Scenes 4, 8, 12, 16, 20, and 24 represented views of Mount McKinley from their respective sites, and scenes 25 and 26 were views of Mount McKinley from Ruth Glacier Overlook and Stony Point, respectively. The first numbered scene within a block represented the view 90^0 to the left of the Mount Mount McKinley view. The second scene represented the view opposite or 180^0 from the view of Mount McKinley, and the third scene was the view 90^0 to the right of the Mount McKinley view.

Each of these four tables (Tables 1 through 4) shows the mean response for each set of bipolar adjectives. Along the right side of the table is the average score for the combined adjective responses for the scene. This average score includes all the adjective pairs except "level-mountainous", the reason for this having been explained earlier.

Figure 2 is a graph that shows each scene's average score for each viewer group. Two observations are immediately obvious: 1) there appeared to be fairly good agreement between groups for each scene; and 2) all views of Mount McKinley were preferred over every other scene. These points will be discussed in greater detail later.

Each site's average adjective values were also tabulated for each group (Tables 5 through 8). These values were generated by combining all four scenes of the site for each adjective descriptor. A basic assumption was that the four scenes of the photo were representative of the entire panoramic view from a site, and that they were generally in the right proportions. In parentheses are the ranks for each site within each adjective. The overall rank for each site is on the right edge of the table, and was calculated by averaging the five ranks within each site, and then ordering these from low to high.

Each group's preference scores for views of Mount McKinley were

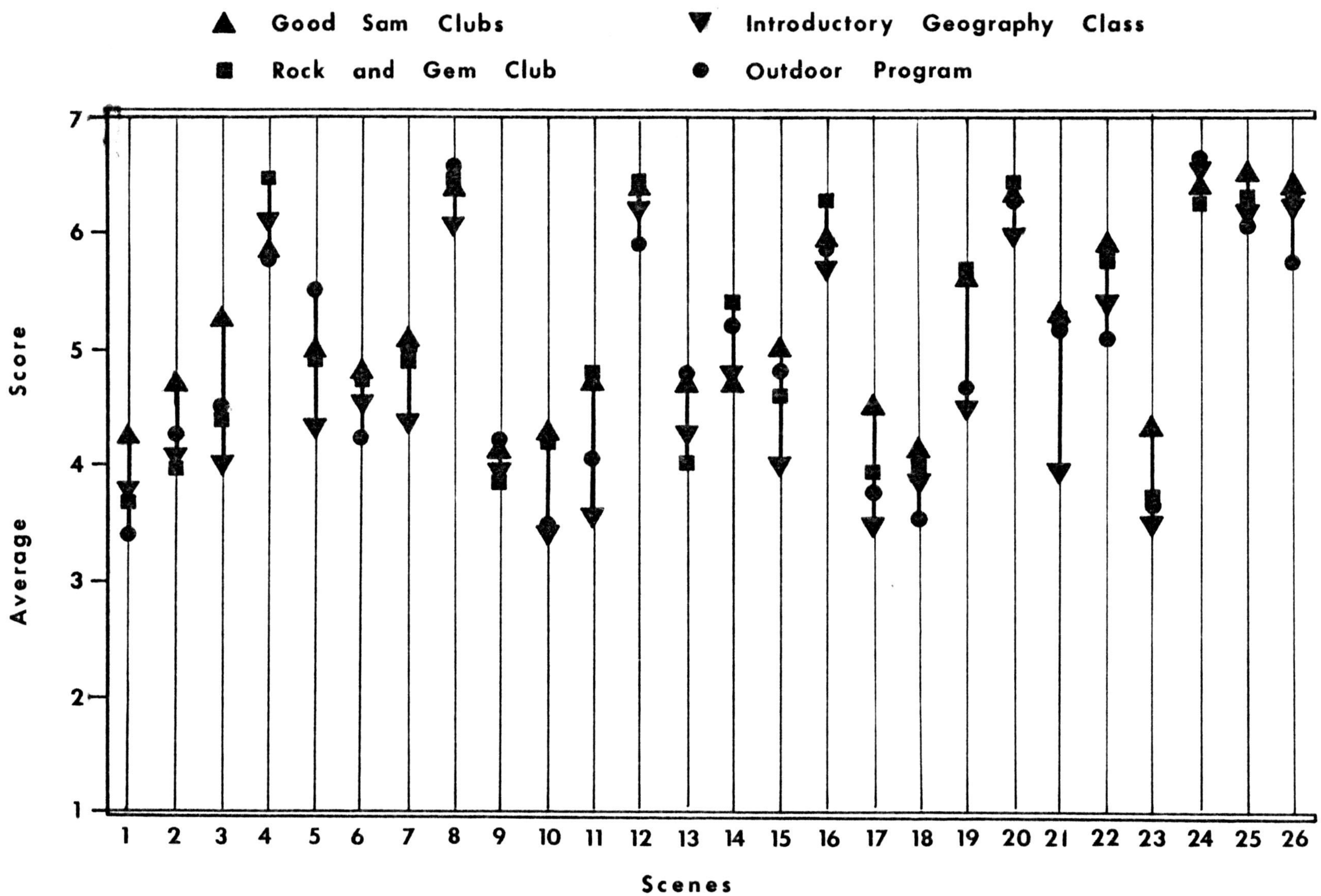

FIGURE 2. AVERAGE SCENE SCORES FOR EACH GROUP

SITE	BEAUTIFUL	LIKE	MOUNTAINOUS	PLEASANT	STIMULATING	VARIED	
A	(4) 5.14	(4) 5.22	(6) 4.54	(4) 5.20	(6) 4.59	(5) 4.92	(5)
B	(2) 5.45	(2) 5.28	(3) 5.61	(2) 5.41	(2) 5.24	(2) 5.17	(2)
C	(6) 5.05	(6) 4.91	(4) 5.25	(6) 4.98	(5) 4.61	(6) 4.88	(6)
D	(5) 5.13	(5) 5.19	(2) 5.73	(3) 5.31	(4) 4.89	(4) 5.00	(4)
E	(3) 5.24	(3) 5.27	(1) 5.91	(5) 5.15	(3) 5.13	(3) 5.01	(3)
F	(1) 5.69	(1) 5.61	(5) 5.20	(1) 5.73	(1) 5.31	(1) 5.21	(1)

TABLE 5. Site scores for the Good Sam Clubs

SITE	BEAUTIFUL	LIKE	MOUNTAINOUS	PLEASANT	STIMULATING	VARIED	
A	(6) 4.78	(6) 4.82	(6) 4.35	(5) 4.87	(6) 4.30	(6) 4.46	(6)
B	(2) 5.30	(1) 5.39	(3) 5.32	(2) 5.40	(2) 4.95	(1) 5.28	(2)
C	(5) 4.83	(5) 4.85	(5) 5.02	(6) 4.85	(4) 4.61	(5) 4.89	(5)
D	(4) 4.85	(4) 4.86	(2) 5.36	(3) 5.02	(5) 4.48	(3) 4.93	(4)
E	(3) 5.00	(3) 5.18	(1) 5.79	(4) 4.98	(3) 4.94	(4) 4.91	(3)
F	(1) 5.37	(2) 5.27	(4) 5.05	(1) 5.45	(1) 4.97	(2) 5.23	(1)

TABLE 6. Site scores for the Rock and Gem Club

SITE	BEAUTIFUL	LIKE	MOUNTAINOUS	PLEASANT	STIMULATING	VARIED	
A	(4) 4.72	(5) 4.74	(6) 3.80	(4) 4.83	(6) 4.18	(6) 4.04	(5)
B	(1) 5.45	(1) 5.58	(1) 4.95	(3) 5.36	(1) 5.22	(1) 5.21	(1)
C	(6) 4.61	(6) 4.64	(4) 4.66	(6) 4.55	(5) 4.25	(5) 4.13	(6)
D	(3) 5.34	(2) 5.46	(3) 4.79	(1) 5.46	(2) 4.99	(3) 4.75	(2)
E	(5) 4.63	(4) 4.86	(2) 4.89	(5) 4.58	(4) 4.42	(4) 4.51	(4)
F	(2) 5.37	(3) 5.38	(5) 4.45	(2) 5.39	(3) 4.79	(2) 4.88	(3)

