Museums Today

Museums provide links in the modern communications chain.

Sidney R. Galler, James A. Oliver
H. Radclyffe Roberts, Herbert Friedmann, Donald F. Squires

Museums are rapidly arriving at a recognition of an increasing responsibility and opportunity in the field of science and education. During the New York (1967) meeting of the American Association for the Advancement of Science, a symposium on the subject "The role of museums in modern communications" presented the new roles that museums are assuming (*1*).

What Is a Museum?

In his introduction, Galler posed the question, "What is a museum?" He proposed that a museum could be considered a vast data bank of three-dimensional objects which have locked within them a varying amount of information. Instead of simply storing these data, however, the modern museum undertakes to unlock this information and to interpret it for presentation to the public. In so doing, the museum forms perhaps the shortest communication link available between the discovery of new facts and the public education. The panel expanded on these ideas and showed that the communication linkage is not a straight chain but at various points includes inserts which add information from the continuing research production of the museum staffs. Other embellishments are added as the exhibit designers enhance the educational value of the data by attractive presentation.

Museums and the Public

Oliver, in his talk on "How museums talk to the public," emphasized that the public represents an extremely wide range of interests and capabilities of absorbing information presented; the range extends from casual visitors who may have come into the museum to get out of the rain, to scholars who use both the museum collections and the scholarly contributions published by the staff. Oliver also reminded the group that there are vast audiences who cannot or do not, for a variety of reasons, come to the museum at all, but to whom the museum can go through publications, radio, television, visiting lecturers, and portable exhibits.

The complexity of the task of reaching such a heterogeneous audience is recognized throughout the museum world, and the evidence of the need is clearly shown not only by the tremendous upsurge in popularity of museums, as indicated by the increasing attendence records, but also by a rapid rate of increase in the number of museums throughout the country—one every third day. Journals such as *Curator*, a technical magazine of museum concepts and procedures, and *Museum News*, the journal of the American Association of Museums, demonstrate this recognition by carrying such articles as "The value of design in visual communication," "Testing of audience reaction to museum exhibits," "Communications and the small museum," and "Museums in TV."

The content and method of communication in these contexts is basically simple. In any museum the exhibited collections comprise the medium of communication—whether a single specimen, artifact, scale model, or an entire integrated hall or gallery. The three-dimensional object alone transmits a message to the visitor's sensory system. The effectiveness and scope of the information received by the visitor depend on the acuity of his sensory receptors and his ability to assimilate information he receives. Traditionally, the collections have been exhibited in as attractive displays as imagination and resources permitted. They have been supplemented with printed labels, of varying length and complexity, which provide information to define more specifically the generalized message provided by the physical and esthetic characteristics of the object. Such exhibits represent the earliest successful teaching machines.

Increasing the effectiveness is now the problem. Parr pioneered in museum exhibition as a means of education and clearly distinguished between the simple goal of providing factual knowledge (the techniques of advertising) and the goal of achieving understanding. The problems are obvious when one considers that the exhibit must not bore the adult or erudite audiences but at the same time should not fail to satisfy the valid needs of less well-informed audiences who should come away with a possibly fractional but accurate understanding of the subject. The most important responsibility facing museums is to increase the involvement of the visitors.

Museums and Scientists

Roberts spoke on "Museums and the scientists" and emphasized the role of the scientist in museum communications. Since scientists are the major sources of the museum information, they should be in a position to advise the exhibit designer concerning the accuracy and significance of the data being presented to the public. An attempt to simplify complex relations is fraught with pitfalls when the intellectual range of the audience is so broad. Like the audience the museum tries to reach, the museum-based scientists also are comprised of a diverse array of personalities ranging from the biopolitician to the scholarly introvert. In the past, most museums could be viewed as containing two entirely separate groups. One was concerned with the visitors and exhibits, and the other, as far as anyone outside the museum could tell, was completely divorced from this and devoted entirely to esoteric scientific pursuits.

Sidney R. Galler is assistant secretary (Science) at the Smithsonian Institution, Washington, D.C. James A. Oliver is director of the American Museum of Natural History, New York, N.Y. H. Radclyffe Roberts is director of the Academy of Natural Sciences of Philadelphia, Philadelphia, Pa. Herbert Friedmann is director of the Los Angeles County Museum of Natural History, Los Angeles, Calif. Donald F. Squires is deputy director of the Museum of Natural History, Smithsonian Institution, Washington, D.C.

Museums and the Community

In the museum today, however, there has been an overall change from detachment on the part of its scientific staff to a desire to be understood and recognized as a contributor to the welfare of the community. This change in attitude has probably come about as a result of the need for greater public support for science. In the past, the public was unconcerned about or even unaware of the research aspects of the museum, and the scientist either had independent means of his own, or was dependent on the support of a few wealthy benefactors. Under such circumstances, it is not surprising that the research worker was isolated.

