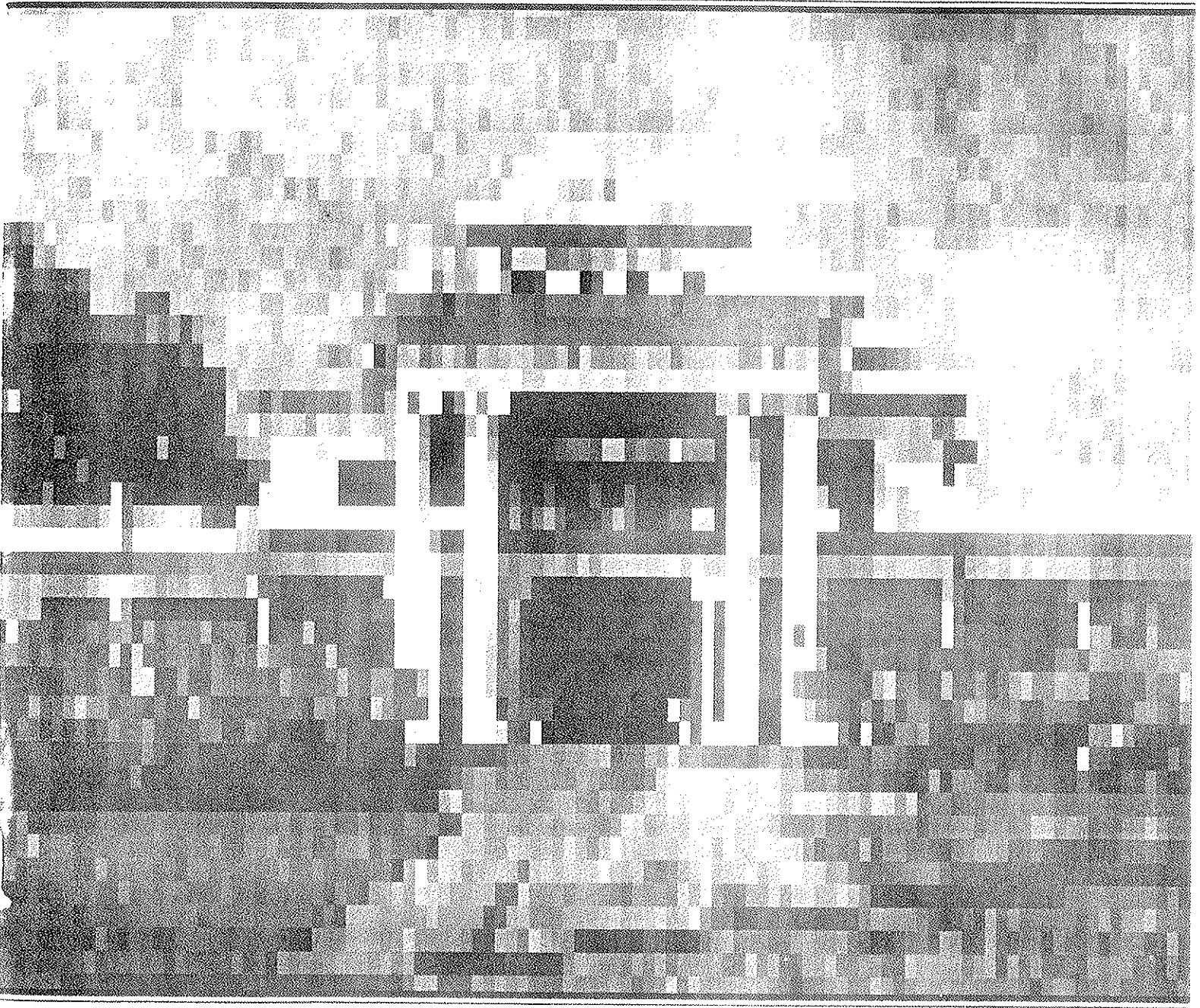


History News

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FOUR DOLLARS



New technologies change
the shape of history

EXHIBIT REVIEW

"Chips and Changes"

Technological exhibits have long fascinated Americans, but, in the past, the impact was generally proportional to size. The giant Corliss steam engine, with its eleven-ton walking beams and 30-foot flywheel, driving 13 acres of machinery at the 1876 Centennial Exposition in Philadelphia, became the most celebrated mechanical display of its time. Today, if one device could be regarded as the symbol of advanced technology, it would be the computer chip. About 3/8-inch square, containing hundreds of thousands of microelectronic components, it may change society even more than the huge engines that drove the Industrial Revolution.