TABLE 7. Site scores for the Outdoor Program

SITE	BEAUTIFUL	LIKE	MOUNTAINOUS	PLEASANT	STIMULATING	VARIED	
A	(4) 4.73	(5) 4.71	(6) 3.69	(3.5) 4.83	(5) 4.36	(6) 4.01	(5)
B	(2) 4.96	(4) 4.76	(2) 5.04	(3.5) 4.84	(1) 4.80	(1) 4.75	(2)
C	(6) 4.38	(6) 4.40	(4) 4.84	(6) 4.48	(6) 4.16	(5) 4.09	(6)
D	(3) 4.87	(2) 4.91	(3) 4.88	(2) 4.87	(3) 4.55	(3) 4.42	(3)
E	(5) 4.42	(3) 4.78	(1) 5.24	(5) 4.65	(4) 4.43	(4) 4.21	(4)
F	(1) 5.05	(1) 4.95	(5) 4.63	(1) 5.08	(2) 4.72	(2) 4.59	(1)

TABLE 8. Site scores for the Introductory Geography class

listed in Tables 9, 10, 11, and 12. Ranks for each site within each adjective are in parentheses. The overall ranks of the views are located on the right side of the tables.

The amount of agreement between the various groups was accomplished primarily by comparing overall rankings for scenes (Table 13). Also looked at was the agreement between site ranks and ranks of views of Mount McKinley. Kendall's coefficient of concordance was computed to measure the amount of agreement and to see if it was significant. Kendall's W=0.912 (on a scale of 0 to 1) indicated that there was a very high level of agreement. A chi-square value calculated from the W was 91.2, and indicated significance beyond the 0.005 confidence level (tabulated X^2=46.93, d.f.=25). Also measured was agreement between the groups on the site rankings (Table 14). The coefficient of concordance W=0.871 with an associated P value less than 0.001 indicated very strong agreement. The P value is the probability of a computed value of W greater than or equal to the tabulated value. It is used when n (the population sample) is less than 7 (Daniel, 1978).

There was much less, but still significant, agreement between groups concerning views of Mount McKinley (Table 15). A coefficient of concordance W=0.295 and associated P value of less than 0.120 was computed.

DISCUSSION

Individual Scenes and Landscape Features

Several characteristics and patterns were evident from looking at the tables of the scene scores (Tables 1 through 4) and the graph of those scores (Figure 2). Within each group, adjective means for each scene appeared to be fairly even, with the greatest amount of variation for the adjectives "mountainous" and "varied." Variation appeared to

SCENE	BEAUTIFUL		LIKE		MOUNTAINOUS		PLEASANT		STIMULATING		VARIED		
4	(7)	6.37	(8)	6.00	(8)	5.49	(8)	5.89	(8)	5.20	(4)	5.86	(7)
8	(2)	6.80	(6)	6.37	(5)	6.29	(3)	6.49	(2)	6.49	(5)	5.80	(2)
12	(5)	6.57	(3.5)	6.57	(1)	6.69	(4.5)	6.46	(6)	6.11	(1)	6.26	(5)
16	(8)	6.09	(7)	6.09	(2)	6.49	(7)	6.20	(7)	5.71	(8)	5.69	(8)
20	(3)	6.74	(5)	6.40	(7)	6.03	(6)	6.26	(5)	6.17	(2)	6.17	(6)
24	(6)	6.53	(2)	6.71	(3)	6.44	(2)	6.71	(1)	6.53	(6.5)	5.74	(3.5)
25	(1)	6.91	(1)	6.89	(4)	6.43	(1)	6.80	(4)	6.37	(6.5)	5.74	(1)
26	(4)	6.60	(3.5)	6.57	(6)	6.23	(4.5)	6.46	(3)	6.40	(3)	5.89	(3.5)

TABLE 9. Scores and ranks for scenes of Mount McKinley -- Good Sam Clubs

SCENE	BEAUTIFUL		LIKE		MOUNTAINOUS		PLEASANT		STIMULATING		VARIED		
4	(6)	6.39	(1)	6.68	(8)	5.75	(5.5)	6.43	(3)	6.39	(2.5)	6.46	(1.5)
8	(4)	6.46	(3.5)	6.50	(7)	6.32	(5.5)	6.43	(5)	6.29	(1)	6.54	(3.5)
12	(2.5)	6.57	(6)	6.43	(1)	6.68	(4)	6.46	(4)	6.32	(2.5)	6.46	(3.5)
16	(8)	6.30	(7)	6.37	(5)	6.44	(2)	6.56	(8)	5.96	(4)	6.30	(7)
20	(7)	6.36	(3.5)	6.50	(3.5)	6.46	(8)	6.32	(1)	6.50	(5)	6.25	(6)
24	(5)	6.43	(8)	6.29	(2)	6.54	(7)	6.39	(6)	6.18	(6)	6.04	(8)
25	(1)	6.63	(5)	6.48	(6)	6.41	(1)	6.67	(7)	6.07	(7)	5.93	(5)
26	(2.5)	6.57	(2)	6.54	(3.5)	6.46	(3)	6.54	(2)	6.43	(8)	5.82	(1.5)

TABLE 10. Scores and ranks for scenes of Mount McKinley -- Rock and Gem Club

SCENE	BEAUTIFUL		LIKE		MOUNTAINOUS		PLEASANT		STIMULATING		VARIED		
4	(7)	6.00	(6.5)	5.95	(8)	5.05	(7)	5.89	(8)	5.42	(4.5)	5.63	(7)
8	(2)	6.74	(1)	6.79	(1)	6.37	(2)	6.58	(1)	6.63	(2)	6.37	(1.5)
12	(5)	6.21	(5)	6.05	(2)	6.16	(4)	6.11	(7)	5.84	(8)	5.32	(5.5)
16	(7)	6.00	(6.5)	5.95	(3.5)	6.00	(6)	6.00	(5)	6.00	(4.5)	5.63	(5.5)
20	(3)	6.53	(4)	6.47	(5)	5.95	(3)	6.32	(3)	6.32	(3)	6.00	(3)
24	(1)	6.79	(2.5)	6.68	(3.5)	6.00	(1)	6.63	(2)	6.58	(1)	6.53	(1.5)
25	(4)	6.26	(2.5)	6.68	(7)	5.53	(5)	6.05	(4)	6.16	(6.5)	5.47	(4)
26	(7)	6.00	(8)	5.79	(6)	5.68	(8)	5.63	(6)	5.95	(6.5)	5.47	(8)

TABLE 11. Scores and ranks for scenes of Mount McKinley -- Outdoor Program

SCENE	BEAUTIFUL		LIKE		MOUNTAINOUS		PLEASANT		STIMULATING		VARIED		
4	(6)	6.22	(6)	6.22	(6.5)	4.52	(4.5)	6.22	(5)	6.26	(7)	5.74	(6)
8	(3)	6.30	(8)	5.91	(8)	5.48	(6)	6.13	(7)	6.17	(5)	5.87	(6)
12	(3)	6.30	(2.5)	6.39	(1)	6.13	(4.5)	6.22	(2.5)	6.43	(3.5)	5.91	(3)
16	(8)	5.48	(7)	5.96	(3)	5.96	(8)	5.65	(8)	5.83	(8)	5.70	(8)
20	(7)	5.91	(5)	6.26	(6.5)	5.52	(7)	5.87	(6)	6.22	(3.5)	5.91	(6)
24	(1)	6.70	(1)	6.70	(2)	6.00	(1)	6.57	(1)	6.52	(1)	6.35	(1)
25	(5)	6.26	(2.5)	6.39	(5)	5.57	(3)	6.26	(4)	6.30	(6)	5.78	(4)
26	(3)	6.30	(4)	6.30	(4)	5.83	(2)	6.30	(2.5)	6.43	(2)	5.96	(2)

TABLE 12. Scores and ranks for scenes of Mount McKinley -- Introductory Geography class