Public Interest in Science

As a result of the extraordinary scientific advances during and after World War II, the general public suddenly recognized science as a moving force in its life. Science rapidly became front-page news. Moral and political issues arose from the need to control the use of some of the discoveries. The public could no longer ignore science, and scientific progress became, at least financially, dependent on an understanding and informed public. Another factor which induced the change of attitude was the sharp rise in research costs, including salaries. Twenty years ago most senior scientists who had spent their lives on the study of fishes, insects, or mollusks at the Academy of Natural Science in Philadelphia were receiving $5000 or less as an annual salary. The rationale was that since the scientist was permitted to work at what he most wanted to do, he could not expect a satisfactory salary as well.

Today, museums must compete with universities, government agencies, and industry for their scientific staff, and salaries are now becoming commensurate with those elsewhere for scientists of similar training. In fact, the point is being reached at which support of scientific research is recognized as a national responsibility. This development has exerted strong influence on the thinking of the scientists and museums. It has required the justification of programs in terms of national and community interest, and it has stimulated the scientist to think of the larger objectives of his work, often leading to a desire on his part to educate the public about the importance of his field and the interesting aspects of his own work.

The interest of the general public, and the desire to cater to the public, however, do not relieve the scientist of his responsibility to his science. He must continue to uncover new data and to provide thoughtful interpretations and hypotheses. Especially, he must maintain the responsibility for the publication of his work which will stand as a reference to be used by other scientists. These reference works, and the collections on which they are based, are a national resource—something like a cross between a Bureau of Standards and a reference library. This aspect of museum work has not changed, except that more use is being made of the facilities on the basis of a conscious effort on the part of museums to bring these to the attention of the scientific public too long accustomed to take them for granted or to ignore them. Effective use of museum data depends on an understanding of taxonomy. The disastrous results of the long neglect of this field are now recognized, and interest in taxonomy is increasing among students. Museums are assisting the universities in the development of a new generation of taxonomists and are accepting graduate students for training in the use of collections for studies in systematics and evolution. This is a case in which the museum has the special facilities and staff rarely available for such training in the universities. Cooperative arrangements, therefore, are a natural development and serve as another way in which museums communicate with the whole community. These programs receive a great deal of attention because of the need for scientists trained in ecology and evolutionary biology.

Museums' Educational Role

Friedmann spoke on "The educational role of museums." Because of the widespread availability, one might almost say the intrusion of effective mass media of information, man can live on a worldwide scale and at more than one level simultaneously. The average individual becomes consciously or subconsciously more involved with a greater number of his senses in more things, more places, and more concepts than ever before.

Since pictures communicate ideas very directly, real objects should communicate even more effectively. To make clear the basic difference between the two types of involvement we may distinguish two areas of awareness, the sensible and the intellectual. By the sensible is meant the awareness that comes through the senses—sight, hearing, smell, taste, and touch. By the intellectual is meant the awareness that results from the mental process of evaluating and of correlating the sensory impressions into ideas and into conclusions and judgments. So long as knowledge stemmed primarily from words it was based on intellectual awareness without the refreshing Antaean-like constant renewal of experience with the sensible world, and it tended to lead to a loss of interest in those touched by it only casually and to a form of pedantry in those who lived by it. By virtue of their possession and meaningful use of real objects, the museums become one of the most powerful agencies for recapturing the essential experience with sensible reality that renews and vitalizes the sphere of intellectual awareness and involvement.

Unique Objects

Museums as collections and displays of unique objects thus become focal educational centers for this multifaceted involvement. Many schools cannot do this since they do not, and cannot, afford large collections of original material. The importance of the involvement of the visitor-spectator with the original, the actual, the genuine is enormous, even if it is difficult to measure objectively.

One example may serve to illustrate the overwhelming value of the original object: every year thousands of visitors stop to look at the Rosetta Stone in the British Museum. Probably not one in a thousand of them can read the Greek inscriptions, and not one in a million can decipher the Egyptian hieroglyphics, but they still pause before this famous object and let their eyes linger and wander, no matter how aimlessly, over it. Almost every large museum in the world has a cast of the Rosetta Stone, but few, if any of them, keep the cast on exhibit. Yet, for scholars for whom the Rosetta Stone is but a page, not of parchment but of basalt, to be read for its textual contents, the cast is as useful as the original. Just as in other fields of study, scholars make use of photostats or Xerox copies of pages of

rare books not otherwise available. However, for the nonspecialist, for the layman, for almost all the visitors to the museum who are not there seeking particular bits of information in answer to particular questions, an exposure to a cast or a copy gives little or no feeling of involvement. Looking at the original, the least-informed visitor comes to feel that his personal experience has been extended to encompass this famous piece, and he thereby begins to sense that the intellectual triumph of Champollion and his colleagues in first deciphering the mysterious, ancient Egyptian language has become a part of his own personal background of awareness. From that time on whenever he reads about, sees a picture of, or hears someone mention the Rosetta Stone, his interest is alerted to a degree far beyond what it would be had he not had that personal confrontation with the original.

