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NEWSPAPER TREATMENT OF THE VIKING MISSION  
TO MARS, 1975-1976

THESIS

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The study's problem was whether five major newspapers that covered Viking produced informative, educational, interpretive, and credible stories. Indexed, microfilmed articles from January, 1975, to November, 1976, were analyzed.

Conclusions: no newspaper gave the landings the greatest percentage of coverage; every newspaper devoted the largest percentage of coverage to interpretation; science writers used analogy most often; adequate explanations of Viking's implications were not found; four of five newspapers had more references to named than unnamed sources; only two newspapers utilized their staffs more than outside sources.

Recommendations: covering a science event should be planned to include preliminary coverage, follow-up, and analysis; writers must interpret the facts, use educational writing techniques, explain implications, and have specific attribution; newspapers should assess their capabilities for science coverage.

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## CHAPTER I

### INTRODUCTION

The Space Age was born on October 4, 1957, when the Soviet Union launched Sputnik, the world's first artificial satellite, into orbit (20, p. 348). With the establishment of the National Aeronautics and Space Administration (NASA) by means of the National Aeronautics and Space Act passed by Congress in 1958, the United States officially entered a race between the two super powers to reach the moon.

NASA began operations on October 1, 1958, with its primary mission being the "peaceful exploration of space for the benefit of all mankind" (9, pp. 725-726). A survey made at that time by the National Association of Science Writers and New York University, asking editors which scientific topics held special interest for their dailies, showed that the new category "Satellites and Outer Space" led with an 80 per cent vote. The category "Medicine and Public Health" headed the list in a 1951 survey by the same groups, but it slipped into second place in 1958 and again in 1965 when "space" placed first with a 78.3 per cent response by the editors (11, p. 78).

The race to the moon produced several spectacular feats, culminating with the Apollo landing on the moon on July 16, 1969. In the early 1970's, the setting of endurance records in a space station and the sending of unmanned expeditions to fly by other planets began a trend in science writing. A decline in human interest news and an increase in long gaps of time that needed to be filled if interest was to be sustained required more explanatory, background, and interpretive writing (11, p. 225). Hillier Krieghbaum described the situation:

In addition to filling time between visual space happenings, the public's need for this information [analyses, interpretive articles, and Sunday or weekly comments] has been established and many science journalists and some editors and producers are trying to do something to change and improve performances. . . . Newspapers and news magazines may be expected to pursue their reporting-in-depth coverage--and possibly increase it for what their staffs consider supercolossal spectacles (11, p. 225).

The problems and challenges involved in the mass media's treatment of the space program, as well as numerous other scientific events that the mass media must cover, have not received much attention from researchers in the past two decades. In 1963, Earl Ubell indicated that the public is interested in science news presented by the mass media, but it has a deep ignorance when it comes to comprehending many basic scientific concepts (27, p. 297). As summed up by Bryant Kears and Richard Powers, the challenge to

scientists and science writers is to present science in a way that is both comprehensible to average readers and interesting to the more sophisticated ones (10, p. 221).

In order to make science news understandable, the science writer must of necessity educate his readers at the same time he is informing them. Karlen Mooradian elaborated on this point when he explained that whereas the public may know that an event has happened, all too often it does not know why it occurred because the mass media did not provide enough explanation. Much of the news coverage, he said, provides only entertainment, not explanation (17).

In studying science writing about heart transplants, a senior science writer for General Motors Research Laboratories added a responsibility to those just mentioned when he said that the public needs to be made aware of the social and ethical implications of science. William Oates' study revealed that little attention was given to the implications of heart transplant operations as covered by three major newsmagazines (21, p. 684).

If he is to succeed at these demanding tasks, the science writer must have the cooperation of the scientists he seeks out for information. That the press and the science community wish to improve their relationship, which has often been marred by the suspicion and even hostility that many scientists feel toward reporters, is

evidenced by Jean Marx's coverage of a seminar sponsored by the Society for Neuroscience in 1976. Marx related the reporters' view of one of their main problems:

. . . they want stories based on solid facts or conclusions, or on new concepts. Nevertheless, space limitations frequently mean that a story must be condensed and simplified while, at the same time, it is being translated from scientific jargon into English that the audience can understand (13).

Discussion following a panel presentation at the seminar centered on the important difference between valid information and publicity. As Marx described it, "Just about everyone at the seminar agreed that facts must be attributed to particular scientists if they are to have credibility" (13).

The mass media, especially newspapers [which, as cited by Ubell, are the single most important source of science information for adult readers (27, p. 294)], had a unique opportunity to demonstrate their awareness of these problems and their ability to handle them effectively when yet another space spectacular took place in 1976. In February, 1969, even before man set foot on the moon, NASA had announced plans for a mission called Viking, an endeavor that would attempt to put two landers on Mars with the hope of determining whether life could exist there. The mission, the most technically sophisticated and expensive of all the unmanned ones (18, p. 10), was an on-going

scientific event lasting many months that could cause to become fact much of what had been science fiction.

Viking offered specific instances of every general problem involved in scientific writing mentioned thus far in this introduction. For example, long gaps of time between launchings, landings, lander tests, and release of test results needed to be filled with background and interpretive writing. The technology, biology, chemistry, and physics inherent in the mission involved complex concepts and techniques that needed to be explained by reporters. The search for life on Mars could produce findings, the social and ethical implications of which could be profound.

In the time that has elapsed since Viking ceased to be a major news event, commentary about how the mass media performed in covering it has been scant. However, the editor of Science News, Kendrick Frazier, did criticize the mass media for appearing to be interested only in the landings themselves and a yes-or-no answer to the question of whether Mars harbored life (5). His criticism was substantiated somewhat by Viking scientists themselves. Apparently rules established by NASA were designed to minimize sensationalism through speedy disclosure by announcing results from experiments that were incomplete or unconfirmed. Viking scientists, however, complained of the pressure exerted on them to make such immediate disclosures (19, p. 74).

### Statement of the Problem

The major problem of this study was to determine whether selected newspapers that covered the Viking mission produced stories that were informative, educational, interpretive, and credible.

### Purposes

The purposes of this study were

1. To measure the coverage devoted to each of the six phases of the Viking mission by five major United States newspapers;
2. To measure the coverage in terms of the different types of articles (such as straight news story, feature story, or column) written about the mission;
3. To determine whether the science writers utilized any educational techniques to explain the mission to the reader;
4. To examine whether science writers explained the ethical and social ramifications of the Viking mission ;
5. To determine the nature of the attribution used by the science writers ;
6. To determine the sources of the articles published by the newspapers.

### Questions To Be Answered

1. Did any newspaper's coverage of the two Viking landings result in the largest percentage of its total column inches when compared with its coverage of the other mission phases?
2. Was the largest percentage of column inches in any newspaper devoted to interpretive articles with bylines by science writers rather than to editorials, straight news, and other types?
3. What educational technique was used most often by various science writers as they attempted to educate readers?
4. Did the interpretive science writing on Viking contain ethical, social, and depth indicators which show that the writers attempted to explain the significances of the mission?
5. Did bylined writers of straight news and interpretive articles attribute facts to more named than to unnamed sources?
6. Did the selected newspapers rely more on their own writers for articles than on other sources such as the wire services?

### A Review of Recent and Related Studies

A survey of communication studies in the area of science news and writing showed that they tended to fall into five categories: trends in science writing, the nature of science writing, the audience for science news, relations between science writers and scientists, and the role of gatekeepers who control the flow of science news.

The definitive books on the subject were written by Kriehbaum. He touched on all of the five categories above in Science and the Mass Media. In The Public Impact of Science in the Mass Media, he reported on a nationwide survey of attitudes toward science, science writers, and scientists. Satellites, Science and the Public and Science, the News, and the Public reported the results of studies by the National Association of Science Writers (22, p. 121).

The fourteen volumes of Journalism Abstracts for 1963-1977 yielded approximately twenty-three studies on the subject of science writing. Gail McBride's study of trends in newspaper reporting of science news from 1938-1961 rejected two pertinent hypotheses: that newspapers have given increased attention to science news, and that background and interpretive stories would increase relative to spot news stories (14). In 1975, however, Sharon Friedman reported that since 1965 there had been increases in interpretive reporting and in the use of more reader-relevant information in science articles (6, p. 74).

David Pulford's thesis investigating accuracy in newspaper reporting showed that scientists believed that too little information is published. The respondents indicated that quotations and facts are reported fairly well, but relevant information about inferences, methods of study, and results is often omitted (23). Another study



that looked into accuracy was conducted in 1977 by David Briery. He found that 97 per cent of the scientists he polled thought that science writers should have their stories checked by scientists before publication. Sixty-four per cent wanted to have test results appear in scientific journals before being released to the mass media (2, p. 43).

Three studies yielded interesting results regarding the flow of news from its scientific source to the public. Terry Singleton, for example, found no significant communication barriers in the aerospace communication chain made up of engineers, science writers, news editors, and general readers. One practical implication arising from the study is that the science writer might improve reader understanding of aerospace news by using more visual aids (24, p. 181).

In analyzing mass media reporting of science projects at the University of Utah, James Smith found that relations between scientists and the mass media were somewhat strained but that the public relations arm of the university was capable of improving these relations (25, p. 126).

A 1975 dissertation by Rae Goodell dealt with the fact that a large amount of science news is attributed to a relatively small number of scientists who are publicly involved in politics and controversy. Although scientists have usually used government channels to influence public policy, these "visible scientists" are taking issues directly to

the public arena. These select few tend to be highly cooperative with the press and tolerant of the corps' weaknesses (7).

A survey of Journalism Quarterly for 1924-1977 yielded a dozen studies related to science news, two of which are the only studies found that are directly related to NASA and newspaper treatment of space flights. Louis Alexander said that NASA is a full partner in the efforts of the mass media to provide the public with the information and excitement it seeks (1, p. 722). Krieghbaum, on the other hand, found that the human interest angles were played up at the same time that an impressive amount of "textbook science" was written about the Gemini flights (12, p. 120).

In addition to the Oates' and Kearl-Powers' studies mentioned earlier in this introduction, three other pertinent studies dealt with science coverage. James Tankard and Michael Ryan reported that attitude items indicated a strong criticism by scientists of the accuracy of news reporting in general. Moreover, information crucial to understanding research results is often omitted from news stories (26, p. 334). James Grunig found that content must be relevant to the perceived situation of the reader. The style of the science writing is less important than the relevant content, and it is usually read only by a select public (8, pp. 387-389). A 1975 study by Bruce Cole analyzed the content of all the science news articles in a sample of

252 newspaper issues selected from 1951, 1961, and 1971 to determine trends in the amount, content, and nature of science news.

The study reported that controversy in science news increased during the time spans and that science reporters must often work within bounds of restrictions, both formal and informal, imposed by science groups (3, p. 466).

Public Opinion Quarterly for 1937-1976 yielded two pertinent articles. Donald Michael's study indicated a need for before-and-after studies of how well the mass media informs its audience (16). Jack McLeod and James Swinehart found that wide circulation of news about science is not likely to change reading habits, attitudes toward science topics, or use of a scientific frame of reference in interpreting news events (15, p. 589).