Scene	Viewer Groups: Good Sam Clubs	Rock and Gem Club	Outdoor Program	Geog. class
1	24	26	26	22
2	20	21	18	16
3	12	17.5	17	17.5
4	9	1	7	5
5	15	12	9	14
6	16	15	19	12
7	13	13	13	13
8	3.5	3	2	6
9	26	24	20	19.5
10	23	19	25	26
11	18.5	14	21	23
12	3.5	2	5	2.5
13	18.5	20	14.5	15
14	17	17.5	10	10
15	14	16	14.5	17.5
16	7	7	6	8
17	21	23	22	25
18	25	22	24	21
19	10	10	16	11
20	6	4	3	7
21	11	11	11	19.5
22	8	9	12	9
23	22	25	23	24
24	2	8	1	1
25	1	6	4	4
26	5	5	8	2.5

TABLE 13. Ranking of scenes within each viewer group

	Viewer Groups			
Site	Good Sam Clubs	Rock and Gem Club	Outdoor Program	Introductory Geog. class
A	5	6	5	5
B	2	2	1	2
C	6	5	6	6
D	4	4	2	3
E	3	3	4	4
F	1	1	3	1

TABLE 14. Ranking of sites within each viewer group

Site	Scene	Good Sam Clubs	Rock and Gem Club	Outdoor Program	Introductory Geog. class
A	4	7	1.5	7	6
B	8	2	3.5	1.5	6
C	12	5	3.5	5.5	3
D	16	8	7	5.5	8
E	20	6	6	3	6
F	24	3.5	8	1.5	1
Ruth Gl.	25	1	5	4	4
Stony Pt.	26	3.5	1.5	8	2

TABLE 15. Ranking of views of Mount McKinley within each viewer group

increase away from the upper mean score of 7. Overall, the means had a fairly even range between 3 and 7, with the largest share between 4 and 5. This infers that relatively few reactions were negative. Average scores for each scene were similar for each interest group (Figure 2). This was especially true for the views of Mount McKinley, which were scenes 4, 8, 12, 16, 20, 24, 25, and 26. It was also quickly evident that scenes of Mount McKinley had the highest individual adjective means as well as combined averages, with one exception. A study by Melillo (1970 in Zube, 1973), conducted among landscape architects, found that scenes with steep topography were preferred over flat or rolling topography. The high mean scores for the views of Mount McKinley tend to back this observation. In a survey of residents of the state of Washington by Jones et al. (1976), it was noted that high mountains were vastly preferred over other topographic features.

Besides the amount of topographic relief visible, there were some other general features that appeared to influence perception of a scene. It is fairly well accepted that the presence of water in a scene enhances its beauty (Zube, 1973). Of the scenes used for this research, none had a substantial presence of water. The view with the greatest presence of water was scene 22, which showed a lake in the middleground, but at a low angle. This scene generally received the highest interest group ranks for a non-Mount McKinley view. Several other scenes showed water as a minor feature in the background, generally as glacial rivers.

Vegetation did not appear to have a big influence on preference in this study, partly due to the fact that trees found in this area were confined to the lowlands. These trees were relatively small when compared to the trees of the Pacific Northwest, which was what the respondents were familiar with. The survey of Washington residents by

Jones et al. (1976) revealed that large coniferous trees were vastly preferred over any other type of vegetation. Scene 18, among the least preferred of all the scenes, was a photo of the top of a rocky hill with no vegetation present.

Perhaps more influential in this scene's poor rating was the fact that the view was essentially upward and foreground only, and any view was blocked. Craik (1972) found that vertical enclosures cutting off views had a negative effect on a scene's preference.

Clouds were present in several scenes and were probably a negative influence despite Craik's (1972) claim to the contrary. The clouds were most noticeable in views of Mount McKinley from sites A and D. This was important because clouds partially obscured the high mountains, and both appeared as white. This could have had a significant influence on one's rating of the scenes.

All scenes shown in this research were of natural environments. In scenes that included the main river valley, a highway was barely visible, but was not a significant feature.

Mount McKinley Views

As mentioned previously, views of Mount McKinley were without exception the more preferred scenes. However, statistical analysis revealed that agreement concerning which views were the best was not very strong between groups. One principal reason for this was that the scoring was nearing the top of the seven-point scale. Since almost all of these scenes had average scores above 6 on the scale, differences between each group would be less than comparable ratings that were more toward the middle of the scale. This observation was backed by a quick look at the standard deviations for each scene and adjective. The standard deviations for the Mount McKinley scenes appeared to be significantly less than those of the other scenes. This compression at the top of the scale resulted in only a fair agreement between the groups.

All scenes of Mount McKinley were perceived as being among the most mountainous, with the exception of scene 4. In four of the eight scenes (8, 20, 24, and 25), the high mountains were viewed over wide valleys and were still perceived as very mountainous. Scene 4, which was a view of the Mount McKinley Massif over a wide flat valley, had a lower mountainous rating and much higher standard deviations. Scene 12 was perceived as the most mountainous view of Mount McKinley.

Site Comparisons

Analysis of site scores and ranks revealed significant agreement between groups for each site and adjective, as well as overall site rankings. Within each interest group, rankings across the adjectives for each site appeared to be very consistent. This evenness would tend to increase the validity of each site's ranking. If the range for each site within the individual adjective rankings were large, then the overall site rankings would not have been as representative of their individual components.

Site F was ranked first, and site B was ranked second. Sites D and E were ranked evenly, as were sites A and C.

Good agreement was apparent between groups in perception of a site's mountainous character as a whole (Table 16). Site E was generally perceived to have the most mountainous views. Site F, which was generally preferred over the other sites in terms of overall preference, was generally ranked fifth out of sixth in terms of its mountainousness.

Site	Viewer Groups: Good Sam Clubs	Rock and Gem Club	Outdoor Program	Introductory Geog. class
A	6	6	6	6
B	3	3	1	2
C	4	5	4	4
D	2	2	3	3
E	1	1	2	1
F	5	4	5	5

TABLE 16. Ranking of the sites' mountainous character within each viewer group.

Standard Deviations

Standard deviations can provide much insight into groups' perceptions in terms of each adjective descriptor as well as a technique's general validity and usefulness. In this study standard deviations were only looked at briefly, but revealed several important points, many already mentioned. Standard deviations revealed which adjectives elicited the most uniform responses. In comparison to other adjective-pairs, both "stimulating-unstimulating" and "varied-monotonous" had quite high variations in response, in comparison to the other pairs. Use of other adjectives in place of these may have resulted in more reliable and consistent responses.

Suggestions for Further Research

The results could be expected to change somewhat with a change in either the respondents or the bipolar adjectives selected. The data produced in this study was generated by only 105 viewers. Had Alaskans viewed the slides, their reactions may have been quite different. They are much more familiar with the type of terrain that was viewed, and possibly would have indicated greater preferences for those scenes. Kaplan (1972) noted that familiarity and identifiability of a landscape could increase its scenic beauty to the viewer.

CONCLUSIONS

It is possible to rate scenic beauty, or rather peoples' perceptions of scenic beauty. Validity does exist in rating schemes as long as their methodologies have firm support and their results are interpreted correctly and with considerable caution.

