The Research Uses of Visual Information

ESTELLE JUSSIM

As it is being used in a specific and possibly novel way for the purposes of this article, the term *visual information* may be unfamiliar to the reader. Increasingly a part of the vocabulary of visual anthropologists and social historians, whose research concerns will be examined in this paper, it is not yet in common usage among librarians or curators of visual collections. It is to be hoped, however, that the term will be adopted by the information profession at large as we seek to identify major new areas of research dependent largely upon nonverbal documents and to decide which forms of visual information will be increasingly demanded for scholarly and scientific use.

While the term *visual communication* is widely recognized, the term *visual information* more accurately represents the idea of "the visual content of documents" (in whatever medium) and less that of the process implied in communication, with all its complexities. "Visual information" might be correctly defined as a subset of visual communication, as it refers to the visual document itself rather than to purposes, social interactions, context, or other variables of the larger process. By no means the exclusive focus of communications specialists, visual information is presently serving a significant array of other scientific pursuits.

All of us are familiar with the general picture file, and we therefore know that, on its most basic level, visual information involves a picture of something. This article will attempt to present the ways in which contemporary social and natural sciences, as well as the applied arts, are proceeding far beyond the capacity of a picture. The general picture file, as typically maintained in a few major public and research libraries, is often a haphazard collection of individual reproductions clipped from magazines, books, or newspapers—haphazard because

---

Estelle Jussim is Associate Professor, School of Library Science, Simmons College, Boston.
ESTELLE JUSSIM

the collection is simply what the picture librarian recognizes as being potentially valuable to advertising clients, all varieties of historians and publishers, artists and illustrators, occasionally to writers and students, or to members of the general public impelled by special and often unpredictable concerns. The picture files of the public library, like the exceptionally extensive picture morgues of publishers such as Time-Life, are essentially collections of single pictures of something—an armadillo, the house in which Lee Harvey Oswald lived, the military costumes of nineteenth-century French Zouaves, Sarah Bernhardt's pet leopard, Jane Fonda as Barbarella, the handwriting of Franklin Roosevelt, or simply a reproduction of a painting like The Blue Boy. Probably the most frequent use of such items is yet another publication if copyright permits, or perhaps as a means of identifying avenues of further search. Thus the visual information of general picture files is contained in the content of single still pictures which often serve as illustrations to verbal narratives, usually with identifying legends, e.g., "Jesse James at age 14."

The problems of maintaining such general files are described by Ellen Shaffer, presently curator of the Silverado Museum (St. Helena, Calif.) and previously for many years the head of the Rare Books Department, Free Library of Philadelphia:

For the keeper of files it is essential to view all material objectively. All of us are far too prone to regard what interests us as of prime importance—what does not is worthy of scant consideration. However, what is one man's trash is another man's treasure, and one needs to be all-inclusive. In these days of a super abundance of material... it is necessary to be both inclusive and selective—a tightrope which is indeed difficult to negotiate.¹

The importance of inclusiveness as she notes, is that "even a random ramble through files of visual material often turns up a long-sought-for fact."² It is this idea of randomness which is the essence of the general picture file, with both positive and negative implications.

Search, not research, is the customary and perfectly legitimate primary use of the general picture file. Unlike research, which is usually the investigation of the relationship between two or more variables, a search simply accomplishes the finding of a wanted item. The visual information being sought represents a one-time need, unrelated to any scientific structure of investigation.

The next level of visual information might be said to reside in the specialized collection, or organized either according to medium—e.g.,
Research Uses of Visual Information

the still photography or film collections at the International Museum of Photography (Rochester, N.Y.), or at the Museum of Modern Art in New York City—or, according to subject—e.g., the Library of Congress Map Division or the Lincoln Center Drama and Music Library's collection of dance photographs and prints. The expectation is that such a collection of visual records, while comprised essentially of individual images, provides the entire universe (or as much of it as possible) of images relating to that form or subject: all the photographs taken by the geographic surveys of the American West, all the stereographs of Niagara Falls ever produced, all of Mathew Brady's portraits, all films before 1916 produced in France, a complete chronological progression of early views of Venice and its lagoons, all lithographed music score covers of 1870 to 1880, all specimens of Victorian wood types manufactured in Hartford, Conn., or all pictures taken of the moon before and after space exploration.