#### Justification

This study was designed to evaluate newspaper performance in covering a unique space science event. The coverage of the United States' space program by the mass media seemed to have been largely ignored by communication researchers, especially in the 1970's. Even the larger area of science writing received relatively little attention. Therefore, this study can help to fill this gap.

Several groups involved in the coverage of science news, especially of space exploration, might have an interest in this study.

The public information offices of NASA, for example, might benefit from the findings. Science reporters and editors of small papers, as well as larger ones similar to the metropolitan newspapers surveyed, might find application for the findings on their own publications.

### Definition of Terms

Several terms have been defined to carry out the purposes of this study:

Column inch--one column wide and one inch deep.

Depth or scope indicator--any word that goes beyond what would be required to report the objective facts of the news item itself and that indicates a long-range effect or an arena of significance surrounding social or ethical ideas (e.g., implications, significance, meaning, consequences, ramifications) (20).

Ethical indicator--any word that bears reference to any ethical, philosophic, or value system by which men have judged or decided their actions over the years (e.g., ethics, morality, religion, philosophy, race) (20).

Feature story--an article that highlights interesting sidelights and personalities of the mission.

Interpretive science writing--technical writing that attempts to describe and explain scientific experiments and

phenomena and their significances.

Signed columns--those with an identified author.

Social indicator--any word that bears reference either to people in the aggregate sense (e.g., the public, the masses) or to people in a generalized sense (e.g., society, civilization, mankind) (20).

Straight news story--an article that details what happened, shortly after the even occurred.

Unsigned editorials--those written by members of a newspaper's editorial staff.

### Methodology

The materials sampled were indexed articles about the Viking mission in five United States newspapers that serve metropolitan areas in a geographic cross section of the country. These newspapers are The New York Times, the Los Angeles Times, the Chicago Tribune, The Christian Science Monitor, and the New Orleans Times-Picayune.

Several factors figured in the selection of these newspapers. All these publications have the position of science writer or editor on their staffs, as indicated in Volume I of Working Press of the Nation. They serve the four major geographic areas of the country, with the Monitor circulating nationally by means of regional editions. They

exist on microfilm, with indexes to their contents. And, finally, they have established reputations.

In a chapter on "Growth of the Print Media," Edwin Emery, Phillip Ault, and Warren Agee refer to the standings of three of the papers selected. The New York Times, generally recognized as the country's leading daily, has a sizeable national circulation. The Los Angeles Times improved its news content during the 1960's to reach the top levels of American newspaper journalism. The Christian Science Monitor, which circulates nationally with its regionally edited editions, has ". . . won widespread respect . . . and built a high reputation for . . . its interpretative articles" (4, pp. 76-77).

The analysis covered a time period beginning on January 1, 1975, so that articles written prior to the actual launchings of Vikings I and II in August and September of that year could be studied, and ending on November 8, 1976, when communication with both landers and orbiters ended temporarily.

Question One (Did any newspaper's coverage of the two Viking landings result in the largest percentage of its total column inches when compared with its coverage of the other mission phases?) was answered by counting column inches categorized according to which phase of the mission was covered. The phases are pre-launch, launchings, flights from Earth to Mars, landings, tests performed,

and follow-up on test results. Percentages were calculated to determine which phase was considered the most newsworthy by the newspapers.

Question Two (Was the largest percentage of column inches in any newspaper devoted to interpretive articles with bylines by science writers rather than to editorials, straight news, and other types?) was answered by counting column inches of articles as they were categorized according to type. Percentages were figured to see which type of article predominated.

Question Three (What educational technique was used most often by various science writers as they attempted to educate readers?) involved finding and counting the techniques of instruction that bylined science writers used in interpretive science writing and straight news articles. The techniques included defining terms, making analogies between unfamiliar scientific phenomena and familiar happenings, giving detailed explanations, giving concrete examples, and using illustrative aids such as graphs, charts, and drawings. It was determined which one of these techniques was used most often and whether particular science writers preferred certain of the techniques, as indicated by their consistent use of them.

Question Four (Did the interpretive science writing on Viking contain ethical, social, and depth indicators that show that the writers

attempted to explain the significances of the mission?) involved coding ethical and social ramifications mentioned in the Viking coverage, using three categories of indicators--ethical, social, and depth--developed by William R. Oates (21). Oates described his methodology as follows:

A semantic content analysis technique known as word designation analysis was used to measure social and ethical content in the selected material. The technique was defined by Irving Janis who, along with Harold Lasswell and others, was interested in propaganda content analysis during World War II.

The technique is used in the present study to describe the frequency with which social and ethical concepts are referred to (e.g., counting the number of times society is referred to, irrespective of the particular word that may be used to make the reference) (21, p. 681).

Question Five (Did bylined writers of straight news and interpretive articles attribute facts to more named than to unnamed sources?) was answered by counting the references to named and unnamed sources used for attribution by the science writers in bylined straight news and interpretive articles.

Question Six (Did the selected newspapers rely more on their own writers for articles than on other sources such as the wire services?) was answered by counting articles written by the newspapers' own writers and those obtained through other sources.

All articles about the Viking mission that were listed in the index of each newspaper (with the exception of letters to the editors)



for the time period of January 1, 1975, through November 8, 1976, were studied. The five newspapers were evaluated collectively and were compared and contrasted with each other in terms of performance.

#### Limitations of the Study

Five daily newspapers were analyzed: The New York Times, the Los Angeles Times, The Christian Science Monitor, the Chicago Tribune, and the New Orleans Times-Picayune. These publications have the positions of science editor or writer on their staffs and represent a geographic cross section of the United States.

The analysis covered a time period beginning on January 1, 1975, prior to the launchings of Vikings I and II in August and September of that year, and ending on November 8, 1976, when communication with the landers and orbiters ended temporarily.

Conclusions were reached solely on the basis of what appeared on the pages of the newspapers analyzed. All articles, except letters to the editors, were studied. Neither the training, experience, or motivations of the writers nor the policies of the publications figured in the study or its conclusions.

## Organization of the Study

Chapter I presents the introduction.

Chapter II deals with the quantitative analysis used to measure the total amount of space that the newspapers devoted to the six phases of Viking and the amount of space they devoted to the different types of articles.

Chapter III covers the qualitative analysis necessary to determine whether science writers attempted to educate readers, whether they interpreted the social and ethical ramifications of Viking, the nature of their attribution, and what sources of information were tapped by reporters and editors.

Chapter IV interprets the findings, presents conclusions, and makes recommendations.

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## CHAPTER II

### A QUANTITATIVE ANALYSIS OF TWO ASPECTS OF NEWSPAPER COVERAGE OF THE VIKING MISSION

Quantitative analysis was undertaken to determine how much space was devoted to the Viking mission by the five newspapers surveyed. The coverage was measured on the basis of two criteria: the six phases of the mission and the types of articles written about the mission.

The five newspapers devoted varying amounts of space to the six phases of the Viking mission. In order to determine whether any newspaper's coverage of the two Viking landings resulted in the largest percentage of its total column inches when compared with its coverage of the other mission phases (Question One of the study), the column inches were measured and categorized according to the phases. No headlines were included in the measurements. The phases were pre-launch, launch, flight, landing, tests performed, and follow-up on test results for both Vikings I and II.

The subject matter of an article determined placement when column inches were measured and the copy categorized according to

the mission phases. If an article contained facts that belonged in two or more phases, the story was categorized further, and each section was measured separately. The column-inch amounts were then placed into the appropriate phase. A few articles that did not deal even indirectly with a particular phase were categorized according to the phase that was occurring at the time the article was printed. All measurements were rounded off to the nearest quarter inch. Captions of photographs were not included in the analysis.

The phases of the Viking mission varied in length. For Viking I, the pre-launch phase lasted from January 1, 1975, to August 20, 1975, when launch occurred. Viking II's pre-launch extended from January 1, 1975, to September 4, 1975. The launchings of Viking I and II occurred on August 20 and September 4, 1975, respectively, with articles about the two launches appearing on these two days and for several days afterwards. The flight period for Viking I ranged from August 20, 1975, to the landing on July 21, 1976. For Viking II, the flight period lasted from September 4, 1975, to September 4, 1976. Again, articles about the landings appeared on the landing dates and on several days following touchdown. The time period during which articles appeared on the tests performed, with follow-up articles on the results of those tests, extended from the two landing dates to November 8, 1976, when transmission from the Viking landers ceased.

The five newspapers studied were the Chicago Tribune, The Christian Science Monitor, the Los Angeles Times, the New Orleans Times-Picayune, and The New York Times. For the purpose of brevity in several tables in this study, these publications were referred to as CT, CSM, LAT, NOTP, and NYT, respectively.

#### Coverage of the Six Phases of Viking

The Chicago Tribune devoted 498.25 column inches to the six phases of the Viking mission to Mars. Table I shows the varying amounts accorded each phase for Vikings I and II. The Chicago

TABLE I

#### THE CHICAGO TRIBUNE'S COVERAGE OF THE SIX PHASES OF THE VIKING MISSION TO MARS

Phase	Column Inches of Coverage of Viking I and II
Pre-launch . . . . .	25.50 (I)
	.00 (II)
Launch . . . . .	5.75 (I)
	.00 (II)
Flight . . . . .	177.00 (I)
	5.00 (II)
Landing . . . . .	73.50 (I)
	12.50 (II)
Tests Performed . . . . .	111.25 (I)
	13.25 (II)
Follow-up on Test Results . . . . .	23.00 (I)
	4.50 (II)
	<u>47.00 (I and II)</u>
Total	498.25



Tribune's coverage of Viking was small until the long flight period. Then, the largest count for all phases, 177.00 column inches, appeared. Coverage of the tests performed by Viking I measured 111.25 column inches, followed by the Viking I landing at 73.50 column inches. Viking II received 35.25 column inches, or 7 per cent of the Chicago Tribune's total coverage.

The Christian Science Monitor devoted slightly more total space to the Viking mission than did the Chicago Tribune, as shown in Table II. The pre-launch and launch stages received very little

TABLE II

THE CHRISTIAN SCIENCE MONITOR'S COVERAGE OF THE SIX PHASES OF THE VIKING MISSION TO MARS

Phase	Column Inches of Coverage of Viking I and II
Pre-launch . . . . .	19.25 (I) .00 (II)
Launch . . . . .	9.00 (I) .00 (II)
Flight . . . . .	71.50 (I) 15.00 (II)
Landing . . . . .	117.75 (I) .00 (II)
Tests Performed . . . . .	135.50 (I) 1.75 (II)
Follow-up on Test Results . . . . .	169.00 (I) <u>.00 (II)</u>
Total	538.75

attention from the Monitor. The flight period received a total of 86.50 column inches. As the mission continued, Viking II was largely obscured by Viking I; the second Viking received 3 per cent of the Monitor's total coverage. The largest amount of space was devoted to following up on test results for Viking I, 169.00 column inches.

The Los Angeles Times' coverage of the Viking mission was larger than that of the Chicago Tribune or The Christian Science Monitor. Table III shows the Los Angeles Times' 1,436.25 column inches of coverage by phases of the mission and Viking craft.