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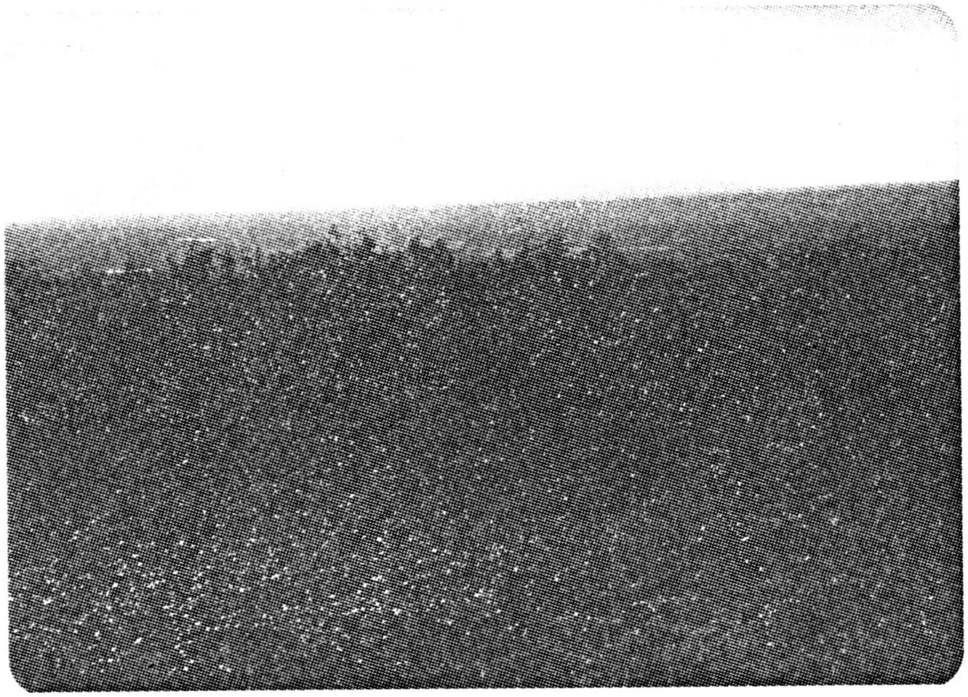
APPENDIX A. Scenes Used in the Slide Presentation

The following photos are color-xeroxed prints of the twenty-six slides used in this study. Headings and brief descriptions are found under each photo.

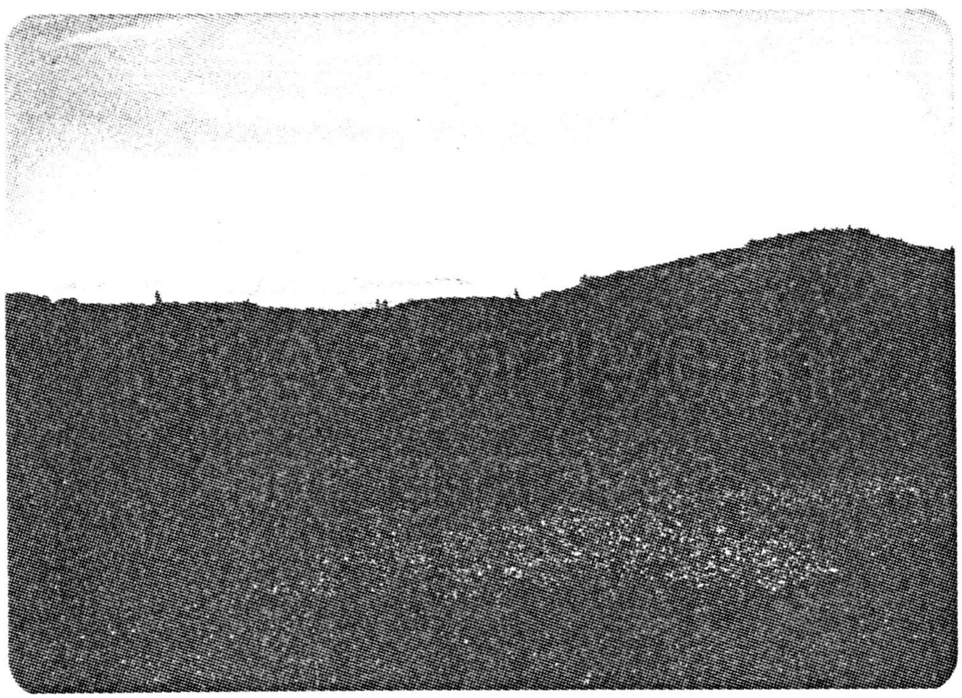
The left heading (e.g. 90^{0} Left) refers to the direction the photo was taken from the particular site in relation to Mount McKinley. The right heading refers to the site from which the photo was taken. A center heading,inserted under every major site's first photo, notes the respective site's elevation.

It should be noted here that these photocopies give only a fair idea of the original slide used in the study. In transferring the image of the slide to the photocopy via a color print, much of the original quality was lost. The degree of darkness present in the slide was amplified by conversion to the color print. There was also a loss in sharpness in the conversion from slide to photocopy. These points must be kept in mind when viewing these reproductions .



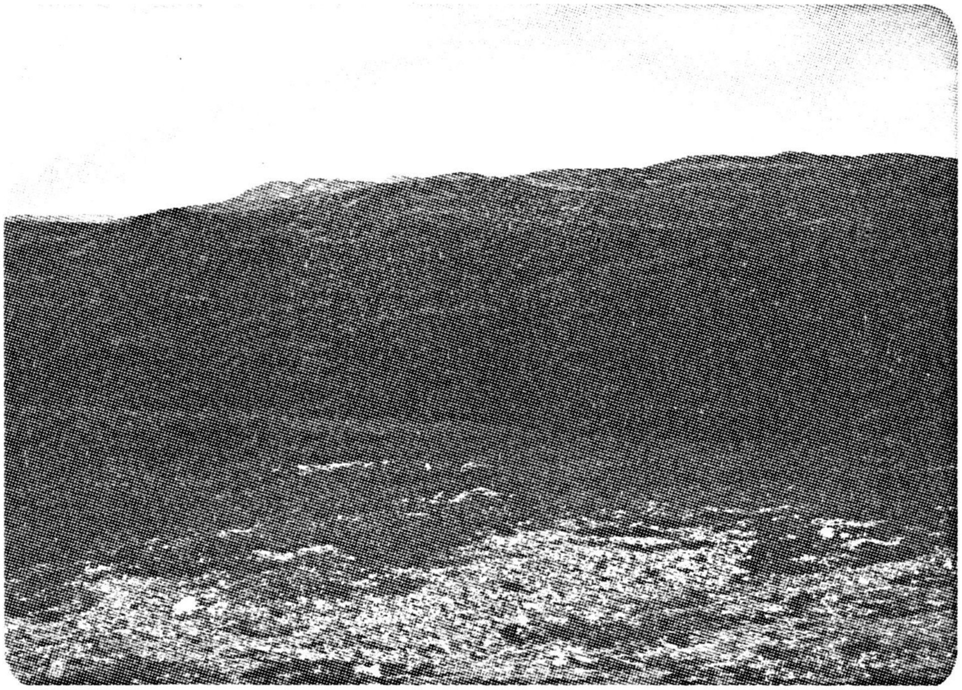
SCENE 1: 90^{0} left Elev. 1800 ft. SITE A

View southwest across lower Chulitna River valley. (high foreground)



SCENE 2: 180^{0} opposite SITE A

Ridgetop of Curry Ridge.



SCENE 3: 90° right — SITE A

View northeast along Curry Ridge.

SCENE 4: Mt. McKinley — SITE A

View northwest across Chulitna River valley to Mounts Foraker, Hunter, and McKinley (left to right) and the Ruth Glacier.

SCENE 5: 90° left   Elev. 2500 ft.   SITE B

View southwest across Chulitna River valley. (Blowing dust from gravel bars)

SCENE 6: 180° opposite   SITE B

Ridgetop of Curry Ridge. (foreground only)

SCENE 7: 90^{o} right SITE B

View northeast up Chulitna River valley.

SCENE 8: Mt. McKinley SITE B

View northwest across Chulitna River valley.

SCENE 9: 90^{o} left   Elev. 3900 ft.   SITE C

View southwest across top of Peters Hills.