Anyone from farm boy to poet who saw the Corliss engine gained, without explanation, a good idea of what it could do, a general understanding of how it worked, and some strong impressions of how it was likely to change the world. None of these things is obvious with today's computer technology. The microprocessor chip has gone so far beyond the limits of human sense perceptions that the uninstructed observer cannot understand enough even to marvel at its wonders. Only a carefully designed presentation that appeals to the mind more than to the senses can help us appreciate what microelectronics is and what it can do to, and for, society.

This is the achievement of "Chips and Changes," an exhibit now touring major museums from coast to coast. More than three years in preparation, the exhibit was produced by the Association of Science-Technology Centers and designed by Rogow + Bernstein of Los Angeles, with the aid of nationally prominent scholars.

Most of the academic advisors of the exhibit project are experts in humanistic or social science disciplines related to the interaction between technology and society. They include, among others, Bernard Barber of Barnard College, Melvin Kranzberg of the Georgia Institute of Technology, Bernard Cohen of Harvard University, Samuel Gorovitz of the University of Maryland, and Michael Mahoney of Princeton University.

The National Endowment for the Humanities, the Intel Corporation (a pioneer of the silicon chip), and eight other corporate sponsors contributed

funds for the \$1 million cost of "Chips and Changes." Nearly every major firm in the computer field also contributed in some way.

Far from being simply a display of marvels, the exhibit has well-considered educational objectives. It provides the basics of the background, development, production, and applications of microprocessors, and, above all, it explores the benefits and costs to society that result from their use. In the eyes of its creators, this last goal most clearly distinguishes "Chips and Changes" from previous computer exhibits. According to Wendy Pollock of ASTC, the exhibit "is the first to explore not only the amazing technology of tiny computers-on-chips, but also their influence on people's hopes, fears, and options."

Upon entering the exhibit, which I saw this spring at the Science Museum of Virginia, one immediately finds the subject placed in historical context. The very effective first panel depicts ten life-size individuals of decreasing ages from one hundred, each showing an "invention" that was relatively new "When I Was Ten." This presentation has much more impact and gives a more human perspective than the usual time line. The presentation shows also Americans' declining sense of wonder, from the woman who remembers the thrill of taking her own pictures with an 1888 Kodak No. 1 camera to the boy who says, "We've got a computer at home, but I don't know if it's so great." A seven-minute slide show, illustrating the development of communications and manufacturing technology since Edison's time, further emphasizes the historical context and provides an excellent introduction to the exhibit itself.

The attractive design of the 3,000-square-foot show includes pavilions illustrating the history of the computer, the design and manufacture of chips, the concept of artificial intelligence, and the basic operating principles of computers and software. The last topic, understandably, is least emphasized. In addition, seven exhibit islands demonstrate applications of the microprocessor to information systems, the "paperless office," automated factories and robots, "smart tools" (including weapons), home computing, health care, and games. There is