TABLE III

THE LOS ANGELES TIMES' COVERAGE OF THE SIX PHASES  
OF THE VIKING MISSION TO MARS

Phase	Column Inches of Coverage of Viking I and II
Pre-launch . . . . .	91.75 (I)
	2.50 (II)
Launch . . . . .	23.50 (I)
	4.00 (II)
Flight . . . . .	446.00 (I)
	23.00 (II)
Landing . . . . .	95.25 (I)
	73.00 (II)
Tests Performed . . . . .	178.75 (I)
	97.75 (II)
Follow-up on Test Results . . . . .	225.25 (I)
	<u>175.50 (II)</u>
Total	1,436.25

The Los Angeles Times devoted 375.75 column inches, 26 per cent of its total Viking coverage, to Viking II. This was the largest amount of coverage that Viking II received from any of the five newspapers. The combined flights received the largest number of column inches, 469.00. The next largest amount was the 400.75 column inches used to follow up on test results for the final phase of the mission.

The New Orleans Times-Picayune devoted more column inches to the first two phases of the Viking mission than did both The Christian Science Monitor and Chicago Tribune. Table IV shows the Times-Picayune's coverage, revealing that the 115.50 column

TABLE IV

THE NEW ORLEANS TIMES-PICAYUNE'S COVERAGE OF THE SIX PHASES OF THE VIKING MISSION TO MARS

Phase	Column Inches of Coverage of Viking I and II
Pre-launch . . . . .	95.25 (I)
	20.25 (II)
Launch . . . . .	23.00 (I)
	3.50 (II)
Flight . . . . .	172.00 (I)
	29.75 (II)
Landing . . . . .	103.00 (I)
	67.50 (II)
Tests Performed . . . . .	128.00 (I)
	38.00 (II)
Follow-up on Test Results . . . . .	102.75 (I)
	<u>51.75</u> (II)
Total	834.75

inches of Times-Picayune's coverage of the pre-launch and launch stages, however, was still less than the 121.75 column inches devoted by the Los Angeles Times. The New Orleans Times-Picayune devoted 210.75 column inches, or 25 per cent of its total coverage, to Viking II. This percentage is the same as that given Viking II by The New York Times and one percentage point less than that of the Los Angeles Times.

The New York Times' coverage of the Viking mission totaled 1,929.00 column inches, the largest amount accorded Viking by any of the five newspapers, as shown in Table V. The New York Times'

TABLE V

THE NEW YORK TIMES' COVERAGE OF THE SIX PHASES  
OF THE VIKING MISSION TO MARS

Phase	Column Inches of Coverage of Viking I and II
Pre-launch . . . . .	125.50 (I) 12.50 (II)
Launch . . . . .	36.00 (I) 14.00 (II)
Flight . . . . .	390.00 (I) 85.50 (II)
Landing . . . . .	160.00 (I) 110.75 (II)
Tests Performed . . . . .	377.75 (I) 167.25 (II)
Follow-up on Test Results . . . . .	355.25 (I) <u>94.50 (II)</u>
Total	1,929.00

coverage of the early pre-launch phase was larger than that of any other paper, and its coverage of Viking II encompassed more space than any of the other publications. The New York Times devoted 484.50 column inches (25 per cent of its total coverage) to the second Viking, 100.00 column inches more than the next highest amount, the 375.75 column inches used by the Los Angeles Times to cover Viking II.

Table VI shows the column inches devoted to and percentages of coverage of the six phases of the Viking mission by the five newspapers analyzed. The figures in Table VI reveal that the first half of the Viking mission received less than half of the total coverage of any newspaper. The Chicago Tribune used 43 per cent of its total coverage (213.25 column inches) for the first three phases; The Christian Science Monitor used 21 per cent (114.75 column inches). Both the Los Angeles Times and the New Orleans Times-Picayune devoted 41 per cent of their space to the first three phases: 590.75 column inches for the Times and 343.75 column inches for the Times-Picayune. The New York Times' coverage of the pre-launch, launch, and flight of the mission accounted for 34 per cent (663.50 column inches) of its total coverage.

Question One asked whether any newspaper's coverage of the two Viking landings resulted in the largest percentage of its total

TABLE VI  
 A COMPARISON OF THE COLUMN INCHES AND PERCENTAGES OF TOTAL SPACE  
 ALLOTTED TO THE SIX PHASES OF THE VIKING MISSION  
 BY FIVE NEWSPAPERS

Phase	Newspaper				
	CT	CSM	LAT	NOTP	NYT
Pre-launch	25.50 5%	19.25 4%	94.25 7%	115.50 14%	138.00 7%
Launch	5.75 1%	9.00 2%	27.50 2%	26.50 3%	50.00 3%
Flight	182.00 37%	86.50 16%	469.00 33%	201.75 24%	475.50 25%
Landing	86.00 17%	117.75 22%	168.25 12%	170.50 20%	270.75 14%
Tests	124.50 25%	137.25 25%	276.50 19%	166.00 20%	545.00 28%
Follow-up	74.50 15%	169.00 31%	400.75 28%	154.50 19%	449.75 23%
Totals	498.25	538.75	1,436.25	834.75	1,929.00

column inches when compared with its coverage of the other mission phases. Table VI shows that not one of the five newspapers used the largest percentage of its space to cover the landings. Three of the five newspapers devoted more space to phase three, the flights of Vikings I and II, than to any other phase of the mission. The Chicago Tribune devoted 37 per cent of its total coverage (182.00 column inches) to the flights. Thirty-three per cent of the Los Angeles Times' coverage (469.00 column inches) was used to cover the flights, and 24 per cent (201.75 column inches) of the New Orleans Times-Picayune's coverage was about the flights.

The Christian Science Monitor and The New York Times emphasized the fifth and sixth phases. The Monitor devoted 31 per cent (169.00 column inches) to following up on the results of the tests performed by both Viking landers. The New York Times used 28 per cent (545.00 column inches) to describe and explain the tests performed by both Viking landers.

#### Types of Viking Coverage

In addition to measuring column inches of coverage used to cover the various phases of the Viking mission, measurements were made to divide the coverage according to the types of articles written. Question Two of this study was designed to investigate whether the largest percentage of column inches written about Viking in any

newspaper was devoted to interpretive articles with bylines by science writers rather than to editorials, straight news, or other types of writing.

In order to answer Question Two, the coverage was categorized as signed columns, straight news stories, features, editorials, and interpretive science writing. Often, one article contained content that qualified as both straight news and interpretive science writing. When this occurred, the article was divided by type of content, the parts were measured, and the resulting measurements were placed into the appropriate categories. All measurements were rounded off to the nearest quarter inch. Captions of photographs and headlines were not considered in the analysis.

The amounts of straight news coverage and interpretive science writing should be compared when surveying the tables that follow. Of interest, too, are the amount of space devoted to featuring sidelights or highlights of the mission, the extent to which columnists expressed their opinions about the Viking mission and its implications if life were found on Mars, and the amount of editorializing.

Table VII shows the categorization of content according to the types of articles about Viking printed by the Chicago Tribune. The Tribune's coverage of Viking consisted mainly of 237.25 column inches of interpretive science articles, or 45 per cent of its total coverage.



The smallest amount of the Tribune's coverage (2 per cent) consisted of twelve column inches of editorials. Columnists and feature writers contributed almost 100.00 column inches each; straight news coverage was slightly less, 79.75 column inches.

TABLE VII

THE CHICAGO TRIBUNE'S COVERAGE OF THE VIKING  
MISSION BY TYPE OF ARTICLE

Type of Article	Column Inches	Percentage
Signed Columns	97.50	19
Straight News	79.75	15
Features	99.50	19
Interpretive Writing	237.25	45
Editorials	<u>12.00</u>	<u>2</u>
Totals	526.00	100

Eighty-five per cent of The Christian Science Monitor's 546.25 column inches of Viking coverage consisted of interpretive science writing. The other amounts were dwarfed by this volume of 463.75 column inches of writing that explained various facets of the Viking mission. Table VIII shows the Monitor's coverage.

TABLE VIII

THE CHRISTIAN SCIENCE MONITOR'S COVERAGE OF  
THE VIKING MISSION BY TYPE OF ARTICLE

Type of Article	Column Inches	Percentage
Signed Columns	16.50	3
Straight News	29.25	5
Features	8.25	2
Interpretive Writing	463.75	85
Editorials	<u>28.50</u>	<u>5</u>
Totals	546.25	100

Interpretive science writing continued to predominate in the Los Angeles Times' coverage. The Times devoted 81 per cent of its coverage to interpreting the facts of Viking. Its 1,111.25 column-inch total was much greater than the combined interpretive writing totals for both the Chicago Tribune and The Christian Science Monitor. Straight news accounted for 11 per cent of the Los Angeles Times' total coverage; signed columns made up 5 per cent. Table IX shows the Los Angeles Times' coverage.

The New Orleans Times-Picayune printed a large amount of straight news, second only to that printed by The New York Times.

TABLE IX

THE LOS ANGELES TIMES' COVERAGE OF THE  
VIKING MISSION BY TYPE OF ARTICLE

Type of Article	Column Inches	Percentage
Signed Columns	64.25	5
Straight News	146.50	11
Features	32.50	2
Interpretive Writing	1,111.25	81
Editorials	<u>21.50</u>	<u>2</u>
Totals	1,376.00	101

The Times-Picayune carried 276.75 column inches of straight news coverage for 30 per cent of its total column inches. The largest percentage of its coverage, however, was the 44 per cent, or 402.75 column inches, devoted to interpretive writing. More editorials were run in the Times-Picayune about Viking than in the Chicago Tribune and The Christian Science Monitor combined. The Tribune carried 12 column inches of editorials; the Monitor, 28.50; and the Times-Picayune, 88.50. Table X shows the Times-Picayune's coverage.

TABLE X

THE NEW ORLEANS TIMES-PICAYUNE'S COVERAGE  
OF THE VIKING MISSION BY TYPE OF ARTICLE

Type of Article	Column Inches	Percentage
Signed Columns	48.00	5
Straight News	276.75	30
Features	97.00	11
Interpretive Writing	402.75	44
Editorials	<u>88.50</u>	<u>10</u>
Totals	913.00	100

The New York Times greatly outdistanced the others in the category of feature writing, with 153.75 column inches, the largest amount surveyed. The paper printed the largest amount of interpretive science writing, 1,294.00 column inches. Of the 1,983.75 total column inches the Times printed about Viking, none was used by a columnist to comment on the mission. The Times ran 81.50 column inches of editorials, using more space than the Chicago Tribune, The Christian Science Monitor, and Los Angeles Times combined for editorial opinion. Table XI shows these data and related percentages.

TABLE XI

THE NEW YORK TIMES' COVERAGE OF THE VIKING  
MISSION BY TYPE OF ARTICLE

Type of Article	Column Inches	Percentage
Signed Columns	0.00	0
Straight News	454.50	23
Features	153.75	8
Interpretive Writing	1,294.00	65
Editorials	<u>81.50</u>	<u>4</u>
Totals	1,983.75	100

Table XII shows a comparison of each of the five newspapers with the other four. It is obvious from this table that The Christian Science Monitor devoted the largest percentage of its total coverage, 85 per cent, to interpretive science writing. In fact, in answer to Question Two, each newspaper analyzed did devote more space to interpretive science writing than to any of the other four types of articles.