SCENE 10: 180^{o} opposite   SITE C

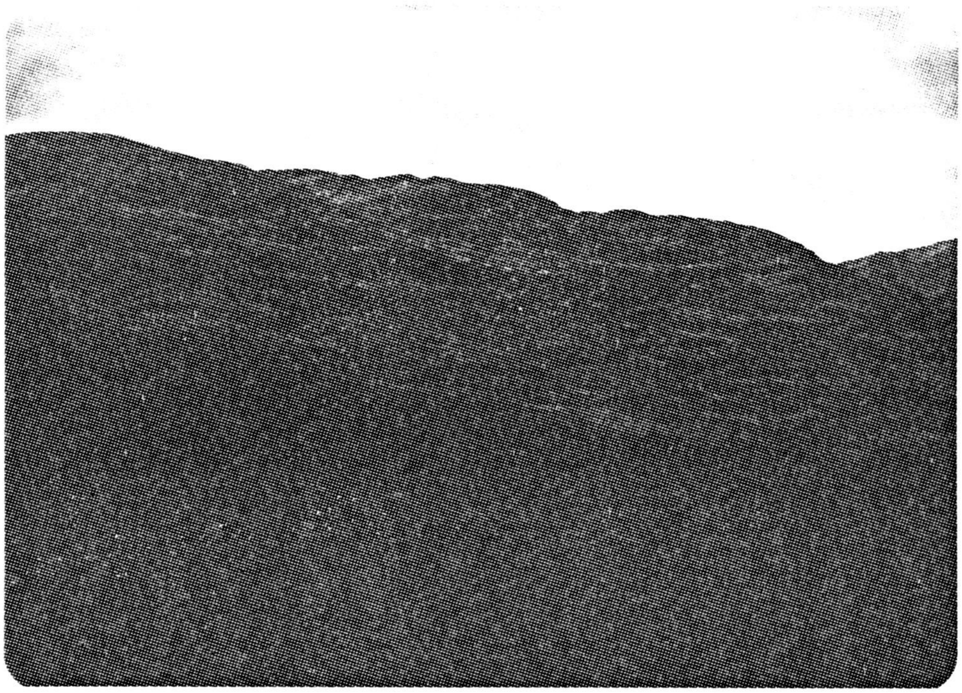
View southeast to lower Chulitna River valley.

SCENE 11: 90^{o} right SITE C

View northeast up Chulitna River valley. (Ruth Glacier is the white streak across the middle of the photo)

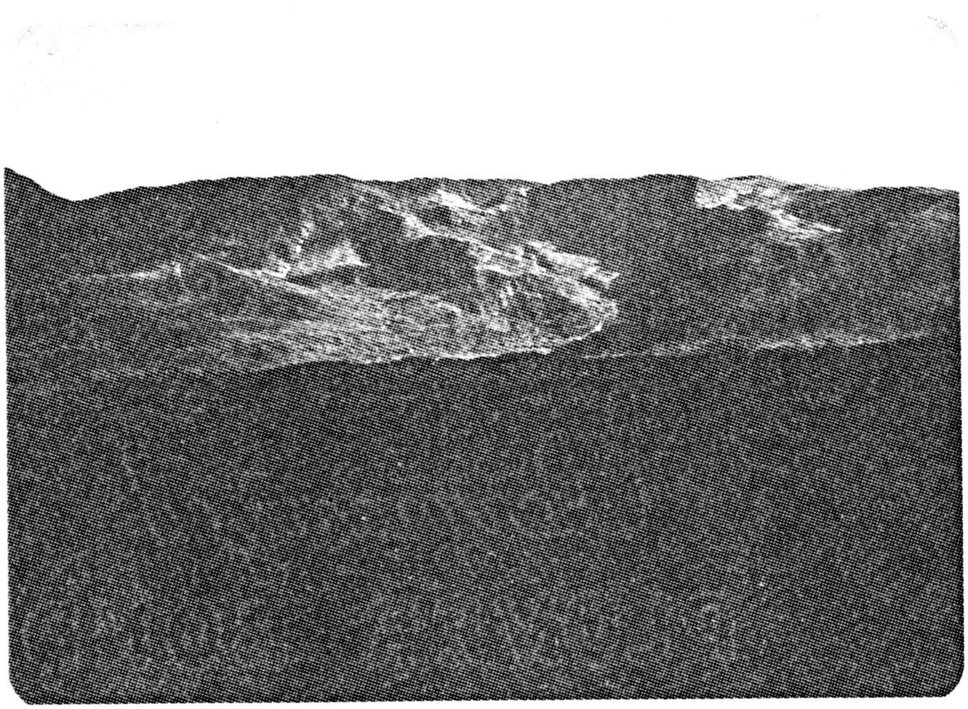
SCENE 12: Mt. McKinley SITE C

View up Tokositna Glacier. Mounts Foraker, Hunter, and McKinley in the background (left to right).



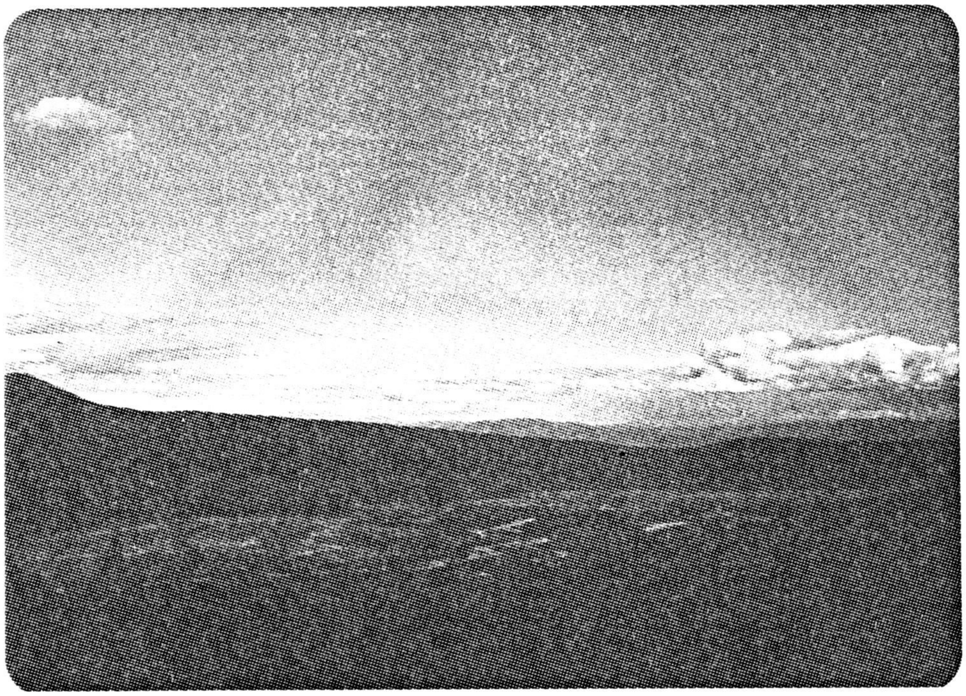
SCENE 13: 90° left Elev. 2000 ft. SITE D

View southwest to Dutch Hills.



SCENE 14: 180° opposite SITE D

View southeast to Peters Hills.



SCENE 15: 90° right SITE D

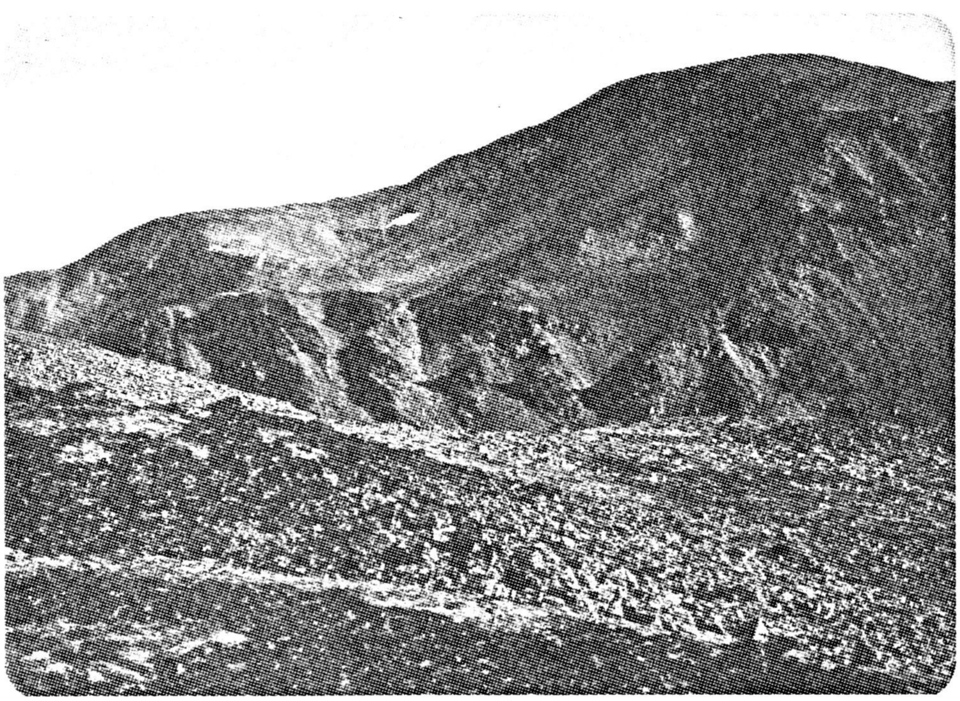
View northeast across Tokositna River.