In the natural sciences, the specimens exhibited are equally genuine but are usually not unique. Still, many subjects are displayed that the visitor hardly expects to meet in real life. Notable among these are displays of natural habitat groupings from remote corners of the world beyond the expected experience of most viewers even in today's world of easy and rapid travel.

Habitat Groups

A habitat group presents the animal as a part of reality, whereas a lone mounted specimen without a proper setting merely represents its outward appearance. Even in the case of well-known animals, the lay visitor may have misleading notions which the solo specimen cannot correct. Thus, to many people, the lion is commonly thought of as the fierce denizen of the jungle, and when asked to describe what the word jungle means to them, they are apt to say "the dense forest," which of course is not the true habitat of the animal.

Although every habitat group is not necessarily the equivalent of a great work of art, its inherent motivation is along the same lines. Both start out to convey facts about the sitter or the animal, and both, to the degree that they are successful, present far more than the outward appearance. Not content with the very real qualities of habitat groups, museums are attempting to enhance their effectiveness still further by the addition of discretely modulated sound effects, animal sounds, and environment sounds, typical of early morning, dusk, or specific seasons.

It comes as a surprise to many to find that all lions do not sound like their filmsake in M.G.M. productions. The use of sound does not merely involve the visitor with another sense in addition to sight, but is a reminder of the fact that our natural world is one of sound, and that because of its pervasive presence, sound often sets a mood better than does unaided sight.

For the present at least, the further involvement of smell is generously left to the zoos. (Friedmann perhaps has not been informed of the very pleasant exhibit of Stohlman's Confectionary at the Smithsonian's Museum of History and Technology which is enveloped by an aroma of chocolate!) By the use of such devices, museums, unlike schools with their regular classes, quizzes, and assigned readings, teach in a seductive way, luring the learners with displays and causing them to increase their knowledge continually and pleasantly without their necessarily realizing that this is occurring.

Special Strength of Museums

Many visitors, adult as well as children, come to museums in a state of passive receptivity. They come in not to learn but to look, and it is the museums' job to turn the looking into learning. The basic educational aim of museums is to help the visitor to accept an involvement with unfamiliar and even alien objects, or to enhance his preexisting awareness of more familiar objects, and to solidify and strengthen this involvement by contact with the actual things themselves, not with words about them or pictures of them. The variety of subject matter and of the areas in which the museums attempt to attract the interest and to engender the spark of curiosity that is essential to the learning process is not only very diverse, but is unique to museums. The presence of collections of real objects is their special arsenal of potential learning with which they can make their penetrating, if quiet and seemingly passive, assault on the receptive, if not always prepared and eager, minds of the viewers. The museums' role in education is to renew and to enlarge the visitor's involvement with as many aspects of the sensible world as possible in the expectation that this will in turn enhance his awareness of and concern for the intellectual world.

Computers Aid Museums

The first three speakers at the symposium expressed the philosophy among museum people regarding their responsibility to the public. Squires concluded the meeting with the subject "The computer comes to the aid of museums," by discussing techniques by which the desirable scientific communication is being accomplished. Some natural history museums, in Squires' view, are reaching a point in their development much like that which confronted certain dinosaurs about 200 million years ago. Their size and bulk are such that most of the incoming energy (dollars) is consumed by the process of maintaining the bulk (collections), with the result that less and less is accomplished to excite interest, to replenish intellectual resources, or to change the inexorable direction of their growth. These museums, therefore, can either continue to visualize themselves as warehouses, or as institutions that dredge the informational content from the specimens, to be interpreted, analyzed, or synthesized as bits of a mosaic which fill important gaps in the total picture of man's knowledge.

Squires differentiates in somewhat the same way as Friedmann does between museums of unique objects, that is, museums of arts and history and the museums of nonunique objects such as museums of natural history. In museums of arts and history, appreciation and even the emotion involved may be stronger precisely because of the uniqueness of the sculpture or relic. In the natural history museums the informational content of the nonunique specimen, enriched and enlarged through progressive study gives value, and each specimen represents a fact snatched from an environment and an instant in time. The accumulation of these objects, with the recognition that the informational content is likely to continue to be produced as new study techniques develop and as new data are obtained, is the true reason for the continued existence of these collections.

With recognition of the importance to the nation of knowledge relating to ecology, as was mentioned by Roberts, the museums' audience is rapidly expanding to include mission-oriented government agencies. It is valid for such agencies to ask the natural history museums such questions as where animals live, and what organisms they are associated with in specific environ-

ments. Most museums have the potential to answer such questions but few have the capacity to do so. The development of such a capability is one of the important projects now exciting the Smithsonian Institution's Museum of Natural History.