Of special note in Table XII is the fact that The New York Times did not print a single column on Viking or its implications if life were found on Mars. It should be explained that the small

TABLE XII

A COMPARISON OF THE COLUMN INCHES AND THE PERCENTAGES OF TOTAL SPACE ALLOTTED TO THE VIKING MISSION BY TYPE OF ARTICLE

Type of Article	Newspaper				
	CT	CSM	LAT	NOTP	NYT
Signed Columns	97.50 19%	16.50 3%	64.25 5%	48.00 5%	0.00 0%
Straight News	79.75 15%	29.25 5%	146.50 11%	276.75 30%	454.50 23%
Features	99.50 19%	8.25 1%	32.50 2%	97.00 11%	153.75 8%
Interpretive Writing	237.25 45%	463.75 85%	1,111.25 81%	402.75 44%	1,294.00 65%
Editorials	12.00 2%	28.50 5%	21.50 2%	88.50 10%	81.50 4%
Totals	526.00	546.25	1,376.00	913.00	1,983.75

amount of space devoted to features by The Christian Science Monitor resulted from the fact that many articles which indeed featured a special aspect of the mission were predominantly interpretive of the scientific phenomena involved and were therefore classified under the category of interpretive science writing.

## CHAPTER III

### A QUALITATIVE ANALYSIS OF FOUR ASPECTS OF NEWSPAPER COVERAGE OF THE VIKING MISSION

In addition to quantitating the aspects of the newspaper coverage of the Viking mission described in Chapter II, qualitative analysis was undertaken to examine four characteristics of the coverage, especially the interpretive science writing. These characteristics included the writers' use of educational techniques; the use of ethical, social, and depth indicators to explain Viking's implications; attribution; and sources of articles.

Question Three asked which of five educational techniques was used most often by various science writers as they attempted to educate readers. The reading public will understand science news if it is written in an instructive as well as factual style. As summed up by Bryant Kears and Richard Powers, the challenge to scientists and science writers is to present science in a way that is both comprehensible to the average reader and interesting to a more sophisticated one (3, p. 221).



## Five Educational Techniques

In order to determine whether the bylined writers of the straight news and interpretive science articles that appeared in the five newspapers studied had attempted to explain the Viking mission to their readers, a count was taken of five instructive techniques that would aid in instruction while adding color and special interest. These techniques were defining terms, structuring analogies, explaining in detail, using concrete examples, and supplementing articles with illustrations.

### The Definition

The American Heritage Dictionary of the English Language defines "definition" as "the statement of the meaning of a word, phrase, or term" (6, p. 346). Scientific jargon can be made understandable by translating it into laymen's language by means of simple definitions. At times, the phrase "is defined as" appeared in the definitions counted, but definitions also were given in parentheses, in brackets, in dependent adjective clauses, as appositives, and between dashes.

### The Analogy

Analogy is defined by American Heritage Dictionary as "correspondence in some respects, especially in function or position,

between things otherwise dissimilar" (6, p. 47). Fiction writers and poets have long made analogies through the use of similies and metaphors. The simile, an expressed comparison, compares two unlike objects using the words "like," "as," "than," "similar to," and "resembles." The metaphor, an implied comparison between two seemingly unlike objects, says one thing is another. Similies and metaphors enhance nonfiction writing in the same way they do fiction; in science writing these figures of speech can produce an earthly counterpart for a condition on another planet or give reality to a theory or concept.

In some of the science articles surveyed, the entire lead was an analogy. For example, George Alexander began an article in the Los Angeles Times with this lead: "Like a magician, the planet Mars pulled another scientific rabbit out of its hat Saturday and seemingly dared a spellbound audience of scientists here on earth to tell if the trick was done biologically or chemically" (5, p. 1). Some articles were based entirely on an analogy that was reiterated throughout the piece. For example, a James Pearre article in the Chicago Tribune introduced Viking as a tourist in a foreign land and then developed this analogy by cataloging the "tourist's" picture-taking activities (2, p. 2).

In addition to constructing analogies in the form of similies and metaphors, interpretive science writers formed analogies by compounding adjectives: "a spider-like robot spacecraft" (1, p. 14) and by using adverbs to make a comparison: "Some ridges wind serpentine across the landing zone" (4, p. 1). The use of analogy in the science writing was instructive, and it added color and style to the journalists' coverage of the Viking mission.

#### The Detailed Explanation

Detailed explanation, the third educational technique tallied, was the most frequently encountered. The majority of the articles went into considerable detail to explain the flights, especially the mechanics involved in the operation of the two landers. It was the most basic of the techniques.

#### The Concrete Example

The use of concrete examples was minimal. This lack of specific examples may be due to the fact that the Viking mission involved previously unexplored territory, the terrain of Mars. A concrete example is "representative of a group as a whole" or is "a previous case or situation that is the same or similar to the one at hand," according to American Heritage Dictionary (6, p. 456). The Viking exploration of Mars had no precedent, and scientists

studying the test results transmitted to Earth from the landers were just beginning to discern Mars' true characteristics.

### The Illustrative Aid

The final educational technique was the use of illustrative aids (photographs, diagrams, and artists' sketches), which were dramatic and informative. The photographs of the Martian terrain, the first of their kind ever taken, were striking in their starkness. They stand as a monument to man's technical ingenuity. Diagrams were used at various stages of the mission to show such things as the path Viking took to reach Mars, the parts of the Viking landers, and the steps involved in various lander tests. The few artists' sketches encountered in the study mainly showed a scene or route that could not be photographed.

Table XIII shows the count of educational techniques encountered in 216 articles printed in the five newspapers. The analogy was used most often by writers on all papers, with the exception of the New Orleans Times-Picayune where the definition occurred most often. Los Angeles Times' writers utilized the largest total of techniques, 312; The New York Times had the second largest number, 190.

TABLE XIII

A COUNT OF EDUCATIONAL TECHNIQUES USED IN BYLINED  
STRAIGHT NEWS AND INTERPRETIVE SCIENCE  
ARTICLES IN FIVE NEWSPAPERS

Educational Technique	Newspaper				
	CT	CSM	LAT	NOTP	NYT
Definition	20	15	48	27	24
Analogy	46	42	149	12	84
Detailed Explanation	7	29	52	13	50
Concrete Example	17	15	29	1	13
Illustrative Aids					
Photograph	6	10	20	6	13
Diagram	9	1	10	0	4
Artist's Sketch	<u>2</u>	<u>0</u>	<u>4</u>	<u>1</u>	<u>2</u>
Totals	107	112	312	60	190

### Implications of Science News

In addition to employing educational techniques in their science writing in order to educate the public, journalists should accept responsibility for 'helping the public understand the social and ethical implications of science news (7, p. 680). Question Four of this study asks whether the bylined interpretive science writing about the Viking mission contained ethical, social, and depth indicators that showed that the writers attempted to explain the significance of the venture to their readers.

In order to measure these indicators, a semantic content analysis technique known as "word designation analysis," used in a study of medical news in newsmagazines by William R. Oates (7, pp. 680-684), was adopted with modifications. The basic assumption of Oates' method was that a newsmagazine's attention to the social and ethical implications of a story is adequately reflected by the frequency with which pertinent lexical signs of these concepts appear.

In this study all lexical signs were divided into three categories: ethical indicators, social indicators, and depth (or scope) indicators. An ethical indicator is defined as "any word that bears reference to any ethical, philosophic, or value system by which men have judged or decided their actions over the years" (7, p. 681). Examples of ethical indicators used by Oates and incorporated into this study are ethics, culture, morality, race, teachings, and conscience. A social indicator is defined as "any word that bears reference either to people in the aggregate sense or to people in a generalized sense" (7, p. 681). Examples are Americans, the public, all, society, civilization, mankind, and sociological. A depth (or scope) indicator is defined as "any word that goes beyond what would be required to report the objective facts of the news item itself and that also indicates a long-range effect or an arena of

significance surrounding social or ethical ideas" (7, p. 681).

Examples are implications, significance, consequences, imprint, the future, era, and epoch.

Oates' definitions and examples were used as a guide, and a small number of indicators inherent in the Viking content were added. The interpretive science writing carrying bylines of science writers was then scanned and indicators were noted. The tables of indicators for each paper show the total number of interpretive science articles surveyed, the number of articles with no indicators of any kind, the percentage of articles without indicators, and the average number of indicators per article. All the words counted as indicators are listed, with numbers indicating if they appeared more than once. The indicators listed in Tables XIV through XVIII are quoted directly as they were printed. They are listed in order of frequency.

In answering Question Four, a comparison of the five newspapers showed that the interpretive science writing did contain indicators in small, varying amounts. The Los Angeles Times' articles led the other papers with sixty-seven, the largest number of indicators. The New Orleans Times-Picayune was next with sixty-three; the Chicago Tribune, fifty-six; The Christian Science Monitor, thirty-eight; and The New York Times, thirty. Although the Los Angeles Times' articles contained the largest number of indicators, 88 per

TABLE XIV

THE FREQUENCY OF ETHICAL, SOCIAL, AND DEPTH INDICATORS  
IN THE BYLINED INTERPRETIVE SCIENCE WRITING OF THE  
CHICAGO TRIBUNE

Ethical	Social	Depth
history('s) - 4	man('s) - 5	implication - 3
current thinking	universe - 4	eons - 2
ethical	cosmos - 2	epochal - 2
	the public - 2	profound
	our solar system - 2	change (verb)
	our lives	the future
	life	evolution
	our age	momentous
	beings	speculation
	ourselves	milestone
	human	impact
	planet	for foreseeable
	galaxy	centuries
	humanity	significance
	public reaction	the next centurey
	public attention	
	mankind	
	extraterrestrial	
	life	
	a New World	
	nations	
	Earth	
	generations	
Total = 6	Total = 32	Total = 18

Total Number of Interpretive Science Articles: 21  
Number of Articles without Indicators of Any Kind: 10  
Percentage of Articles without Indicators: 48 %  
Average Number of Indicators Per Article: 2.2



TABLE XV

THE FREQUENCY OF ETHICAL, SOCIAL, AND DEPTH INDICATORS  
IN THE BYLINED INTERPRETIVE SCIENCE WRITING OF THE  
LOS ANGELES TIMES

Ethical	Social	Depth
scientific	earth - 5	speculation - 3
history - 5	man('s) - 5	future - 3
historic - 2	human(s) - 4	momentous - 2
space history	universe - 3	evolution
philosophic	the world - 3	evolved
belief	life - 2	eventual exploration
theological	extraterrestrial	foreshadow
the past	life	milestone
historians	cosmic	indications
	consciousness	quest
	worldwide	search
	mankind	impact
	shared world	centuries
	view	provocative key
	ourselves	profound
	human race	epoch
		theoretical and practical understanding
		significant discovery
		monumental event
		importance
Total = 13	Total = 29	Total = 25

Total Number of Interpretive Science Articles: 68  
Number of Articles without Indicators of Any Kind: 60  
Percentage of Articles without Indicators: 88 %  
Average Number of Indicators Per Article: 1.0