It is at this point that research may be said to become possible, as what is ordinarily needed to solve a problem is a sufficient quantity of information to permit generalizations. Individual visual records, acquired comprehensively, extensively, and according to plan, can provide sufficient visual information to permit the verification of hypotheses about the nature of various phenomena, e.g., the impact of the photographic technologies on the graphic arts; the cultural differences between presentations of women in English, French and German films; or the social conditions of the Bowery in the 1890s. The essential assumption of this type of research is that history is not a compilation of unique events for which unique visual records exist, but rather is a normative phenomenon for which the quantitative evaluation of the content of large numbers of visual records may provide visual evidence.

This quantitative approach pervades humanistic studies as well as those in sociological or technological areas. In discussing the shift from the traditional interest in illustrational technique to interest in the content of illustration, Kenneth Lohf writes:

As in the case of nineteenth-century English book and periodical illustration, we as students, scholars, collectors and librarians have become more involved in the conditions of society and life which were depicted. . . . The illustrators of the works of Dickens, Thackeray and Trollope teach us much about the English customs and conditions fictionalized in the stories and novels which they complement. One will continue to return to them for study, not
only because they are depictions of past times, but also because they provide a richer and more profound understanding of the great works of literature.  

To verify the content of the illustrations, such social interpretation undoubtedly requires the support of other records, both verbal and visual. This type of investigation, involving substantial collections of visual materials, is becoming widespread. (For example, William Katz is currently investigating the social implications of magazine illustration.) It is not the single image, then, but large aggregates of associated images which are required for certain types of historical explanations undertaken in the spirit of the scientific method.

The substantial difference between the exploration of already existing visual records, whether single or in aggregate, and the new uses of visual information is revealed by tracing the development of a particular type of scientific investigation, that of human and animal movement and expression.

In order to write *The Expression of the Emotions in Man and Animals*, published in 1873, Charles Darwin took the precaution of studying every book, painting, drawing, diagram, and engraving that he could find on the subject. He came to the not-unexpected conclusion that much nonsense had been promulgated prior to the invention of photography, especially photography swift enough to capture ephemeral muscular contractions:

> When we witness any deep emotions, our sympathy is so strongly excited, that close observation is forgotten or rendered almost impossible. . . . Our imagination is another and more serious source of error; for if from the nature of the circumstances we expect to see any expression, we readily imagine its presence.

Darwin therefore refused to trust purely verbal records or sketches, and not only borrowed photographs of facial and bodily expressions from his colleagues, but had wood engravings prepared with the aid of photography.

At approximately the same time, and continuing into the 1880s, photographer Edweard Muybridge was in the process of trying to solve the puzzle of animal locomotion in the study of horses. It was not until he invented a special camera shutter “designed to give an exposure as short as 1/1000th of a second” that he was able to demonstrate that a horse actually lifted all four feet from the ground during one phase of the gallop. Following the prior inventions of an
astronomer who had succeeded in taking photographs of the transit of the planet Venus, the French physiologist Étienne-Jules Marey developed a photographic gun which permitted recording a seagull's flight at exposures of 1/720th of a second. Ultimately, he stopped motion at exposure times of 1/5000th of a second.\textsuperscript{10}

In a fascinating series of events, the need for the scientific investigation of animal and human motion and expression led to the invention of the motion picture camera and the projector as the only suitable mechanisms for the study of sequences of a character sufficiently finite to elude the most expert human eye. The requirement for visual information instigated the development of successful technologies which today comprise the major medium for the continuing exploration of physical realities in both micro- and macro-modalities. As in the experience of Darwin, Muybridge, and Marey, the camera is today the primary tool for the investigation of physiological and psychological phenomena. A typical example is the film \textit{Benjamin}, recently screened over public television, which demonstrated how intensive the use of the camera is by biological scientists. Benjamin was an infant whose responses to various stimuli were studied through camera techniques devised especially for the accumulation of visual information concerning the development of eye and muscle coordination. It was only the meticulous analysis of slow motion and single frames of stopped motion pictures that resolved several crucial questions about infant abilities.