SCENE 16: Mt. McKinley SITE D

View northeast up Tokositna Glacier. (shortened right side of photo; clouds almost totally obscure Mt. Hunter in center of photo)

SCENE 17: 90° left Elev. 3600 ft. SITE E

View southwest along Indian Ridge and Chulitna River valley.

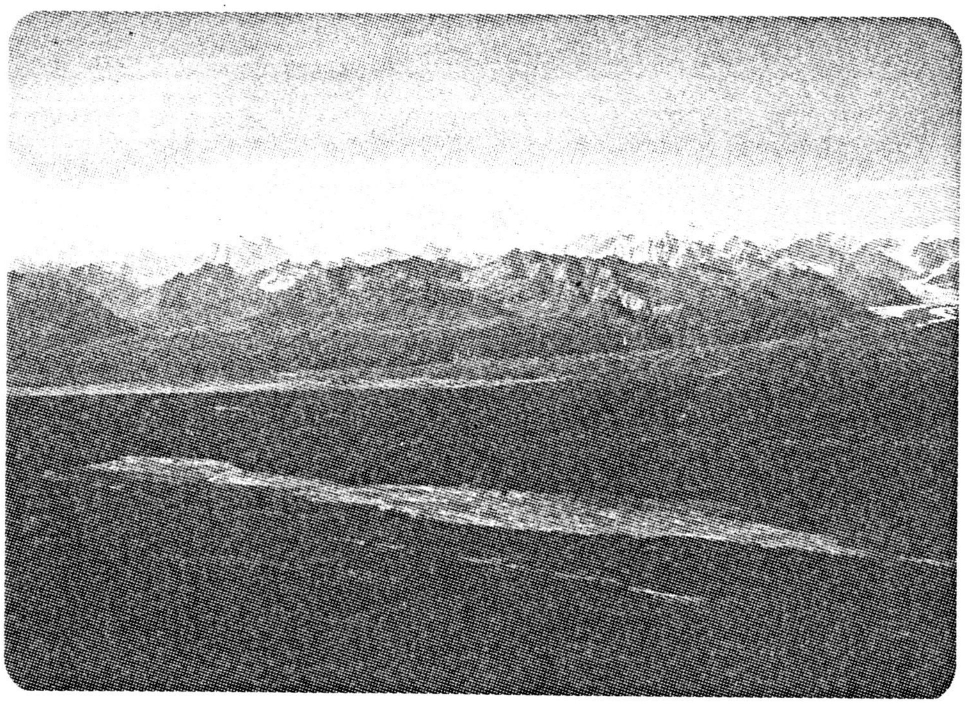


SCENE 18: 180° opposite SITE E

Top of Indian Ridge.

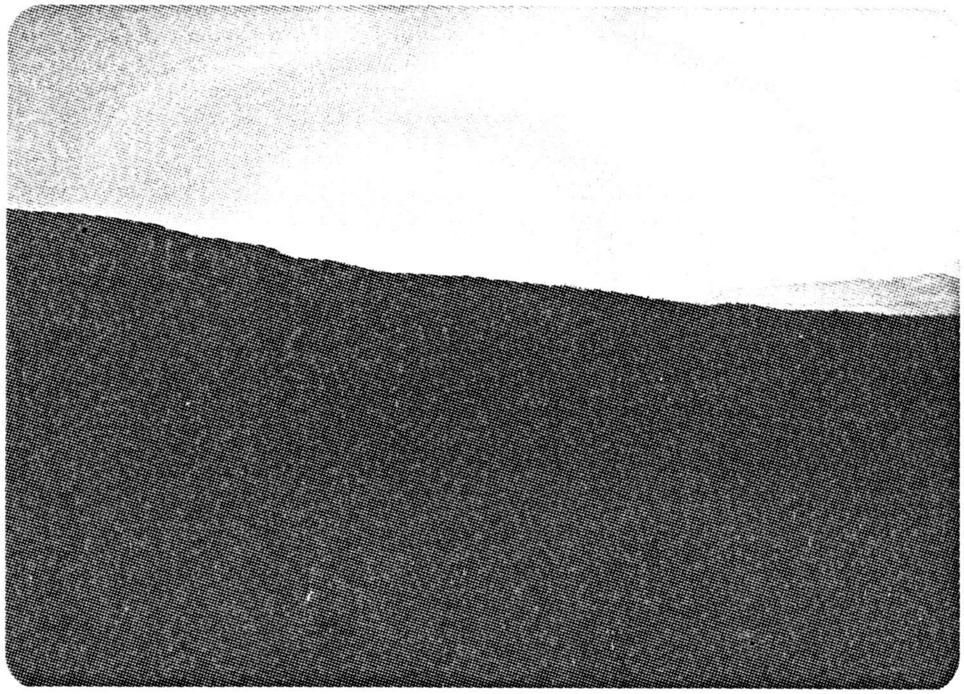
SCENE 19: 90° right SITE E

View northeast up Chulitna River valley.



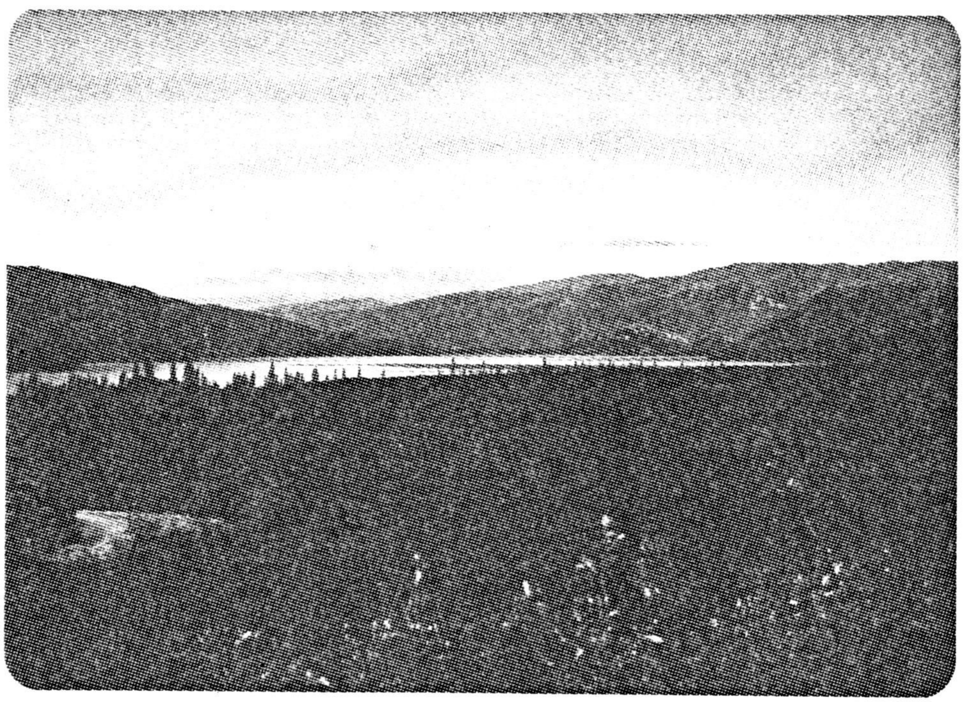
SCENE 20: Mt. McKinley SITE E

View across Chulitna River and Eldridge Glacier to Mt. McKinley.