TABLE XVI

THE FREQUENCY OF ETHICAL, SOCIAL, AND DEPTH INDICATORS  
IN THE BYLINED INTERPRETIVE SCIENCE WRITING OF THE  
NEW ORLEANS TIMES-PICAYUNE

Ethical	Social	Depth
history - 9	man('s) - 4	perspective - 3
knowledge - 2	human(s) - 4	future - 2
historic	the world('s) - 2	consequences - 2
our past	our own world - 2	discovery - 2
intellectual	lives - 2	foreshadow
curiosity	our planet - 2	fate
cultural	universe	to the benefit of
historians	humanity	tomorrow's
	mankind	epochal
	a new world	exploration
	lands	vistas
	peoples	possibilities
	world view	scope
	ourselves	aspirations
	human race	monumental
		significant discovery
		ultimate importance
Total = 16	Total = 25	Total = 22

Total Number of Interpretive Science Articles:	14
Number of Articles without Indicators of Any Kind:	10
Percentage of Articles without Indicators:	71%
Average Number of Indicators Per Article:	2.2

cent of the sixty-eight articles did not contain any indicators. Therefore, the indicators were confined to a few articles. The New York Times and The Christian Science Monitor yielded 82 per cent

TABLE XVII

THE FREQUENCY OF ETHICAL, SOCIAL, AND DEPTH INDICATORS  
IN THE BYLINED INTERPRETIVE SCIENCE WRITING OF  
THE NEW YORK TIMES

Ethical	Social	Depth
history - 4 knowledge legend	people - 3 man('s) - 3 mankind centuries universe cosmos life	speculation - 5 possibility (of life) indication (of life) significance discovery revolutionize heighten interest revolutionary changes momentous
Total = 6	Total = 11	Total = 13

Total Number of Interpretive Science Articles:	57
Number of Articles without Indicators of Any Kind:	48
Percentage of Articles without Indicators:	82 %
Average Number of Indicators Per Article:	1.9

and 80 per cent of articles without any indicators, respectively.

Table XIX shows that the Chicago Tribune and the New Orleans Times-Picayune had the largest number of indicators per article with 2.2 each. The New York Times' articles averaged 1.9 indicators per article, and The Christian Science Monitor and Los

TABLE XVIII

THE FREQUENCY OF ETHICAL, SOCIAL, AND DEPTH INDICATORS  
IN THE BYLINED INTERPRETIVE SCIENCE WRITING OF  
THE CHRISTIAN SCIENCE MONITOR

Ethical	Social	Depth
historic	man('s) - 8	perspective - 2
philosophers	mankind('s) - 6	speculation
religious beliefs	human beings - 2	profound impact
philosophy	his	speculates
philosophical	cosmos	universal
historical	earth-centered	perspective
	universe	21st century
	species	impact
	human (adj.)	implication
		future
Total = 6	Total = 22	Total = 10

Total Number of Interpretive Science Articles:	36
Number of Articles without Indicators of Any Kind:	29
Percentage of Articles without Indicators:	80%
Average Number of Indicators Per Article:	1.0

Angeles Times tied with 1.0 each.

#### Attribution

The fifth question of this study deals with attribution, the identification of the source or sources a writer consults for facts and quotations. The reporters who cover aerospace events controlled by NASA must rely mainly on the public information office and the

TABLE XIX

A COMPARISON OF ETHICAL, SOCIAL, AND DEPTH INDICATORS  
IN THE BYLINED INTERPRETIVE SCIENCE WRITING OF  
THE FIVE NEWSPAPERS STUDIED

Indicator and Related Indices	Newspaper				
	CT	CSM	LAT	NOTP	NYT
Ethical Indicators	6	6	13	16	6
Social Indicators	32	22	29	25	11
Depth Indicators	<u>18</u>	<u>10</u>	<u>25</u>	<u>22</u>	<u>13</u>
Totals	56	38	67	63	30
Total Number of Articles	21	36	68	14	57
Number of Articles without Indicators	10	29	60	10	48
Percentage of Articles without Indicators	48%	80%	88%	71%	82%
Average Number of Indicators Per Article	2.2	1.0	1.0	2.2	1.9

sanctioned press conference to obtain facts for articles. This dependency on limited sources that are available only at specified times has proven to be a source of complaint for the science writer. The scientists, however, have had their complaints, too. For example, they often complain that scientific accuracy is condensed

out of a story to make it understandable to the lay reader (8, p. 120).

Attribution is a visible sign of this relationship between the science community and the press. Both parties could probably agree that attributing information to specific, named sources rather than to anonymous ones is preferable for several reasons. Specific attribution lends credibility, and it allows for more direct quotations, which means less dilution or distortion of the accurate facts through paraphrasing.

To answer Question Five, the five newspapers were examined to determine whether bylined writers of straight news and interpretive articles attributed facts to more named than unnamed sources. Each example of attribution was counted and categorized as "named" or "unnamed." This meant that only one scientist might be the named source for the facts in the story, but if he were referred to ten additional times in the piece, then eleven entries were made in the "named" category. To restate this procedure in grammatical terms, pronouns or terms such as "this scientist," which referred directly to a named antecedent, were counted as named sources. Therefore, the actual number of sources consulted by writers is smaller than indicated by the attribution figures.

Table XX shows that the Los Angeles Times' eighty-two articles surveyed contained the greatest amount of attribution, 487

references to named sources and 181 to unnamed sources. The New York Times' sixty-seven articles contained the second largest amount of attribution, 391 references to named sources and 141 to unnamed sources. The Christian Science Monitor had 241 references to named sources and 140 to unnamed sources in thirty-six articles. The Chicago Tribune had ninety-four references to named sources and eighty-seven to unnamed sources in twenty-two articles. Finally, the New Orleans Times-Picayune's twenty-two articles had the same number of references to named and unnamed sources, sixty-six.

TABLE XX

ATTRIBUTION TO NAMED AND UNNAMED SOURCES IN  
BYLINED STRAIGHT NEWS AND INTERPRETIVE  
SCIENCE ARTICLES IN FIVE NEWSPAPERS

Attribution	Newspaper				
	CT	CSM	LAT	NOTP	NYT
References to Named Sources	94	241	487	66	391
References to Unnamed Sources	87	140	181	66	141
Total Articles Analyzed	22	36	82	19	67

Table XXI shows that The Christian Science Monitor's articles contained the largest average number of references to named sources per article, 6.69. The Los Angeles Times was second, with 5.94 named-source references; The New York Times, third with 5.84; the Chicago Tribune, fourth with 4.27; and the New Orleans Times-Picayune, fifth with 3.47.

TABLE XXI

THE AVERAGE NUMBER OF ATTRIBUTION REFERENCES  
TO NAMED AND UNNAMED SOURCES IN FIVE  
NEWSPAPERS

Attribution Average	Newspaper				
	CT	CSM	LAT	NOTP	NYT
References to Named Source	4.27	6.69	5.94	3.47	5.84
References to Unnamed Source	3.95	3.89	2.21	3.47	2.10
Total Articles Analyzed	22	36	82	19	67

The Chicago Tribune had the largest average number of references to unnamed sources per article, 3.95. The Christian Science Monitor was second with 3.89; the New Orleans



Times-Picayune, third with 3.47; the Los Angeles Times, fourth with 2.21; and The New York Times, fifth with 2.10.

In answer to Question Five, four out of five newspapers did attribute facts and quotations to more named than to unnamed sources.

#### Article Sources

The sixth and final question investigated in this study was whether the selected newspapers relied more on their own writers for articles about Viking than on outside sources such as the wire services. In order to obtain the necessary data to answer the question, all types of articles, with the exception of editorials, were classified as being written by a source on the paper's staff or by a source outside the employ of the paper (9).

The Chicago Tribune printed nineteen articles from members of its staff and twenty-four articles from outside sources. James Pearre of the Chicago Tribune Press Service, science editor Ronald Kotulak, and science writer Peter Reich contributed articles. Columnists Bill Anderson and Joan Beck were the only other staff contributors. The Chicago Tribune used a limited number of outside sources. United Press International (UPI) articles numbered ten; The Associated Press (AP), eight. Other outside contributors

worked for Newsweek, the Washington Star, and the New York Times Wire Service.

Unlike the Chicago Tribune, The Christian Science Monitor relied on its science editor, David Salisbury, for approximately 75 per cent of the Viking articles it ran. He contributed thirty-three pieces of interpretive science writing on many varied aspects of the mission. Twelve pieces of straight news were carried in the Monitor's "Mini-Briefs" section. Because these news briefs were written by "Monitor correspondents," they were included in the staff category, as was a special article by Kenneth W. Gatland, president of the British Interplanetary Society. One AP article was printed.

The science editor of the Los Angeles Times contributed many articles on Viking. George Alexander wrote sixty-three interpretive science pieces, the largest number produced by any writer analyzed. Marvin Miles, aviation editor at the Times, contributed twelve articles; additional items were produced by staffers Bella Stumbo, Nieson Himmel, Eleanor Hoover, and Robert Gillette. The total number of articles written by staff members of the Los Angeles Times was eighty-two.

The Los Angeles Times printed very few articles from outside sources. Of the nine stories in this category, two were from AP, one was from UPI, and the remainder were from science fiction

writer Ray Bradbury, humorist Art Buchwald, Cornell University astronomer Carl Sagan, and columnist Zev Yaroslavsky.

The New Orleans Times-Picayune printed one article by a staff member, Lois Timnick of the Times-Picayune National Service. None of the articles analyzed was written by Podine Schoenberger, the paper's science editor. Of the eighty-three articles printed about Viking, seventy-seven were obtained from AP. AP writers contributing these stories included Michael Harmon, Richard Saltus, Peter J. Boyer, and Richard Carelli. Other contributors included Marvin Miles and George Alexander of the Los Angeles Times, Robert S. Kramer (director of lunar and planetary programs for NASA), Art Buchwald, and United Features Syndicate.

Of the five newspapers analyzed, The New York Times' attribution was most evenly divided between named and unnamed sources. Sixty-four articles were written by staff members and sixty-seven by outside sources. The three major New York Times' contributors were its director of science news, J.N. Wilford, twenty-four articles; Victor K. McElheny, nineteen; and Walter Sullivan, fourteen. Other Times' writers were Frank J. Prial, Boyce Rensberger, and John Leonard. Four articles without bylines but tagged "Special to The New York Times" were included in the staff category.

The UPI was used more than any other outside source by The New York Times, accounting for thirty-five articles. The AP was the source of twenty. Other articles were submitted by Carl Sagan, a NASA scientist, William D. Smith, Robert Jastrow, and Reuters. Six straight news items included in the Times' "Ideas and Trends in Summary" section were classified as outside sources.

In summary, Table XXII shows that only The Christian Science Monitor and the Los Angeles Times utilized their staffs for Viking coverage more than outside sources. The Chicago Tribune obtained five more articles from outside sources than from its staff; The New York Times' coverage was divided almost equally between

TABLE XXII

A COMPARISON OF BYLINED VIKING ARTICLES FROM  
STAFF OR OUTSIDE SOURCES IN FIVE  
NEWSPAPERS

Source	Newspaper				
	CT	CSM	LAT	NOTP	NYT
Articles by Employees	19	46	82	1	64
Articles by Non-employees	<u>24</u>	<u>1</u>	<u>9</u>	<u>83</u>	<u>67</u>
Total	43	47	91	84	131

staff and outside sources. With the exception of one article, the New Orleans Times-Picayune relied entirely on outside sources.

