**JAY APT**
**DIRECTOR**
**CARNEGIE MUSEUM OF NATURAL HISTORY**
**PITTSBURGH**

Many natural history museums have traditionally been inner-directed. We create halls that are admired by our curators and accurately portray the hard work of research that has gone into the identification and systematic analysis of the artifacts in the hall. But the skills of the model maker's art are often lost on our visitors, who no longer come through our doors to admire the accuracy with which a model depicts the natural world. To be visitor-directed, we must recognize that our visitors have a knowledge base that is at a much higher level than what they had 100 or 50 years ago. Today, their knowledge comes from the Discovery Channel, National Geographic Explorer, the Internet, and the many popular magazines that are devoted to the Earth.

Several of the directors of natural history and natural science museums now come from fields outside the curatorial ranks. We often see clearly the distinction between inner- and visitor-oriented museums. But to succeed in redirecting our museums, we must also ensure that the curators, exhibit staff, and education staff realize that (1) visitors matter, and (2) visitors are not satisfied with the experiences they often get from museums. To address the first point, the governing bodies of the museum (for example, the board of trustees) can make a strong statement directly to the staff. But quantitative measures are also available: one is to make a strong connection between support and visitor excitement, so that the staff realizes the dollar value in gifts and grants generated by the new vision. Audience surveys address the second point most effectively. Surveys of attitudes and perceptions of the museum among visitors, and particularly among non-visitors, are extremely effective means of dispelling "common wisdom" and of convincing staff that changes are required.

Specific surveys of new exhibits are also effective measures of whether new directions are on target. Exit interviews can rank the importance of the various attributes of an exhibit. Decisions can then be made for future exhibits to allocate resources to attributes rated important by the visitors. (Are real specimens such as fossils more important than realistic models such as fleshed-out dinosaurs?) The educational impact of exhibits, docents, and classroom activities can also be quantitatively measured by specific exit surveys. At the Carnegie Museum of Natural History, we had a small, summer dinosaur exhibit that tested concepts that may be used when we undertake a major renovation of our dinosaur and evolution exhibits. By asking adults and children in an exit survey 11 true/false questions, we were able to measure directly the effectiveness of different methods of teaching concepts of dinosaur and mammal evolution.

The results of such surveys also act as baseline data against which the effectiveness of changes is measured. As the museum's new direction is established, follow-up surveys can be used to validate the new vision to both internal audiences (staff) and external ones (donors and the news media). They can provide more detailed analysis than the single datum provided by attendance figures, and can pinpoint shifts in visitor demographics that may be of great interest to donors.

Natural history museums are also great centers of scientific research. Directors or deans must make resource allocation decisions among the many fields represented in the museum. If it were ever possible to support all requests for funding, staffing, or space allocations in the past, that time has long since disappeared! There are tools available for assessing the effectiveness of scientific research performed at the museums, just as there are at universities. One such tool is the visiting committee, a group of nationally or internationally known scientists who come to evaluate a particular field every few years, and make a report to the director on areas of strengths, and areas that can be strengthened. Another tool, widely used in universities, is the *Science Citation Index* (SCI), which records the number of times that other scientists have cited a paper. Although SCI does not index some important journals (such as many museum annals), it is still a very useful tool for evaluating the impact of scientific work. Of course, success in obtaining grants and professional honors is also a useful quantitative measure of scientific staff effectiveness.

The Carnegie Museum of Natural History is fortunate to be part of an organization, the Carnegie Museums of Pittsburgh, that recognizes the fundamental importance of quantitative measures for improving our visitors' experience and our scientific productivity. We, together with several other like-minded institutions, are inventing a new type of natural history museum: a hands-on, interactive museum of the Earth. As we proceed down this new path, we want to make as few expensive errors as possible. Quantitative surveys can define the potential for unintended miscommunication inherent in new ideas, logos, advertisements, or exhibit concepts. The director's job is to lead the museum into uncharted waters, but the rocks and occasional favorable winds on that voyage can now be spotted by the keen eyes of quantitative tools.