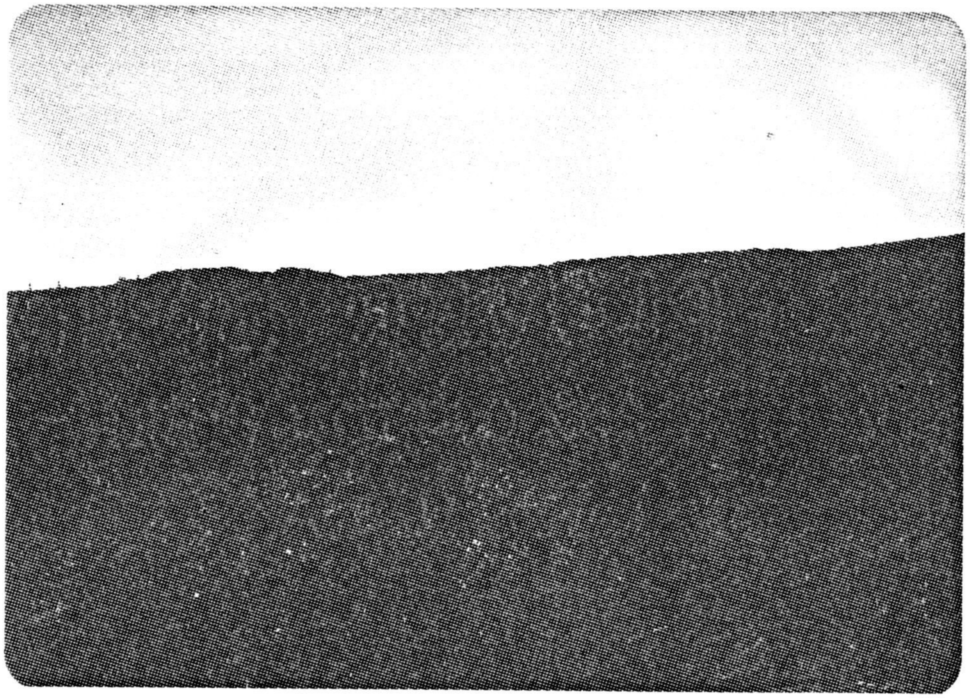
SCENE 21: 90° left Elev. 2000 ft. SITE F

View east toward lesser peaks of Alaska Range.



SCENE 22: 180° opposite SITE F

Wonder Lake.

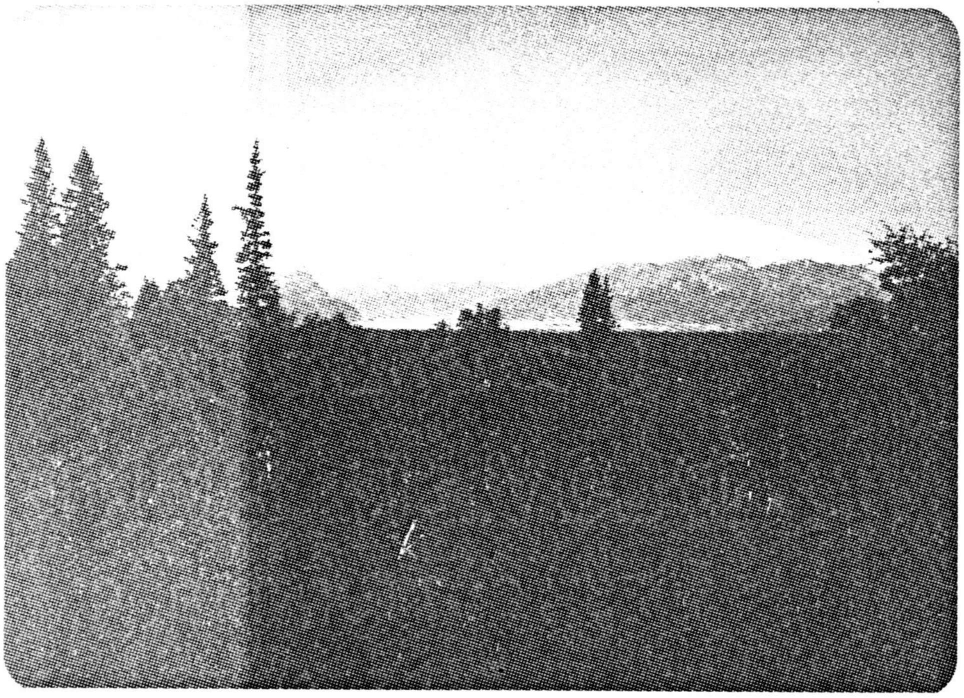


SCENE 23: 90^{o} right SITE F

View of low ridge.

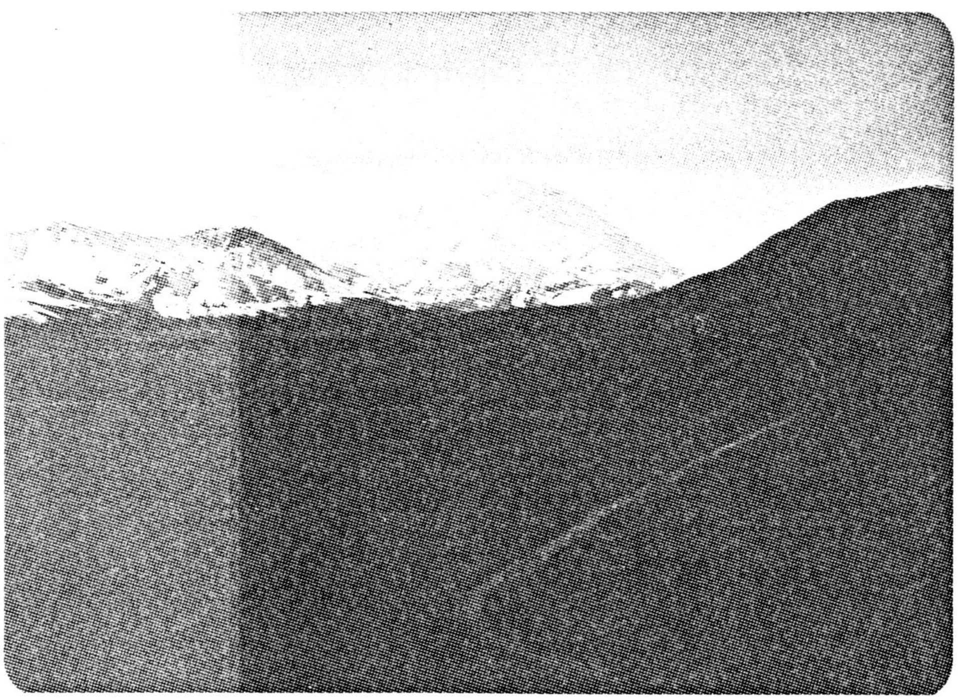
SCENE 24: Mt. McKinley SITE F

View southward across McKinley valley to Mt. McKinley.



SCENE 25: Mt. McKinley Elev. 800 ft. RUTH GLACIER OVERLOOK

View of Mounts Hunter and McKinley (left to right) above Ruth Glacier.



SCENE 26: Mt. McKinley Elev. 3900 ft. STONY POINT

View of Mt. McKinley from the northeast in Mt. McKinley National Park.

APPENDIX B. Sample page from the questionaire.