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CHAPTER IV  
INTERPRETATION, CONCLUSIONS, AND  
RECOMMENDATIONS

The major problem of this study was to determine whether selected newspapers that covered the Viking mission produced articles that were informative, educational, interpretive, and credible.

The Informative Nature of the Coverage

In appraising the informative nature of the newspapers' coverage, several criteria were considered: the total amount of coverage, the total coverage for each of the six phases of Viking, whether the two landings received more coverage than the other phases, and whether Viking II received as much coverage as Viking I.

The New York Times devoted the largest number of column inches to Viking, 1,929.00. The Los Angeles Times was second with 1,436.25, followed by the New Orleans Times-Picayune with 834.75, The Christian Science Monitor with 538.75, and the Chicago Tribune with 498.25. The square inches of editorial space available in the

Wednesday, July 21, 1976, edition of each of the five newspapers analyzed in the study was calculated in order to show the comparative sizes of the five. The total number of square inches available in each edition was determined, and the total square inches of advertising (classified and display) were subtracted to yield the square inches of advertising space. Advertising inserts for firms such as Woolco and J. C. Penney were not included in the total pages count. Table XXIII shows the comparative sizes of the newspapers analyzed.

TABLE XXIII

A COMPARISON OF AVAILABLE EDITORIAL SPACE IN A REPRESENTATIVE EDITION OF EACH OF FIVE NEWSPAPERS ANALYZED IN THE STUDY

Newspaper	Total Pages	Square Inches of Editorial Space
<u>The New York Times</u>	68	9,435.15
<u>Los Angeles Times</u>	100	7,494.34
<u>Chicago Tribune</u>	62	7,388.06
New Orleans <u>Times-Picayune</u>	54	4,660.74
<u>The Christian Science Monitor</u>	28	4,317.55



A comparison of the total column inches of coverage and the amount of available editorial space in each paper produced some consistencies and inconsistencies. The New York Times and Los Angeles Times possessed the greatest capacity to provide a large amount of Viking coverage. Although the Los Angeles Times is the largest in the number of pages, its large volume of advertising greatly reduced its available editorial space, perhaps explaining its second place ranking.

The New Orleans Times-Picayune ranked fourth in available editorial space, and yet it ran the third largest amount of Viking coverage. The Chicago Tribune, ranked third in available editorial space, ran the smallest amount of Viking coverage. The Christian Science Monitor, a tabloid with the smallest amount of available editorial space, carried the fourth largest amount of Viking coverage.

These figures show that The New York Times and Los Angeles Times considered Viking to be a major news event worthy of extensive coverage. The Times-Picayune certainly devoted adequate coverage, with more than 800.0 column inches printed. Even the newspapers ranking fourth and fifth in total coverage, The Christian Science Monitor and the Chicago Tribune, devoted 500.00 or more column inches to Viking.

The distribution of these column-inch counts according to the amount of space given to the six phases of Viking yielded pertinent information about how the six newspapers may (or may not) have planned their coverage of the mission. For example, no paper devoted more than 43 per cent of its coverage to the first half of the mission, which included pre-launch, launch, and flight. That the news media covered Viking prior to the landing on Mars was important for several reasons. First, public awareness needed to be cultivated; the public needed to be prepared for the initial landing and the steps of the mission to follow. Second, there was a long gap of time during the flight that needed to be filled with background, analysis, and interpretive reporting. In Science and the Mass Media, Krieghbaum, writing in 1967, saw a desire on the part of many science reporters and editors to fulfill the public's need for this information, especially for "super-colossal spectaculars" (2, p. 225).

During the period from January 1, 1975, to the first Viking landing on July 21, 1976, The New York Times carried the largest amount of coverage, 663.50 column inches, followed by the Los Angeles Times, 590.75 column inches, the New Orleans Times-Picayune, 343.75, the Chicago Tribune, 213.25, and The Christian Science Monitor, 114.75. The figures demonstrate that pre-landing coverage was provided by all the papers.

The Christian Science Monitor, renowned for its interpretive news coverage, devoted only 21 per cent of its Viking coverage to the first half of the mission. Other percentages are equally revealing. Although The New York Times' 663.50 column-inch count was large, it represented only 34 per cent of this paper's coverage. It was surpassed by the Los Angeles Times and the Times-Picayune, each of which devoted 41 per cent of its coverage to the first half of the mission. The largest amount of space, however, was the 43 per cent of coverage by the Chicago Tribune. The Tribune, then, apparently made the best attempt to enlist readers' interest in the ongoing saga of Viking and to provide background information that readers could take to the landings and tests that followed.

Some details concerning the sparseness of The Christian Science Monitor's coverage are in order. In 1975, the Monitor's Viking coverage consisted of nine articles. Straight news items on Viking both before and after landing consisted primarily of "Inside the News--Briefly" and "Mini Briefs" that were rarely longer than four column inches. Obviously, readers of the Monitor were expected to follow news of Viking in their daily newspapers, with interpretation in the Monitor to be read after Viking I landed. Many articles even referred to a past phase of the mission as though Monitor readers would be knowledgeable about it, but the information had not been mentioned in the paper.

The landings of Vikings I and II received varying amounts of coverage from the five newspapers. The New York Times devoted 270.75 column inches (14 per cent of total coverage) to the landings. The New Orleans Times-Picayune devoted 170.50 column inches (20 per cent); the Los Angeles Times, 168.25 column inches (12 per cent); The Christian Science Monitor, 117.75 column inches (22 per cent); and the Chicago Tribune, 86.00 column inches (17 per cent).

Table XXIV shows the differences in the six newspapers' coverage of Viking I and Viking II. Of perhaps minor but pertinent

TABLE XXIV

A COMPARISON OF VIKING I AND VIKING II COVERAGE  
BY FIVE NEWSPAPERS

Newspaper	Column Inches	
	Viking I	Viking II
<u>Chicago Tribune</u>	463.00	35.25
<u>The Christian Science Monitor</u>	522.00	16.75
<u>Los Angeles Times</u>	1,060.50	375.75
New Orleans <u>Times-Picayune</u>	624.00	210.75
<u>The New York Times</u>	1,444.50	484.50

importance is the fact that Viking II was largely ignored by both the Chicago Tribune and The Christian Science Monitor. The Monitor used 3 per cent of its coverage for Viking II and the Chicago Tribune, 7 per cent, whereas the other three papers devoted 25 to 26 per cent of their coverage to Viking II.

### The Educational Nature of the Coverage

Question Three (What educational technique was used most often by various science writers as they attempted to educate readers?) involved the analysis of definitions, analogies, detailed explanations, concrete examples, and illustrative aids. Writers of bylined interpretive science writing used a total of 781 educational techniques. The analogy was the most widely used technique, 333, followed by 151 detailed explanations, 134 definitions, 88 illustrative aids (55 photographs, 24 diagrams, and 9 artist's sketches), and 75 concrete examples. The analogy enabled the science writers to construct a relationship between something new and different about Mars and something old and familiar on Earth, a very important relationship conducive to the reader's understanding of Viking's findings. Detailed explanations helped to clarify and to explain; definitions helped to translate the jargon of the scientist into layman's terminology; illustrative aids helped in the formation of mental pictures of unfamiliar terrain, vehicles, and complicated test apparatus.

Los Angeles Times' science writers led the field in the greatest utilization of each of the educational techniques. Of the 333 analogies, the Los Angeles Times' articles accounted for 149, The New York Times for eighty-four, and the Chicago Tribune for forty-six. Of the 151 detailed explanations, fifty-two were found in the Los Angeles Times, fifty in The New York Times, and twenty-nine in The Christian Science Monitor. Of the 134 definitions, forty-eight appeared in the Los Angeles Times, twenty-seven in the New Orleans Times-Picayune, and twenty-four in The New York Times. Of the eighty-eight illustrative aids, fifty-five were photographs. Of these fifty-five pictures, the Los Angeles Times carried twenty; The New York Times, thirteen; and The Christian Science Monitor, ten. Of the twenty-four diagrams, the Los Angeles Times carried ten; the Chicago Tribune, nine; and The New York Times, four. Of the nine artists' sketches, the Los Angeles Times carried four, and the Chicago Tribune and The New York Times, two each.

A discussion of the educational quality of the science writing on Viking would be incomplete without mention of the specific writers who utilized the writing techniques analyzed. The interpretive science writing in the Chicago Tribune was the product of Peter Reich and James Pearre. Reich's copy usually was clear and precise, but at times it tended to be flowery. In the June 24, 1976 issue

of the Chicago Tribune (Section IV, p. 14) is a fine example of Reich's work, accompanied by illustrative aids, that could serve as a model of interpretive science coverage. Reich's colleague, James Pearre of the Chicago Tribune Press Service, produced articles filled with colorful analogies and detailed explanations. Of note is the fact that Ronald Kolulak, the science editor of the Chicago Tribune at the time of Viking, produced only one article carrying his byline. It appeared in October of 1976, at the end of the mission. Of note is the fact that diagrams in the Tribune's coverage, produced by staff artists, were effectively used to illustrate the content of articles they accompanied.

The Christian Science Monitor's science editor, David Salisbury, wrote almost all of the paper's Viking articles. Salisbury excelled at digging out interesting angles of the mission and interviewing scientists and technicians not sought by writers on other papers. Salisbury's copy was too erudite at times, because of his habit of quoting scientists' jargon or employing his own learned scientific vocabulary without explanation or definition. Most often, however, he showed a skillful use of all the educational techniques analyzed. He was one of three or four science writers who had the ability to base an entire article on an analogy.

The aerospace editor of the Los Angeles Times, Marvin Miles, wrote several articles about Viking early in the mission, but

he was supplanted by the Times' science editor, George Alexander, who produced the majority of the Times' coverage. Alexander wrote straight news articles and interpretive pieces in which he utilized a variety of the educational techniques. Of all the major science writers, he was particularly skilled at forming colorful analogies between strange, new Mars' phenomena and everyday, familiar surroundings of Earth. Many of his analogies were uniquely infused with his sense of humor, as in this example: "The widespread ruggedness of the Martian terrain has been as much of a surprise to Martian Viking team scientists as a full-grown Brahma [sic] bull would be to a rodeo cowboy who had been expecting to rope a calf" (3, II, p. 1).

Science writers Victor K. McElheny, John N. Wilford, and Walter Sullivan contributed equally to The New York Times' coverage of Viking. The voluminous amount of copy they produced was educational, but it was also rather staid because they used the technique of detailed explanation almost exclusively. Sullivan's writing was creative and used a variety of the educational techniques, but McElheny and Wilford were dry reading at best. Most of the Viking articles in the New Orleans Times-Picayune were written by anonymous Associated Press writers. Only a few bylines were ever carried. Generally, the language of the AP writers lacked



color and style. Only a small frequency in the use of the educational techniques was observed.

