PERCEPTION OF EXTREMES IN THE PHYSICAL ENVIRONMENT

by Jeffrey T. Lutz

In recent years there has been a notable increase in research related to man and his physical environment. Current geographic literature reflects an heightened interest in man's perception of his environment. Lowenthal has written numerous articles dealing with environmental perception and behavior in different geographic settings. He feels that much more information is needed concerning the way people perceive the physical world.

Several geographers have focused on man's perception of natural climatic hazards. Sewell edited a volume on Human Dimensions of Weather Modification, containing a series of papers which are included in a section entitled "Perception of Effects of Weather and Attitudes to Weather." Rooney conducted a study on the urban snow hazard in the United States. He opines that man's attitude toward the snow hazard can be partly explained in terms of his perception of the phenomenon, but this perception is difficult to measure.

The value of perception studies becomes evident in view of man's increasing concern with the quality of the environment. A number of researchers have examined public opinion toward air pollution and related environmental hazards. Medalia reported on an opinion survey designed to assess the community perception of air quality in Clarkston, Washington, a community located approximately 4 miles downwind from a pulp mill. A request for the survey was motivated by public complaints about reduced visibility, damage to house paint, tarnishing of silver,
undesirable odors, and suspected effects on health resulting from air pollution.

An initial problem is encountered in attempting to determine just what the words "air pollution" mean to most people. It is recognized that a large number of varieties of air pollution exist, which in turn, elicit a variety of responses by man to perceived air pollution problems. For most of the residents of Clarkston, Washington the term "air pollution" does represent a well-structured concept, with the most salient features of this concept being malodors, low visibility, and nose-throat irritation. Consideration is also given to the severity of air pollution as both a personal problem and as a community problem.

The studies already cited have dealt with the perception of atmospheric extremes such as heavy snowfall and air pollution, or climatic hazards such as flood and drought. However, there is a dearth of comprehensive research focusing on man's general perception of extremes in the physical environment. In the present study an attempt is made to expand our knowledge of man-environment relationships by examining this aspect of man's perception of his world.

The environmental perception of in-state college students who attended universities in different regions of the United States was assessed by means of a questionnaire. The states of Vermont, North Carolina, Minnesota and Arizona were selected as being representative of the Northeastern, Southern, North-Central and Western regions respectively.

The students were requested to select the appropriate state in the conterminous United States (excluding Alaska, Hawaii and the District of Columbia) for the following: hottest place (H), coldest place (C), wettest place (W), driest place (D), greatest snowfall amounts (S), greatest air pollution problem (AP), and greatest water pollution problem (WP). The students could perceive the phenomena as affecting either an entire state, or a specific location within a state. The resultant student perception is illustrated in Figure 1. Therein are presented the three states in each category which are viewed (by the greatest percentage of students) as projecting images of the pertinent extremes in the physical environment.

INFLUENCE OF TRAVEL EXPERIENCE

Theoretically, travel experience is an important factor which can influence a student's perception of extremes in the physical environment. Likewise, educational background and exposure to mass media presumably affect an individual's viewpoint. Although the effect of mass communications and specific educational training (courses in climatology and environmental science, etc.) were not assessed in the present study, a crude measure of travel experience was obtained.

However, since the temporal extent of travel experience was not specified, one is limited in making generalizations about the relationship between travel experience and the perception of extremes in the physical environment.
Figure 1
Perception of Extremes in the Physical Environment

D  Driest place
W  Wettest place
WP  Greatest water pollution
AP  Greatest air pollution
H  Hottest place
C  Coldest place
S  Greatest snowfall
Since factors such as temperature, precipitation and atmospheric stability (affecting the potential for air pollution episodes) etc., can change appreciably between seasons, conditions during a summer vacation or one holiday season are not necessarily representative of an area's physical environment (as pertains to both long term normals and the potential for extremes). Nonetheless, it is hypothesized that a student would still gain impressions from travel experience which would influence his perception of the physical environment.

A majority of students from each university had considerable travel experience throughout the United States. California, Colorado and Florida were the states visited by the highest percentage of students.

However, for the vast majority of students, travel outside their respective regions was quite limited. This lack of exposure to environmental conditions in other parts of the United States must be considered in the overall assessment of the students' perception of extremes in the physical environment.

There was a slight propensity for students to select their own state in response to climatic questions. For example, over 65 percent of the Arizonans selected their own state as the hottest and driest place. Likewise, over 60 percent of the Minnesotans view their own state as coldest, and one-fourth of the sample feel that some location in Minnesota receives the greatest snowfall amounts. Perhaps the students selected their own state based upon personal experience, or in lieu of knowledge about climate.