Rather than fostering a dependence on photographs or films already produced by either amateurs or professionals, current education in both physical and cultural anthropology insists that the methodological preparation of the student must include the acquisition of motion and still photography skills, in the belief that the camera provides unique access to phenomena. The methodology, and the philosophy which supports it, are perfectly exemplified by the activities of the Society for the Anthropology of Visual Communication, an outgrowth of the Program of Ethnological Film begun in 1966. The society's statement of purpose articulates well the expansion of scholarly and scientific interest into all aspects of visual information:

\begin{quote}
The purpose of the Society for the Anthropology of Visual Communication (SAVICOM) is to bring together and support researchers, scholars, and practitioners who are studying human behavior in context through visual means and who are interested
\end{quote}
ESTELLE JUSSIM

in: the study, use, and production of anthropological films and photography for research and teaching; the analysis of visual symbolic forms from a cultural-historian framework; visual theories, technologies and methodologies for recording and analyzing behavior and the relationships between the different modes of communication; the analysis of the structuring of reality as evidenced by visual productions and artifacts; the cross-cultural study of art and artifacts from a social, cultural, historical, and aesthetic point of view; the relationship of cultural and visual perception; the study of the forms of social organization surrounding the planning, production, and use of visual symbolic forms.¹¹

Such a comprehensive statement of purposes represents the predominant contemporary approach to visual information, no longer to be encountered in the individual fragments of a general picture file, nor even in the massive aggregates of special visual collections, but as both a tool of scientific investigation and its product. Thus, contemporary psychiatric practice frequently makes use of videotape for video feedback to individuals or generated by group interaction. Often these videotape sessions become part of permanent files, serving as the core of an expanding collection of human behavioral records. Educators permit their classroom activities to be videotaped for further study; actors, athletes and dancers practice with videotape and use videotape instructional units.

All of those human behaviors which involve kinesthetic, kinetic, and nonverbal activities are now being recorded for the sake of the study and restudy of visual information concerning the relationship of structure to motion, culture to gesture, micro-act to ideology. For example, videotapes of court cases, made by special permission, were studied at Hampshire College (Amherst, Mass.) for differences in the ways prosecutors behaved toward white defendants and toward black defendants. This investigation attempted to develop a hypothesis concerning the acts of so-called “micro-aggression” toward black or poor defendants. The tapes were repeatedly played back through a monitor and stopped at individual frames for inspection; micro-acts consisting of minute gestures, approaches or withdrawals, facial expressions, or use of props were defined by several methods of content analysis.

The science of proxemics (i.e. the study of the culturally determined relational positions of individuals within a particular society)
Research Uses of Visual Information

established by Edward Hall, author of *The Silent Language* and *The Hidden Dimension*, is extensively based upon photography, computer programs and special methodologies of observation. As Edward Sapir observed, "we respond to gestures with an extreme alertness and, one might almost say, in accordance with an elaborate and secret code that is written nowhere, known by none, and understood by all." It is this secret code, rich with cultural meanings, that both Hall and Ray Birdwhistell have been attempting to analyze and elucidate, each by using his own system of kinesics. Semanticists, communications specialists and psychiatrists are increasingly attempting to codify the visual information contained in what Birdwhistell calls "a structural system of significant symbols (from all the sensorily based modalities) which permit ordered human interaction." It is exactly as Charles Darwin wondered one hundred years ago: whether "the same expressions and gestures prevail, as has often been asserted without much evidence, with all the races of mankind, especially with those who have associated but little with Europeans." In order to help us to understand other people and overcome the limitations of our ethnocentrism, research scientists require increasingly specific visual resources of considerable sophistication. Their findings are summarized for the general public in documentary films and illustrated books.

The ethnological study of rare human experience is not the sole preoccupation of the Society for the Anthropology of Visual Communication or of its members. According to an article by Jay Ruby and Richard Chalfen concerning the extensive curriculum of visual anthropology at Temple University,

Visual anthropology should be conceptualized broadly enough to include, (1) the study of human nonlinguistic forms of communication which typically involves some visual technology for data collecting and analysis, (2) the study of visual products, such as films, as communicative activity and as a datum of culture amenable to ethnographic analysis, and (3) the use of visual media for the presentation of data and research findings—data and findings that otherwise remain verbally unrealized.

We have already discussed some aspects of their first category. The second category—the study of visual artifacts—involves not only ethnographic analysis, but the even older method of archaeological survey, using films as artifacts produced by specific cultures. The notion of film as history is comparatively new; it stresses the inves-
tigation of the characteristics of feature films, not as films about history, but rather as carriers of the culture which produced them, enjoyed them, and praised or condemned them. Two years ago, Harvard University initiated a program of “film as history,” using films about or produced during the Great Depression. This method of approaching history seems sure to be increasingly utilized, and clearly requires massive aggregates of films well preserved in organized archives.