### The Interpretive Nature of the Coverage

In addition to investigating whether the Viking coverage by the five newspapers was informative and educational, analysis was undertaken to determine whether the coverage also had been interpretive. This involved answering Question Two (Was the largest percentage of column inches in any newspaper devoted to interpretive articles with bylines by science writers rather than to editorials, straight news, and other types?) and Question Four (Did the interpretive science writing on Viking contain ethical, social, and depth indicators which show that the writers attempted to explain the significances of the mission?).

The answer to Question Two was that every newspaper studied did devote the largest percentage of column inches of its coverage to interpretive science writing rather than to either signed columns, straight news, features, or editorials. The Christian Science Monitor led the way by devoting 85 per cent (463.75 column inches) of its space to interpreting the facts of Viking. The Los Angeles Times was second with 81 per cent (1,111.25 column inches); The New York Times, third with 65 per cent (1,294.00 column inches); the Chicago Tribune, fourth with 45 per cent

(237.25 column inches); and the New Orleans Times-Picayune, fifth with 44 per cent (402.75 column inches).

At issue was whether the newspapers would simply relay the facts of Viking or whether they would interpret the facts for their readers. In most of the articles surveyed, factual straight news reporting introduced the piece, but the content quickly moved into interpretation, which continued until the conclusion. With the exception of the Chicago Tribune, whose second largest number of column inches was devoted to the feature article, each paper devoted its second greatest number of column inches to the straight news article. The New York Times carried the largest amount of straight news, 454.50 column inches (23 per cent of its coverage). The New Orleans Times-Picayune was second with 276.75 column inches (30 per cent); the Los Angeles Times, third with 146.50 (11 per cent); the Chicago Tribune, fourth with 79.75 (15 per cent); and The Christian Science Monitor, fifth with 29.25 (5 per cent).

In the realm of interpretation, another point raised in this study was whether the science writers attempted to theorize about the implications which the discovery of life on Mars might have on the future of mankind, especially in areas such as religion, economics, and biology, chemistry, and other sciences. The responsibility for interpretation in this area was difficult, and most of the science writers fell far short of the mark.

In order to determine the extent to which science writers dealt with Viking's implications and significance, three types of indicators were counted: ethical, social, and depth (scope). A total of 255 indicators was noted. Ethical indicators totaled forty-eight; depth indicators, eighty-eight; and social indicators, 119. The bylined interpretive writing analyzed for these indicators totaled 196 articles; therefore, the average number of indicators per article was 1.3. The figures continued to be disappointingly small when the number of indicators per newspaper was examined. The Los Angeles Times' science writing contined the largest number of indicators, sixty-eight; the New Orleans Times-Picayune was second with sixty-three; the Chicago Tribune, third with fifty-six; The Christian Science Monitor, fourth with thirty-eight; and The New York Times, fifth with thirty.

Therefore, ironically, The New York Times, which carried the greatest number of column inches of interpretive science writing and the third largest percentage of coverage devoted to interpretation, ranked fifth in the number of indicators. The Christian Science Monitor, which devoted a greater percentage of its coverage to interpretation than any of the other newspapers, ranked fourth in the number of indicators. Equally ironic is the fact that the New Orleans Times-Picayune and Chicago Tribune, which ranked fourth and fifth,

respectively, in the amounts and percentages of interpretive science writing printed, ranked high in the number of indicators. The New Orleans Times-Picayune had the second largest number of indicators; the Chicago Tribune, the third. The most consistent of the five newspapers in interpretation was the Los Angeles Times. Ranked second both in column inches of interpretive writing and in percentage of coverage devoted to interpretive writing, it ranked first in the total number of indicators with sixty-eight.

Again, an ironic contrast lies in the fact that the Los Angeles Times had the largest percentage of interpretive articles without any indicators, 88 per cent. The New York Times' articles had 82 per cent without indicators; The Christian Science Monitor, 80 per cent; the New Orleans Times-Picayune, 71 per cent; and the Chicago Tribune, 48 per cent. The Chicago Tribune and Times-Picayune led in the average number of indicators per article, 2.2. The New York Times was third with 1.9, and The Christian Science Monitor and Los Angeles Times tied for fourth with 1.0 each.

The close examination of the writers and their use of indicators provided some pertinent observations. David Salisbury of The Christian Science Monitor wrote one major article entitled "Why Exploration Means So Much to Man" that ran on page one of the July 19, 1976 issue, two days before Viking I's landing. Many

implications were discussed in it, and in only two other articles in which Salisbury quoted men like Carl Sagan, Cornell University astronomer, and Harold Klein, head of the Viking biology team. Most of the indicators appeared in quotation marks.

Of the Chicago Tribune writers studied, the columnists wrote more about Viking's implications than did the science writers. Bill Anderson, Joan Beck, and Edward Edelson attempted to speculate on the implications of life on Mars and provided valuable insight. Peter Reich and James Pearre mentioned implications but did not explain what the implications were. For example, Pearre wrote, "The impact on humanity will be great," but he never mentioned how. He did, however, interview Carl Sagan, thus bolstering the Chicago Tribune's number of indicators. In fact, without Carl Sagan, who wrote pieces himself or was interviewed by the science writers, the overall number of indicators in the interpretive writing would have been much smaller. Sagan's ability to theorize on implications and to express his theories eloquently provided more insight into the impact which the discovery of life might have than did the articles of any of the science writers or the people they interviewed.

### The Credibility of the Coverage

The final aspect of the newspapers' coverage of Viking to be evaluated was credibility. Question Five of the study (Did bylined writers of straight news and interpretive articles attribute facts to more named than to unnamed sources?) was based on the need for writers to attribute facts to particular scientists if their articles are to have credibility, an idea discussed by Jean Marx in an article for Science in 1976 (4, p. 136). Often, writers encounter problems in trying to interview scientists, and some hostility exists between the two groups. Some Viking scientists, for example, complained that NASA exerted pressure on them to make immediate disclosure of the results of Viking experiments that were often incomplete or unconfirmed (5, p. 74).

A count of named and unnamed source references in bylined articles about Viking showed that four of five newspapers printed articles with more named source references than unnamed. The Los Angeles Times' articles contained the largest number of references to named sources, 487, averaging 5.94 per article. The Los Angeles Times' 181 references to unnamed sources averaged 2.21. The New York Times' articles contained the second largest number of references to named sources, 391, averaging 5.84 per article. The New York Times' 141 references to unnamed sources averaged

2.10. The Christian Science Monitor's coverage contained 241 references to named sources, giving it the highest average, 6.69. The Monitor's 140 references to unnamed sources averaged 3.89. The Chicago Tribune's nine-four references to named sources averaged 4.27 per article. The Tribune's eighty-seven references to unnamed sources averaged 3.95. The New Orleans Times-Picayune contained the same number of both types of references, sixty-six, averaging 3.47.

A detailed examination of the science writers and their articles provided some interesting insights into their attribution. Generally, the major Chicago Tribune science writers, Peter Reich and James Pearre, had poor to adequate attribution. In the New Orleans Times-Picayune, little attribution was categorized because so few articles carried the bylines required by this study's methodology. Both The New York Times and the Los Angeles Times' writers must have been present at most of the NASA briefing sessions and press conferences because the major sources they quoted or referred to were NASA scientists, such as James S. Martin, Dr. Gerald Soffen, Harold Klein, C. Barney Farmer, and Harold Masursky. Such names appeared repeatedly in the copy of both newspapers. David Salisbury of The Christian Science Monitor made more references to named than to unnamed sources in his

articles. His attribution was the most specific of the writers examined. In fact, he seemed to be the only science writer who got behind the scene of the NASA-sanctioned briefings and press conferences to interview lesser known scientists who could explain in detail phases of the mission that they were handling directly. In effect, Salisbury personalized the mission more than any other science writer studied.

#### The Nature of the Sources of the Coverage

The preceding evaluation of the five newspapers in this study established whether their coverage of the Viking mission was informative, educational, interpretive, and credible. Inherent in this evaluation and interpretation was whether each paper relied mainly on its own staff in covering Viking or whether sources outside each paper were utilized for much of the coverage. In answering Question Six of this study (Did selected newspapers rely more on their own writers for articles than on other sources such as the wire services?), it was found that the papers' reliance on outside sources varied. Only the Los Angeles Times and The Christian Science Monitor utilized their staffs more than outside sources. Eighty-two articles in the Los Angeles Times' coverage were produced by staff members, mainly George Alexander, compared to nine from outside sources. David Salisbury of The Christian Science Monitor



produced forty-five of the forty-six articles catalogued, with The Associated Press producing the one article from an outside source.

The New York Times and Chicago Tribune were similar in their more balanced use of sources. The New York Times' staff produced sixty-four articles, and sixty-seven articles were obtained from outside sources. The Chicago Tribune's staff produced nineteen articles, and twenty-four were obtained from outside sources. The New Orleans Times-Picayune's staff produced one article, and eight articles were obtained from outside sources, mainly AP.

#### Summary of Findings

In summary, the major findings are as follows.

#### Informative

The New York Times devoted the largest number of column inches of coverage to Viking, 1,929.00. The Los Angeles Times was second with 1,436.25.

The Chicago Tribune devoted the largest percentage of any newspaper's coverage to the first half of the Viking mission, 43 per cent. Both the Los Angeles Times and the New Orleans Times-Picayune devoted the second largest percentage, 41 per cent.

The New York Times devoted the largest number of column inches to the first half of the mission, 663.50. The Los Angeles

Times was second with 590.75 column inches.

The Christian Science Monitor devoted the largest percentage of any paper's coverage to the two Viking landings, 22 per cent. The New Orleans Times-Picayune was second with 20 per cent.

The New York Times devoted the largest number of column inches to the landings, 270.75. The New Orleans Times-Picayune was second with 170.50.

The New York Times gave Viking II the greatest number of column inches of coverage of any of the five newspapers, 484.50 (25 per cent of its total coverage). The Los Angeles Times was second with 375.75 column inches (26 per cent); the Times' 26 per cent of total coverage was the largest percentage devoted by any of the five newspapers.

#### Educational

Seven hundred and eighty-one educational techniques were found in the articles analyzed, of which 333 were analogies, 151 detailed explanations, 134 definitions, and 88 illustrative aids.

The Los Angeles Times' science writers employed the largest number of educational techniques in their writing.

### Interpretive

The Christian Science Monitor devoted the largest percentage of any paper's coverage to interpretation, 85 per cent. The Los Angeles Times was second with 81 per cent.

Except for the Chicago Tribune, which devoted the second largest percentage of its coverage to feature articles, all other newspapers devoted their second largest percentage to straight news.

Two hundred and fifty-five implication indicators were noted in 196 of the straight news and interpretive articles analyzed, of which 119 were social, 88 were depth, and 84 were ethical.

The Los Angeles Times had the largest number of indicators, sixty-eight; the New Orleans Times-Picayune was second with sixty-three indicators. The Los Angeles Times, however, also had the largest percentage of articles without indicators, 88 per cent.

### Credible

Four of the five newspapers had more named-source than unnamed-source references. The Los Angeles Times' articles had the largest number of references to named sources, 487, or 5.94 per article. The New York Times was second with 391, or 5.84 per article. The Christian Science Monitor had the highest average number of named-source references per article, 6.69.