As anticipated, the perception of specific extremes differed between university groups. However, the general (overall) view of extremes in the physical environment was quite comparable among samples.

**PERCEPTION OF EXTREMES**

Approximately one-third (32.6%) of all the students included in the survey perceived Arizona as the state with the hottest place in the contiguous United States. Only eighteen percent of the respondents correctly selected southern California (where Death Valley recorded the western hemisphere's highest temperature of 134°F). An additional 14 percent of the respondents considered the hottest place to be located in the state of Texas. Over one-fourth (26%) of the Vermon ters envisioned the hottest place as located in Florida, whereas 69 percent of the Arizona students selected their own state.

Minnesota (27%), Maine (17%), and Montana (17%) are the three states appraised by the greatest percentage of students as possessing the coldest location. Clearly, the northern states project images of cold climatic conditions. Actually, Rogers Pass, Montana holds the record for the lowest temperature reading in the conterminous United States (excluding Alaska) of -70°F.

Over one-fifth (22%) of the students correctly apprehended high precipitation totals in the state of Washington (where Wynoochee records the greatest average annual precipitation total in the conterminous United States, 144 inches). The Gulf Coast states, particularly Florida and Louisiana, were also considered wet. In addition, an appreciable proportion
(15%) of the students from Minnesota, Vermont and Arizona view the Pacific West Coast state of Oregon as the wettest place.

In the eyes of the respondents, Arizona, New Mexico and Nevada project images of dry climatic conditions. In this case, fewer than 5 percent of all the students correctly selected southern California. Actually, Death Valley is the driest place with an average annual precipitation total of 1.63 inches.

Approximately one-half of all the participants in the survey viewed either the state of Montana, Minnesota, or Colorado as receiving the greatest snowfall amounts in the conterminous United States. In reality, Mount Rainier, in the state of Washington, established a new United States record for total seasonal snowfall when 1,122 inches were measured in 1971-72. However, less than 5 percent of all the respondents selected the state of Washington. Even fewer students envision high snowfall totals in the state of California, but considering individual snowstorms, Mount Shasta Ski Bowl recorded North America's greatest snowfall in one storm, 189 inches.

An attempt to assess the students' awareness of pollution problems is more difficult since there are various types of both air and water pollution, as well as a considerable variation among humans in their response to pollution. For example, "water pollution" could be viewed (or defined) in terms of a health hazard, degradation of a recreational resource, or merely the visual stigma (discoloration of water) due to industrial wastes and oil spills, etc. Therefore, it is realized that an interpretation of the students' views of pollution problems is subjective.

An equal proportion of the sample (42% in each case) viewed New York and southern California as encumbered with the greatest air pollution problem. A number of students specifically cited Los Angeles and New York City for their air pollution problems. Another 5 percent of the respondents felt that New Jersey (affected by local sources and situated downwind from New York City) is afflicted with a significant air pollution problem.

According to student opinion, pollution also affects water quality in the state of New York. Whether associated with the Great Lakes (Lake Erie, in particular) or New York City, the state is singled out as exhibiting the greatest water pollution problem in the United States. The Great Lakes states of Michigan and Ohio also project images blemished by water pollution problems.10

SUMMARY

In general, less than one-fifth of the total respondents accurately perceived the distribution of climatic extremes in the conterminous United States. In particular, the students fared poorly when requested to locate the hottest place, and the state with the greatest snowfall amounts. A contrast in the perception of specific climatic extremes was notable between sample groups,
but the overall perception of extremes in the physical environment was comparable.

The students view New York and southern California as encumbered with the greatest air pollution problems. The state of New York is also singled out for water pollution problems, as are the Great Lakes states of Michigan and Ohio.

FOOTNOTES


2. The pilot studies were conducted by Gilbert White, *Human Adjustment to Floods*. Chicago: University of Chicago, Department of Geography Research Paper No. 29, 1945. White was concerned with flood-plain management and he kindled an interest in hazard studies at the University of Chicago.


7. The city frequently experiences poor atmospheric ventilation owing to low wind speeds and low-level inversions.

8. The participants included the University of Vermont, the University of North Carolina at Chapel Hill, Mankato State College, and Arizona State University. The sample totaled 1,139 valid responses.

9. The students were requested to indicate the number of times they had traveled in each of the states of the conterminous United States.

10. For example, the Cuyahoga River in Ohio has actually been set afire on more than one occasion due to the concentration of flammable industrial wastes in the water.
THE GEOGRAPHICAL BULLETIN

Published semi-annually by Gamma Theta Upsilon, is available by subscription for $4.00 per year. Individual copies may also be purchased from Gamma Theta Upsilon at $2.00 per issue. While the supply remains, complete back sets of the first 8 volumes can be purchased for $10.00.

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