This museum is looking toward the computer sciences, not only as a means for more economical ways to process specimens and associated data, but also to provide an information system which will put in the hands of the scientists the capability of making valid correlations regarding population composition, distribution, habitats, and so forth, on the basis of a reasonably large sampling. From tests with source automation-data systems, it has been found at the Smithsonian that they increase productivity of a cataloger or data recorder by 70 percent or more. In addition, data can be recorded and encoded in such a way that they are machine-readable, thus making the exchange of information among a wide variety of users feasible and easy. By storing such data in ways which are readily filed and searched, queries involving the names of taxa, geographic distribution, species diversity, or faunal assemblages could be answered. By this means, the museums will reach their greatest fulfillment as repositories of information.

Squires believes that if museums do not undertake this role of actively accumulating complete information for analytic and synthetic use and thus become a library of factual and interpretative documentation their useful lifetime is limited. Whether or not data-retrieval systems are used, the museums must provide cross-linkage between their specimen holdings, their documentation, and the literature about objects in their collections. It is part of an experimental project of the Smithsonian Institution's Museum of Natural History to develop such ties.

With respect to technology, we are only a few years away from the potential of unlocking the future storehouses of documentation and entering into a direct dialogue with the scientific community. The identification of plants and animals, through the use of keys operated on an on-line, real-time basis in the conversational mode through computers is a reality in at least a dozen natural history establishments in the United States. A decade from now it may be possible to make plant or animal identification by voice interrogation directly through telephone lines to central computational facilities. Maps of species based on the holdings not only of one museum, but of the museums of the world should be an automatic output 25 years from now. Answers to complex questions about the associations of species and about the ecological settings from which they were taken, as well as changes in that setting should also be part of the repertoire of the museum of the future.

Thus, the museums' role as a communications link is a real and recognized one, reaching perhaps a broader range of users than any other kind of institution. Their long-stored, carefully developed fund of information is a continuously producing source of knowledge which is increasing in value and which will increase at a still more rapid rate with the use of modern communications techniques.

Note

1. The chairman of the session was S. R. Galler, assistant secretary (Science) of the Smithsonian Institution, and the panelists were: J. A. Oliver, director, American Museum of Natural History, New York; H. R. Roberts, director, Academy of Natural Sciences, Philadelphia; H. Friedmann, director, Los Angeles County Museum, Los Angeles; and D. F. Squires, deputy director, Museum of Natural History, Smithsonian Institution, Washington, D.C. Mrs. Ileen E. Stewart, National Institutes of Health, arranged the symposium as a feature of Section T, Information and Communications.

NEWS AND COMMENT

Lake Michigan: Salmon Help To Redress the Balance

Last September throngs of sports fishermen showed up on Lake Michigan suffering from "coho fever," a condition which is expected to return again this fall. Young coho salmon had been planted by the Michigan Department of Conservation in two Lake Michigan tributaries some 18 months earlier, and now they were due to return as heavy, mature fish. Return they did, concentrating by the thousands in the lake waters near the mouths of the rivers in which they had been planted, then starting their run upstream to spawn. True to its nature, the coho struck savagely at the anglers' lures, and some 60,000 of them were caught. These fish weighed an average of 12 pounds or better, and excited fishermen often displayed 20-pounders in triumph.

The coho, a native of the Pacific northwest, had not been introduced in Lake Michigan simply to produce a fever in fishermen, however. Besides being a magnificent sports fish, the coho is a voracious predator that is expected to help control the superabundant alewife, a type of herring which invaded Lake Michigan about 20 years ago and recently has become the lake's dominant and least-welcome fish species. The alewife has displaced several commercially important native species (such as the lake herring) and has caused distress because of massive die-offs that pollute beaches and drive away tourists. It is hoped that, through the stocking of Lake Michigan with the coho and other predatory sports fish, the alewife will be converted from a nuisance to a valuable forage species.

The introduction of the coho is only part of a bold strategic intervention by the Michigan Department of Conservation in a lake ecology in which, for various reasons, a desirable balance has been lost. This intervention involves, in addition to the stocking of predatory fish, the rigorous control of commercial and sports fishing and an ambitious interstate and federal effort at pollution abatement. The Department of Conservation is, moreover, taking a leading part in efforts to curb the use of persistent pesticides—a particularly potent lake pollutant now suspected to have been the cause of heavy mortality of coho fry last winter in state fish hatcheries. In short, at the same time that this state agency seeks to establish a balanced and valuable new fishery, it is trying to save Lake Michigan.

The salmon-stocking program has grown steadily since the initial plantings in Lake Michigan and Lake Su-