Of the five newspapers analyzed, only the Los Angeles Times and The Christian Science Monitor utilized their staffs for Viking coverage more than they did outside sources. The Los Angeles Times printed eighty-two articles produced by its staff and nine from outside sources. The Christian Science Monitor printed forty-five articles produced by its staff and one from an outside source.

### Conclusions

Question One asked, "Did any newspaper's coverage of the two Viking landings result in the largest percentage of its total column inches when compared with the coverage of the other mission phases?" Inherent in the question is the supposition that the spectacular news value of the landings might have caused the newspapers to exploit this value with over-blown coverage. The data indicate a negative answer. Not one newspaper studied devoted the largest number of column inches or the largest percentage of its coverage to the landings. The Christian Science Monitor devoted 22 per cent of its Viking coverage (117.75 column inches) to the landings; the New Orleans Times-Picayune was second with 20 per cent (170.50 column inches); the Chicago Tribune, third with 17 per cent (86.00 column inches); The New York Times, fourth with 14 per cent (270.75 column inches); and the Los Angeles Times, 12 per cent (168.25 column inches).

The time factor greatly influenced the amount of space accorded the landings. For example, the flight period of Viking I lasted from August 20, 1975, to July 21, 1976. Many more articles could have been written during this lengthy period than were written about both Viking landings during the short period of time immediately before and after the landings took place. This conclusion is substantiated by the fact that three of the five newspapers ran more column inches about the flights of Vikings I and II than about any of the other phases. The Chicago Tribune devoted 182.00 column inches (37 per cent of coverage) to the flight; The Christian Science Monitor, 169.00 column inches (31 per cent of coverage) for follow-up on test results; the Los Angeles Times, 469.00 column inches (33 per cent of coverage) for the flight; the New Orleans Times-Picayune, 201.75 column inches (24 per cent of coverage) for the flight; and The New York Times, 545.00 column inches (28 per cent of coverage) for the tests performed by both Vikings.

The fact that Viking II received much less coverage than Viking I in all the newspapers seems to substantiate a criticism about the news media's handling of Viking that was voiced by the editor of Science News, Kendrick Frazier. He said that the news media appeared to be interested only in the landings and a yes-or-no answer to the question of whether Mars harbored life (1, p. 387). The

scant coverage accorded Viking II and the fact that only two of the five newspapers gave the largest percentage of their coverage to the tests performed by the Vikings and the follow-up results of these tests tend to support Frazier's criticism. When Viking I did not yield test results that substantiated life on Mars, the tests run by Viking II and their results were largely ignored by two of the five newspapers.

Question Two asked, "Was the largest percentage of column inches in any newspaper devoted to interpretive articles with bylines by science writers rather than to editorials, straight news, and other types?" The data indicate that every newspaper did devote the largest percentage of column inches of its coverage to interpretive articles. From this fact it must be concluded that all five newspapers realized that without interpretation Viking would have been a less comprehensible, less meaningful space event for their readers. Fortunately, their science writers and editors were not content with just getting the facts straight. Karlen Mooradian's criticism of the news media for not providing enough explanation of scientific events they covered, as stated in Chapter I of this study, would not apply in the coverage given Viking by the five newspapers analyzed.

Question Three asked, "What educational technique was used most often by various science writers as they attempted to educate readers?" The data indicate that the science writers utilized

the analogy more than any of the other educational techniques studied. The detailed explanation was widespread throughout the Viking coverage. The technique of defining scientific jargon perhaps should have been used more, but several of the science writers appeared to translate much of this jargon into laymen's terminology before producing their copy, and, therefore, a defining term was simply used in place of a harder word rather than appearing after that word.

Question Four asked, "Did the interpretive science writing on Viking contain ethical, social, and deity indicators which show that the writers attempted to explain the significances of the mission?" The data indicate that although the five newspapers did devote the largest percentages of their types of coverage to interpretive science writing, they did not infuse this writing with enough explanations of the implications of the Viking mission and the possibility that it would prove the existence of life on Mars. It is evident that the top three most interpretive newspapers (The New York Times, the Los Angeles Times, and The Christian Science Monitor) must have condensed their considerations of the implications into a very few articles. It appeared that the science writers were able to speculate somewhat on the impact that the discovery of Martian life would have on mankind, judging from the sufficient number of social indicators, but as the interpretation required more depth, their

abilities to probe deeper (or perhaps the time needed to do so) were not sufficient for the task. The fact that the ethical indicators were the smallest group indicated that the science writers did a poor job of consulting authorities in the ethical, philosophical, or value systems, such as religion, who could have provided the writers with some learned opinions.

Question Five asked, "Did bylined writers of straight news and interpretive articles attribute facts to more named than unnamed sources?" The data indicate that four of five newspapers did print articles with more named source references than unnamed. Considering the obstacles that can hinder the acquisition of information directly from a source, especially in a highly controlled space event such as Viking's flights to Mars, most of the science writers did a commendable job in lending credibility to their newspaper's coverage by seeking out and acknowledging specific sources.

Question Six asked, "Did selected newspapers rely more on their own writers for articles than on other sources such as the wire services?" The data indicate that only the Los Angeles Times and The Christian Science Monitor utilized their staffs more than outside sources. The New York Times, Chicago Tribune, and Times-Picayune obtained more stories from outside sources than from the members of their staffs. The science writers on the staffs of the Los Angeles



Times and The Christian Science Monitor are due full credit for the excellence they demonstrated in many areas of this study. The New York Times, with its balance between staff and outside sources, must share credit for its accomplishments in covering Viking with others such as AP and UPI. Not coincidentally, the Chicago Tribune and the New Orleans Times-Picayune, which relied more on outside sources than on their own staffs, did not excel in any area of Viking coverage investigated except having the largest number of indicators (ethical, social, or depth) per article.

On the basis of the findings and conclusions, it is possible to rank the five newspapers in terms of overall performance. The Los Angeles Times ranks first because of five first-place rankings and four second-place rankings in the statistical findings. Among its first-place rankings are largest percentage of total coverage devoted to Viking II, largest number of educational techniques used by its science writers, largest total of indicators in its articles, largest number of references to named sources, and more articles produced by staff than by non-staff personnel. Among its second-place rankings are total number of column inches devoted to Viking II, total column inches of Viking coverage, percentage of total coverage devoted to the first half of the mission, column inches devoted to the first half of the mission, and percentage of total coverage devoted to interpretive writing.

The New York Times ranks second because of five first-place rankings and one second-place ranking in the statistics. The firsts for The New York Times include largest number of column inches of total coverage, largest number of column inches devoted to Viking II, largest amount of coverage of the six phases being given to tests performed, and largest number of column inches of coverage devoted to the first half of the mission. The second-place ranking is for number of named-source references.

The Christian Science Monitor ranks third because of four first-place rankings: largest average number of references to named sources per article, largest amount of coverage of the follow-up phase of the mission, largest percentage of coverage devoted to interpretive writing, and having more articles produced by staff than by non-staff personnel.

The New Orleans Times-Picayune ranks fourth with two first-place and two second-place rankings. Its firsts include having the largest average of indicators per article (a tie with the Chicago Tribune) and devoting 25 per cent of its total coverage to Viking II. The Times-Picayune's seconds include percentage of coverage used for the first half of the mission and total number of indicators in its articles.

The Chicago Tribune ranks fifth for having two first-place rankings and no second places. It was first in largest percentage of total coverage devoted to the first half of the mission and in largest number of indicators per article.

#### Recommendations

Analysis was undertaken to answer Question One and thereby determine which phase of the Viking mission received the largest percentage of coverage. On the basis of the findings, it is recommended that a major newspaper should formulate plans for coverage of a major science event. Special attention should be given to preliminary coverage that enlists the reader's interest and provides him with background information, to interpretation of the actual event, and to following through with coverage of the results of the event or its implications. In this way, the public will be truly informed. Future studies in this area might investigate how well the public was prepared by the news media for a scientifically significant event, such as the test tube baby in England or DNA research discoveries, by studying what was written before the event occurred, while it was being announced to the world, and after the event, when perspective on its implications could best be achieved.

Analysis was undertaken to answer Question Two and thereby determine whether the largest percentage of column inches of each

newspaper was devoted to interpretive science writing rather than to editorials, features, straight news, or columns. On the basis of the findings, it is recommended that interpretation of the facts of a major science event must of necessity accompany the facts presented in straight news coverage. Personal opinion expressed through editorials and columns is useful for adding to the readers' perspectives on the event, but explanation by the science writers along with a straight news story or in a feature article must interpret the facts in order to enhance the reader's understanding. Future studies in this area might investigate what scientific events editorial writers and columnists of certain newspapers have chosen to comment on and what sources they relied on to inform themselves about the event.

Analysis was undertaken to answer Question Three and thereby determine which educational technique was used most often by the science writers as they attempted to educate their readers. On the basis of the findings, it is recommended that science writers must be well-versed, by whatever means available, in the use of such educational techniques in order to increase the comprehensiveness of their articles. Potential science writers would do well to emulate the skills and style of science writers George Alexander, David Salisbury, Peter Reich, and Walter Sullivan, who were judged

to be the most competent in this area during the course of this study. Future studies in this area might investigate how certain science writers prepared for their present positions, whether their styles of writing changed and improved during their writing careers, and how selected college journalism departments are preparing future science writers.

Analysis was undertaken to answer Question Four and thereby determine whether the interpretive science writing on Viking contained ethical, social, and depth indicators that show that the writers attempted to explain the significances of the mission to their readers. On the basis of the findings, a much-needed recommendation emerged. If science writers are to improve their ability to write intelligently about the significances and implications of major scientific events, it appears that they must cultivate contacts with experts in every major area of life that could possibly be affected by scientific discoveries and advances. For example, interviews with leading churchmen representing major religions of the world in which they were asked to expound on the effects that the discovery of life on Mars would have on their theologies would have been very enlightening. No evidence that such an approach was even contemplated was encountered in this study. Another alternative that would provide the science writer with ramifications from a major scientific

event that he might not be able to think of himself would be to consult a "think tank" organization whose job is to formulate possibilities and changes based on trends in today's society. An interview with a representative of such an organization would have provided valuable copy on the significance of the Viking test results. Future studies should be conducted to determine whether the news media has made any improvement in handling ramifications and implications since its rather poor performance with Viking.

Analysis was undertaken to answer Question Five and thereby determine whether bylined writers of straight news and interpretive articles attributed facts to more named than unnamed sources. On the basis of the findings, it is recommended that science writers make a special effort to have specific attribution in their articles in order to insure credibility. Future studies into attribution, concentrating especially on the methods used by science writers to reach their desired sources and how they utilize the sources in their articles, could yield more insight into this important aspect of science writing.

Analysis was undertaken to answer Question Six and thereby determine whether the newspapers relied more on their own writers for articles than on outside sources such as the wire services. On the basis of the findings, it is recommended that many major

newspapers may need to examine their staffs in order to assess their capabilities for handling their own coverage of an important science event. How, for example, would a newspaper handle the coverage of a nuclear accident like the recent Three Mile Island incident in Pennsylvania if it occurred in its own state? Future studies could be made into how the AP and UPI are organized to handle major science events and to what uses wire service copy on them are put.

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