Of special concern to librarians and visual archivists should be the new breed of documentarians who regard film as primary source material to be produced for scientific purposes. From a recent statement by a team of two filmmakers who epitomize this interesting and valuable new trend, we read the manifesto of E. J. Vaughn and John Schott (cofounders of Document/ICB, New York):

We conceive of ourselves as creative historians working in the film medium. Emerging from academic training in American culture, Art History and Photographic History, we are convinced that the “reality recording” techniques of Information Film offer a fundamentally new approach to social documentation and unprecedented possibilities for wide dissemination.

Their first major film exploring this technique was America’s Pop Collector: Robert C. Scull—Contemporary Art at Auction, a 72-minute color documentary on a pivotal event in the social history of American art. Using the noninterventionist and presentational mode of two-man teamwork—which also characterizes the work of Albert and David Maysles (producers of Salesman, Primary, Gimme Shelter and Grey Gardens), and which makes no verbal editorial commentary on what is visually happening—Vaughn and Schott are now working on a “reality recording” of the backstage activities of one of the most influential of all television programs, “Let’s Make a Deal.” They believe that they “are creating images of contemporary history which will be referred to constantly in the future by both the academic and lay communities.” Thus, there will be an increasing number of film documents providing access to major aspects of American culture. These films, especially produced for visual information purposes by companies like Document/ICB, will prove to be among the major sociological and historical elements of the archives of the future.

Problems of copyright concerning items such as these will have to be solved, as is vividly elucidated by Daniel Bell in The Coming of Post-Industrial Society. These problems will result as knowledge may
Research Uses of Visual Information

tend to move from the status of private property to an as yet unexpected and unwelcomed communality of interests. The counterculture has, of course, long demanded solution of the copyright situation. According to an interview with Michael Shamberg of Raindance and David Cort of Videofreex, this new generation of television producers wants to replace the monopolies of the mass broadcast media with networks of information. While it is difficult to pinpoint the concrete economic realities of some of Shamberg's statements, it is clear that he, like many of his video colleagues, believes that visual information should be a public commodity. The videotapes made by these individuals are often difficult to collect, as they have an animus against the concept of property (and indeed, believe that television is so unique a medium that it defies any attempt at permanence). They do not view their tape production as properties but rather as "processes." It would nevertheless seem of inestimable value to the understanding of the counterculture if the visual record of what they consider to be important events, and their approaches to recording these events, could be made available to historians, sociologists and social psychologists.

Obviously, research into the nature of visual forms themselves, and their applications to everything from architectural structures to bionic possibilities, depends on a tremendous variety of visual documents. The visual information contained in such documents assists mathematicians like Stanislaw Ulam, codiscoverer of the principles of thermonuclear weapons, to investigate the modular properties of natural forms and their relationship to geometrical progressions. Auxology, the study of the growth of biological forms, utilizes the computer and the electron microscope as well as the normal photograph from nature and reveals sometimes startling analogies among such forms as Islamic ceiling vaulting, an array of sunflower seeds, the organization of virus protoplasm, and the mathematic audacity of Buckminster Fuller's geodesic domes.

Architects and designers of our environment increasingly seek visual documentation, depending largely upon computer cathode displays for the preliminary investigation of their ideas. Computers can be programmed to provide a display of the basic dimensions of, for example, an urban shopping mall, manipulating that data into the construction of visual diagrams which show how the mall will look in three-dimensional projection, from above, from the sides, and as the pedestrian would view the walkways, spaces, and buildings. If the profit factor in computer use could somehow be minimized, it would
clearly be of tremendous value to urban studies faculties to be able to study films recording such manipulations. Research in visual forms could proceed most efficiently from the ready availability of visual information in all media. At present, research into various aspects of safety requirements for human environments proceeds through models, visual projections, and heavy dependence on the computer to analyze flows of activity (e.g., in Denis Crompton's idea of "Computer City").24