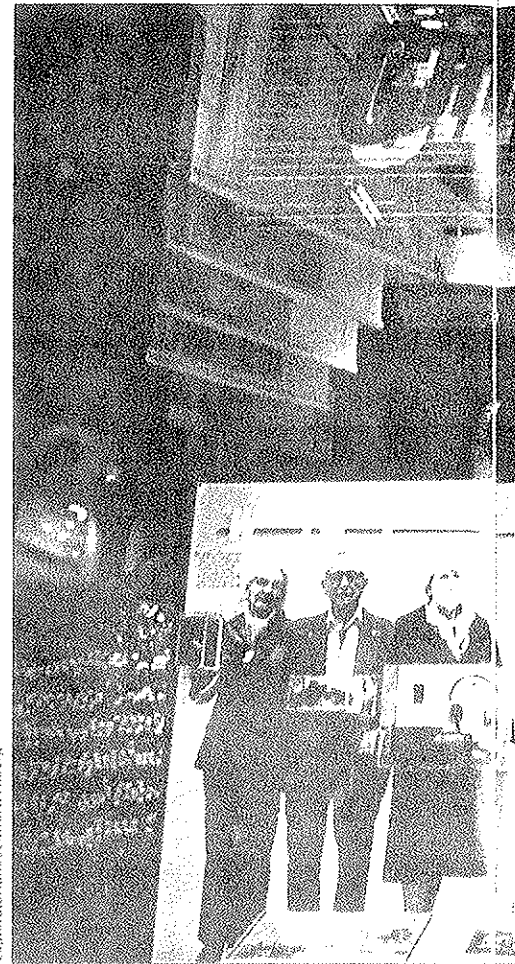


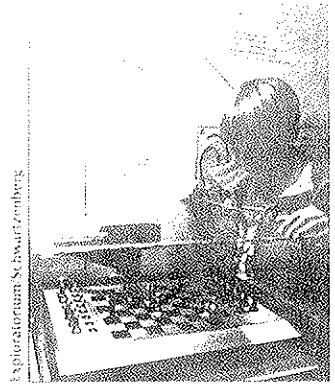
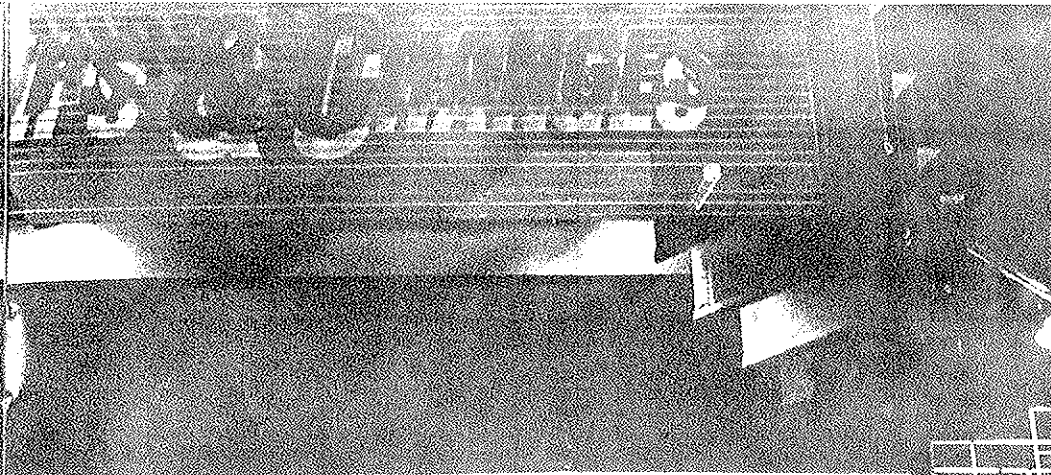
Exhibit: Science Museum of Virginia

also a section on "issues," although controversial questions regarding the positive and negative effects of computerization are not confined to that section.

Adjacent to the "issues" area is a computer programmed to solicit reactions from visitors. Users may see how their opinions compare with others and learn that "researchers are planning to publish the results." Elsewhere, four other computers offer quizzes about "facts and feelings" related to specific applications.