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UNSTIMULATING	___ : ___ : ___ : ___ : ___ : ___ : ___	STIMULATING
PLEASANT	___ : ___ : ___ : ___ : ___ : ___ : ___	UNPLEASANT
DISLIKE	___ : ___ : ___ : ___ : ___ : ___ : ___	LIKE
MONOTONOUS	___ : ___ : ___ : ___ : ___ : ___ : ___	VARIED
MOUNTAINOUS	___ : ___ : ___ : ___ : ___ : ___ : ___	LEVEL
BEAUTIFUL	___ : ___ : ___ : ___ : ___ : ___ : ___	UGLY

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DISLIKE	___ : ___ : ___ : ___ : ___ : ___ : ___	LIKE
MOUNTAINOUS	___ : ___ : ___ : ___ : ___ : ___ : ___	LEVEL
MONOTONOUS	___ : ___ : ___ : ___ : ___ : ___ : ___	VARIED
UNSTIMULATING	___ : ___ : ___ : ___ : ___ : ___ : ___	STIMULATING
BEAUTIFUL	___ : ___ : ___ : ___ : ___ : ___ : ___	UGLY
PLEASANT	___ : ___ : ___ : ___ : ___ : ___ : ___	UNPLEASANT

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LEVEL	___ : ___ : ___ : ___ : ___ : ___ : ___	MOUNTAINOUS
LIKE	___ : ___ : ___ : ___ : ___ : ___ : ___	DISLIKE
BEAUTIFUL	___ : ___ : ___ : ___ : ___ : ___ : ___	UGLY
MONOTONOUS	___ : ___ : ___ : ___ : ___ : ___ : ___	VARIED
PLEASANT	___ : ___ : ___ : ___ : ___ : ___ : ___	UNPLEASANT
UNSTIMULATING	___ : ___ : ___ : ___ : ___ : ___ : ___	STIMULATING

SCENE	BEAUTIFUL	LIKE	MOUNTAINOUS	PLEASANT	STIMULATING	VARIED
1	1.44	1.56	1.31	1.48	1.73	1.81
2	1.08	1.37	1.22	1.20	1.58	1.46
3	.96	1.04	1.21	1.20	1.17	1.18
4	.94	1.21	1.62	1.23	1.84	1.40
5	1.23	1.35	1.38	1.41	1.68	1.82
6	1.39	1.65	1.37	1.41	1.55	1.60
7	1.12	1.39	1.21	1.15	1.19	1.28
8	.41	1.44	.93	1.17	1.17	2.07
9	1.45	1.55	1.16	1.51	1.62	1.88
10	1.40	1.54	1.50	1.31	1.73	1.90
11	1.56	1.45	1.22	1.42	1.87	1.74
12	.70	.74	.53	.82	1.45	1.17
13	1.44	1.35	1.24	1.36	1.70	1.52
14	1.35	1.49	1.19	1.40	1.62	1.59
15	1.08	1.20	1.47	1.18	1.34	1.33
16	1.07	1.04	.85	1.18	1.20	1.60
17	1.50	1.67	1.27	1.48	1.77	1.88
18	1.83	1.85	.94	1.84	1.99	1.88
19	1.08	1.28	1.13	1.02	1.31	1.62
20	.66	1.14	1.46	1.36	1.29	1.44
21	1.27	1.27	1.31	1.09	1.22	1.57
22	.87	1.38	1.51	.89	1.29	1.29
23	1.17	1.37	1.54	1.61	1.81	1.53
24	1.33	.91	.39	.94	1.11	2.11
25	.28	.40	.95	.47	1.24	2.09
26	.55	.70	1.19	.78	.74	1.51

APPENDIX C. Standard deviations for the Good Sam Clubs

SCENE	BEAUTIFUL	LIKE	MOUNTAINOUS	PLEASANT	STIMULATING	VARIED
1	1.79	1.86	1.82	1.73	1.79	1.85
2	1.56	1.83	1.30	1.57	1.81	1.86
3	1.37	1.44	1.55	1.69	1.96	1.88
4	.79	.48	1.62	.69	.79	.74
5	1.91	1.86	1.19	1.62	1.62	1.83
6	1.32	1.25	1.37	1.35	1.63	1.71
7	1.63	1.48	1.64	1.47	1.93	1.60
8	.84	.92	1.25	1.14	1.18	.79
9	1.79	1.71	1.29	1.84	1.67	1.77
10	1.73	1.85	1.92	1.86	2.04	1.87
11	1.52	1.73	1.51	1.40	1.71	1.53
12	.57	.84	.67	.69	.98	.64
13	1.64	1.73	1.21	1.99	1.90	1.85
14	1.36	1.48	1.21	1.53	1.33	1.57
15	1.10	1.56	1.28	1.17	1.46	1.28
16	1.03	.97	.93	.64	1.65	.91
17	1.40	1.81	1.46	1.82	1.98	1.75
18	1.61	1.64	1.12	1.66	1.88	1.60
19	1.24	1.29	1.25	1.39	1.34	.98
20	1.13	1.04	1.04	1.09	.96	1.17
21	1.34	1.60	1.63	1.40	1.79	1.45
22	1.14	1.15	1.23	.99	1.37	.82
23	1.45	1.56	1.43	1.36	1.60	1.60
24	.84	1.08	.84	1.10	1.12	1.35
25	.65	.85	.84	.62	1.57	1.66
26	.63	.64	.74	.64	.69	1.44

APPENDIX C. Standard deviations for the Rock and Gem Club

SCENE	BEAUTIFUL	LIKE	MOUNTAINOUS	PLEASANT	STIMULATING	VARIED
1	1.15	1.15	1.02	1.18	1.22	.90
2	1.02	1.35	1.06	1.26	1.18	1.24
3	1.10	1.38	1.08	1.26	1.30	1.18
4	.88	.97	1.61	1.15	1.30	1.34
5	.96	1.06	.78	1.02	1.17	.96
6	1.43	1.74	1.10	1.57	1.66	1.83
7	.81	1.03	.96	1.00	1.01	.97
8	.45	.42	.68	.51	.50	.68
9	1.02	1.21	.76	1.13	1.20	1.22
10	1.57	1.80	1.65	1.79	1.98	1.69
11	.76	1.37	1.17	1.21	1.37	1.56
12	.71	.78	1.01	.74	1.26	1.73
13	.66	.90	.90	1.00	1.26	1.24
14	.65	.84	.84	1.06	.78	.78
15	.92	1.18	1.37	1.13	1.61	1.46
16	.94	.91	.75	.94	1.00	1.01
17	.94	1.05	1.02	.85	1.12	.96
18	1.79	1.77	.85	1.68	1.68	1.39
19	1.42	1.07	1.10	1.46	1.54	.96
20	.61	.61	1.27	.67	.82	1.29
21	1.54	1.43	1.43	1.35	1.65	1.18
22	1.45	1.42	1.07	1.16	1.41	1.08
23	1.29	1.37	1.17	1.24	1.26	1.37
24	.42	.58	1.11	.88	.61	.84
25	.99	.58	1.43	1.03	1.42	1.50
26	1.05	1.58	1.38	1.30	.91	1.31

APPENDIX C. Standard deviations for the Outdoor Program

SCENE	BEAUTIFUL	LIKE	MOUNTAINOUS	PLEASANT	STIMULATING	VARIED
1	1.22	1.28	.67	1.22	1.61	1.63
2	1.40	1.45	1.24	1.70	1.65	1.51
3	1.07	1.36	1.14	1.06	1.22	1.22
4	.67	.85	1.90	.74	.75	1.36
5	.93	1.37	.89	1.33	1.47	1.40
6	1.38	1.38	.81	1.16	1.54	1.56
7	1.16	1.28	1.24	1.47	1.31	1.39
8	.88	1.12	2.29	1.18	1.19	1.29
9	1.16	1.25	.72	1.02	1.59	1.83
10	1.15	1.16	1.34	1.30	1.60	1.40
11	1.62	1.47	1.23	1.52	1.56	1.38
12	.97	.89	.97	1.09	.59	1.04
13	1.31	1.56	1.03	1.39	1.86	1.50
14	1.51	1.57	1.05	1.51	1.50	1.62
15	1.27	1.39	1.41	1.18	1.47	1.51
16	.99	.82	.77	.88	1.07	1.11
17	1.27	1.37	.82	1.20	1.19	1.35
18	1.67	1.72	.84	1.56	1.91	1.64
19	1.20	1.11	.81	1.03	1.34	1.44
20	.79	.69	1.56	1.10	.67	.95
21	1.18	1.18	1.50	1.11	1.42	1.56
22	1.04	1.31	1.39	1.19	1.58	.94
23	1.35	1.47	1.40	1.35	1.64	1.49
24	.47	.47	1.00	.59	.51	.65
25	1.01	.78	1.16	.92	.82	1.35
26	.70	1.18	1.23	1.02	.73	1.26

APPENDIX C. Standard deviations for the Introductory Geography class