If it is true, as Rudolf Arnheim believes, that “artistic activity is a form of reasoning, in which perceiving and thinking are indivisibly intertwined,”25 or, as Théodule Ribot indicated, that “the logic of images is the prime mover of constructive imagination,”26 then the study of visual forms is clearly not to be confined to the visual artist alone, nor even to the scientist dependent on visual documentation of phenomena. If research is to be linked to creativity, then perhaps the human brain itself must remain a primary synthesizer of images, rather than the computer. In pursuing new knowledge in any field where seeming contradictions must be reconciled or recombined, the ability to visualize is crucial. Among other philosophers, Henri Bergson indicated that creative intuition operates as a kind of visual thinking which can accomplish the reconciliation of opposites, creating new forms out of their coexistence in time and space. Bergson advises his readers “to visualize such incompatible things occupying the same place within the visual field, things which in the common-sense view would drive each other away.”27

Precisely this kind of freewheeling imagination is pursued by the studio artist and applied designer. Anyone connected with visual research in design and fine arts libraries will recognize the difference between the needs of studio artists and those of art historians. Wrestling with problems of imagery, the artist is looking for a nonverbal inspiration, wanting above all to have discrete units to inspect which might satisfy the requirements of a concept. It was to satisfy this need that Bernard Karpel began to persuade librarians to consider what he calls “the documentation of the visible”28 through the card catalog itself. He suggests: (1) an image entry on the card; (2) a descriptive reference based on the material and technique of the object; (3) an evaluative annotation which may also take the form of description; and (4) a fresh semantic, that is, terminology taken from the language of art theory as spoken by the maker, the critic, the historian, the psychologist, and the educator of art, instead of the classification schemes of the traditional print-oriented library.
Research Uses of Visual Information

The following are headings which Karpel derived from the language of art theory, all for a one-page announcement containing a drawing by José Luis Cuevas:

Drawing, pen-and-ink . . . Drawing, rectilinear . . . Figure-Ground, Drawing . . . Figure-Ground, through Unit Organization . . . Interval, Increasing-Decreasing . . . Line, through Edge . . . Movement, Figure-Ground . . . Movement, Two-Dimensional . . . Perspective, through Figure-Ground . . . Shape, Geometric . . . Shape, Rectilinear . . . Spatial Organization, Expansion-Contraction . . . Spatial Organization, through Planes . . . Spatial Organization, through Transparency . . . Spatial Organization through Variation of Scale.20

We can extrapolate from this the immense variety of nonverbal forms requiring verbal access, at least until such time as the artist, designer, and scientist can sit down at computer terminals providing some type of access directly to visual elements.

The studio artist, the designer of our environment, the architect, and the urban planner all require multitudes of visual images. For spatial description alone, the variety is only hinted at by this impressive list by László Moholy-Nagy in The New Vision:

mathematical, physical, geometric, Euclidean, non-Euclidean, architectural, pictorial, dance, scenic, spherical, crystalline, cubic, hyperbolic, parabolic, elliptical, bodily, surface, lineal, one-dimensional, two-dimensional, three-dimensional, n-dimensional, isotropic, topographic, projective, metric, homogeneous, relative, absolute, fictive, abstract, imaginary, finite, infinite, limitless, universal, etheric, inner, outer, hollow, vacuum, formal.50

What happens when to this list are added the myriad combinations of textures (jagged, smooth, hard, fuzzy) or colors (like pinkish-green, orange-yellow, or lavender-grey) can only be conjectured in terms of providing access. Few would dispute the necessity of developing a flexible, multidimensional verbal system to assist research into visual forms.

The gigantic multiplication of visual forms in this century of photographic, motion picture, and now holographic technologies requires an equal multiplication of verbal discussion and critical print analysis. As many students of documents recognize, print itself is a carrier of information beyond the content of the sounds of its individual letters. The visual aspect of print contains visual informa-
tion as diverse as the emotional stimulus of the specific letter forms and the historiographic precision which permitted government prosecutors of Alger Hiss to summon evidence based on the specificity of his typewriter's alphabet, or scholars to expose a forger like Thomas Wise in the production of rare booklets for profit. The letter forms of print, each typographic font, carry with them idiosyncratic evidence of their time, place, manufacturer, and designer. Research into the history of particular documents, therefore, still requires large libraries of identified letter forms and their origins, purely as visual artifacts.