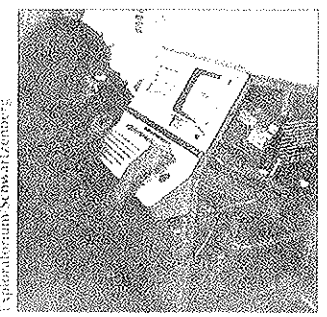
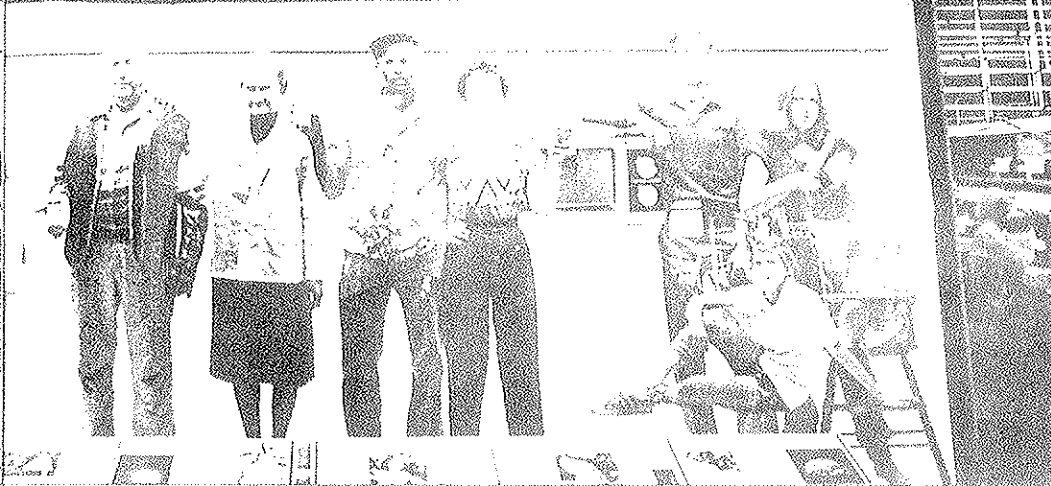
"Chips and Changes" is very much a hands-on exhibit. Displays lure visitors to participate, sometimes by speaking to them. Most important, what they get their hands on is the actual hardware, not contrived push-button demonstrations. Visitors work with high-tech devices in a nonthreatening environment, one in which it is possible to make mistakes and is necessary to experiment.

At the same time, "Chips and Changes" is an extremely literate produc-



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At left, at the Oregon Museum of Science and Industry, the photomural "When I Was Ten," which is normally used as the entrance wall to "Chips and Changes," shows examples of new technologies from each person's past. Above, a visitor observes a robotic chess game. Below, an ultrasound machine, which is used to monitor fetal development, is specifically adapted so that visitors may experiment with it at the "Chips and Changes" exhibit.



Exploratorium/Schwartz/enberg

tion; it is not suitable for any "postliterate" computer generation, if one is coming. Surely, few exhibits of comparable size have contained more or higher quality written material, and the integration of written information and hands-on experience is exceptional. Everyone has seen children running through museums, pushing red buttons, scarcely pausing to see what happens, let alone ever reading anything. This is not possible here. Much of the equipment cannot be operated by novices until they are instructed on its use by accompanying explanations.

Of course, many young people go straight to the games section and stay there. They are confronted by a poster stating "Comic books are to literature what computer games are to programming." One museum staff member at the Science Museum of Virginia remarked, "I wish we didn't have the games," but added that they serve at least to reduce

crowds at and wear on more tightly demonstrated. The educational game selected undoubtedly accomplish more than that, and, in honest reflection, how many of us learned to read, at least partly, from comic books?

"Chips and Changes," though, is an adult show. Certainly children can learn from it, but they probably require guidance to learn much of what the exhibit is really about. It does not presuppose knowledge of electronics but does require a fairly long attention span and a good vocabulary. One notices that adults take more interest and spend much more time in all parts of the exhibit, except in the games section, than do children or teen-agers.

Science museums have often been accused of promoting an uncritical faith in scientific and technological benefits. An exhibit that has received so much support from the high-tech industry might be more than usually open to this

accusation. "Chips and Changes" does achieve its goal of presenting both positive and negative effects of computerization but mainly for those visitors who conscientiously read the labels. Well-written texts raise many controversial questions and leave them open. They also provide information that could lead to a less than optimistic view of the electronic future. Examples include evidence of the downgrading of skilled employees and the statistic that 19,000 computers have access to the FBI's central computer. However, visitors who simply look at, or put their hands on, the artifacts will see only the wonders of digital progress.

There is one outstanding exception. It is the gruesome head of Frankenstein's monster atop the automated factory-robotics display. No visitor can miss this. Its connection with the subject is eventually explained in the text, but it is more effective without explanation.

The learning experience intended by

IN MY OPINION

New technologies for new audiences

BY SIDNEY B. BRINCKERHOFF

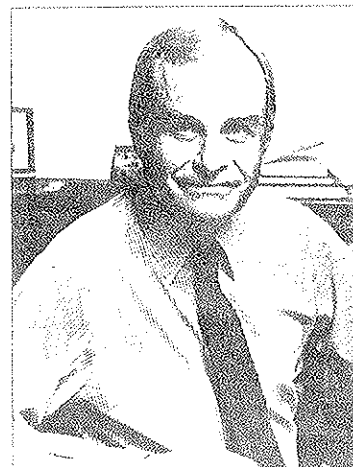
Museum audiences of the future will expect more from their museum experiences than just viewing exhibits from behind a glass or reading descriptive labels. They will want to be challenged by what they see; they will want to participate in the action; and they will want to be a part of the new technology that is sweeping the world.

Let's look at the job of the museum historian. In our profession, we are called social scientists. Our function is to look at the facts and the evidence of past human thought and action and to interpret and analyze that information. Often we don't examine society in depth in museums, but simply *record* and *report* information. We become fixated on the idea that the physical representation of the past is significant in and of itself—we just list the past for viewing and record data on a label for audiences to view. Admittedly, that is a bit of an overstatement, but because we place so much emphasis in museums on artifacts, we often forget that our job as social scientists is to inform and to educate—to open people's minds to explore, reason, understand, and value what we display before them.

What the public needs

If we accept the concepts that we are social scientists, that artifacts aren't an end in themselves, and that they may not be as readily available in the future as in the past, what, then, can we do with museums in the future? I propose we take a look at what the public and technology are telling us.

Clearly, we are becoming an information-hungry society. We are intensely responsive to audio-visual stimuli, and we are rapidly developing tools to increase the flow and return of information in an audio-visual format. The technological revolution of the past decade has been in the area of electroni-



Sidney B. Brinckerhoff

"So, in our new style museums of the 21st century, do we have one vast video arcade and movie theater full of flashing lights and sounds of gunfire?"

cally stored and transported information, and if we believe the futurists, we are just in the beginning skirmishes of that revolution. What I find most fascinating is that data, both words and graphics, can be stored, reproduced, interpreted, transported, and shared rapidly and at increasingly lower cost. Specifically, I refer to computers, laser video disks, and holography.

These tools create marvelous opportunities for what I call the "new audiences" for museums. I have observed young people becoming enraptured in video arcades while interacting with an audio-visual reality that has as its core conflict, competition, and skill. I have read about the interactive video systems at the recent world's fairs, where people could call up information on television monitors by touching pictures at appropriate locations in response to questions on audio-visual screens. I have viewed increasingly larger video screens and dramatizations of human intentions in the form of holo-

the original planners can be affected, perhaps adversely, by the arrangement of the pavilions and islands, a matter that is left to the discretion of individual host museums. Also, a few labels are printed in white on a light background, making them nearly unreadable. Items treated this way were probably judged less important, but some were quite interesting, such as the assertion by a Stanford electronics expert that "If you raise the philosophical objection that the machine does only what we program it to do, the answer is 'That is right, and what I program it to do is think.'"

Occasional petty faults do not detract from the overall quality of the presentation as a major educational experience. It takes about three hours to cover the exhibit completely. Those with less time may concentrate on a few parts and learn a lot about those areas. A quick glance at everything teaches little, but a thorough examination will give the intelligent novice a whole introductory education in microelectronic development and application. Even the experts will almost certainly learn something.

Does "Chips and Changes" teach us to stand in awe before the microprocessors as our ancestors stood before the Corliss engine? Undoubtedly not. Our technology no longer has mighty pistons and flywheels, and we no longer have the naive optimism the people had in the 19th century. These changes, and the appreciation of them promoted by such thoughtful exhibits as this, may give us a chance to do better than our ancestors in making the machine a servant and not an idol or a master.

William H. Thorn
Associate Professor of History
University of Richmond

"Chips and Changes" Itinerary

Museum of Science Boston, Mass.	Through Aug. 25, 1985
Franklin Institute Science Museum Philadelphia, Pa.	Sept. 14 Nov. 10, 1985
The Discovery Place Charlotte, N.C.	Nov. 30, 1985 Jan. 26, 1986

Sidney B. Brinckerhoff is the executive director-emeritus of the Arizona Historical Society in Tucson. This article is adapted from a speech he gave at the Annis Museum Conference in October 1985.