The medical profession has perhaps relied longest on the accurate transmission of visual information. Lancelot Hogben, one of the pioneer historians of visual information, observed that it was the perfection of the drawings by one of Titian's pupils which made the great treatise by Vesalius in 1543 "a milestone in the history of medicine":

Had the De Humani Corporis Fabrica appeared without illustration. . . generations of students and commentators might have found substance for endless disputation concerning the author's meaning. . . . Authors and disciples could no longer hide ignorance behind a mask of verbal ambiguity. 31

Today's medical practitioners take for granted not only education but research through visual means, from the electron microscope camera to the complexities of the liver scan. Like the astronomers who search out the face of the planet Mars using computer analysis of lights and darks to relay visual information back to Earth, contemporary medicine has formed a most productive research relationship with the camera and its attendant new technologies.

Perhaps the most unusual type of visual information is that which provides proof of the existence of new atomic and subatomic particles. In this area of research, the only document which the nuclear physicist retains is a photograph of the passage of a particle which leaves its track of light on film for an infinitesimally brief moment. Here visual information is the substance of the research; the indirect method, so frequently the handmaiden of physical sciences, relies almost exclusively on some type of graphic evidence.

There are, however, certain types of information which cannot be transmitted through visual images of any kind. A glance at the illustrated encyclopedia of technology The Way Things Work reveals
Research Uses of Visual Information

some of these problems. An example of this is the sentence: "As long ago as 1664 the English scientist Robert Hooke occupied himself with the question how silk filament might be produced without the intervention of silkworms;" there is no method known to our society by which this kind of complex, historico-semantic abstraction can be communicated with pictures. Earlier in the encyclopedia, one finds a different kind of sentence: "The central feature of a steelworks using this process is the open hearth-furnace." The diagram of the intricacies of an open hearth furnace which accompanies this sentence is welcome indeed; as a simple diagram, it answers the question of search, not research.

Both search and research may be dramatically assisted by new developments in text-fiche. The University of Chicago Press, for example, is beginning an extensive program of publishing text-and-fiche combinations where small, lightweight, and economical texts will accompany 4 x 6 inch cards containing up to eighty-four illustrations each, in both color and black and white, and viewable on desktop machines. Both in the sciences and in the arts, the publisher remarks that: "Many museums have far more of their total collection in storage than they have on display. Text-fiche publications of special collections... could rescue seldom seen collections from obscurity."

We might observe that if research is no longer to be published exclusively in print form, but rather in visual forms used both to generate evidence and to document findings, then the information profession clearly must develop systems of managing visual information. This article will have indicated that it is long past the time for librarians and archivists to set aside the often nonsensical quibble about "words versus images." Words and images each have their own unique characteristics and their own ambiguities. Meanwhile, the multitudinous and energetic practitioners of contemporary social, scientific and artistic research drive on toward increasingly imaginative uses of visual information obtained through the use of the still picture, the motion picture, and the videorecording. It is no longer a matter of whether or not one picture is worth a thousand words, but rather of an almost complete revolution in the demands of human inquiry. The important question is whether or not the information profession can learn how to control, manage, store, retrieve and disseminate the complex aggregates, the technological forms and the new access modes required for important research which both demands and produces visual information.
ESTELLE JUSSIM

In observing that, in every branch of knowledge and learning as well as in the application of information, the visual has become as important as the verbal, Kenneth Shaffer stated the matter plainly:

We have to shift gears mentally. We have to begin to share the experiences of one branch of research with the applications and organizational tools of others. A considerable alteration of professional attitudes and a considerable expansion of professional education will undoubtedly be required in response to the new challenges of visual information. 

The complete rethinking of library buildings designed to accommodate these new challenges will undoubtedly require research into some of the very types of visual information which this article has described.

To encourage us to make the needed transformation, we should keep clearly in mind how ancient is the human preoccupation with the visual image, and how, in the inspiring words of Sir Herbert Read, “man’s first instinctive response to any challenge from across the threshold of knowledge, from the numinous void, is to strive to make it evident to the senses, visibly and haptically.”

References

2. Ibid.
10. Ibid., p. 21.
11. Society for the Anthropology of Visual Communication. Descriptive mailing provided through the courtesy of Jay Ruby, Temple University. (mimeographed)
12. See, for example, Hall, Edward T. Handbook for Proxemic Research (Studies in the Anthropology of Visual Communication; Special Publication).
Research Uses of Visual Information


14. See Birdwhistell, op. cit.

15. Ibid., p. 95.


20. Ibid., p. 2.


28. Karpel, Bernard. Item #1 of his mounted cardboards on the card catalog provided through the courtesy of the author.

29. Ibid.


33. Ibid., vol. 1, p. 370.

34. Ibid., p. 334.

APRIL 1977
