Movies via computer

Abstract or complex concepts are difficult to communicate. Often they are best grasped visually—particularly through animated films. But making such movies has been tedious and expensive. At Bell Laboratories, therefore, we are experimenting with movies by photographing computer-controlled cathode-ray tubes. Not only is this more efficient than traditional methods, for many kinds of movies, but the computer can sometimes reveal motions and shapes which are otherwise concealed in masses of data. Here are examples of our work.

K. C. Knowlton’s BEFLIX (Bell flicks) is a computer program whose input is a description of the desired movie in the language of the filmmaker: CAMERA, DISSOLVE, ZOOM. Its output is a magnetic tape containing an encoding of pictures. These are subsequently displayed on a cathode-ray tube where they are photographed.

The BEFLIX picture is a rectangular array of dots; the intensity of each can vary through eight levels. The filmmaker can tell BEFLIX that lines or arcs should be drawn, areas “painted” various shades of gray, displayed shapes moved in various directions, and the like. There is an assortment of letter sizes and faces for titling.

The frames below were produced in the BEFLIX language. The first is from a movie describing BEFLIX itself. The second is from a movie about a new programming language produced at Bell Laboratories. In this film, animated “bugs” demonstrate how information is moved around in the computer.

In this new method of animation, both film motion and display on the tube can be controlled automatically by information on a magnetic tape.

A movie by E. E. Zajac demonstrates the effects of gravity in keeping a communications satellite facing the Earth. Satellite motion is described by complicated differential equations. They can be solved on a computer, but the resulting list of numbers is almost incomprehensible. In the movie, however, the dynamics of satellite motion—stability, orientation, and time—are instantly visible.

The pictures show two parts of the movie. At top, the stylized satellite-Earth system is seen from a position fixed relative to Earth (thirty selected frames are superimposed). The lower picture shows the satellite from a position orbiting with it. This is an advantage of computer movie-making: the second viewpoint required only relatively minor program changes.

The film was “reshot” several times to show the effects of various stabilizing parameters.
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for food-irradiation since we already have several alternate methods for preserving food.

What is at issue is the placing of the burden of proof. Whenever a proposed restriction is likely to cause social turmoil (as in the case of caffeine), we can wisely insist on placing a heavy burden of proof on those who propose the change. However, forbidding the irradiation of food would cause no social disruption, outside the narrow circle of a few industries and research laboratories. Here the burden of proof is surely on those who say (ignoring some of the evidence) that food irradiation is 100 percent safe. It would be hazardous to future generations to encourage, or even permit, the development of a food-irradiation industry on the basis of the present inconclusive evidence.

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Transfer Experiments:
A Plea for Tolerance

The letter by Nicholls et al. (22 Dec.) reporting the results of preliminary experiments on the transfer of characteristics from one oscilloscope to another, by means of an extract, produced a common reaction among my colleagues; namely, that the letter was really a parody, with intent to portray, by analogy, the intrinsic absurdity of recent suggestions that it is possible to transmit memory between lower organisms by techniques superficially similar to those described by Nicholls. I should like to point out that if the techniques and results of transfer experiments between oscilloscopes are analogous to those of transfer experiments between Plantaria, they are also analogous to those of transfer of genetic characteristics between P. patens and as described by Alloway (1), the active component for which was subsequently identified as DNA by Avery, MacLeod, and McCarty (2). Those experiments, far from being absurd, have had such far-reaching consequences that I lack arrogance to summarize them.

I have no desire to argue here for credence or incredulity in the suggestion of a phenomenon of memory transfer in Plantaria (or even in oscilloscopes). It is worthwhile, however, to keep in mind the distinction between invalidity and absurdity of scientific results. Any sci-
entist worthy of his chalk can give a quick and rigorous proof, based on rock-bottom fundamentals, that any particular idea, already known to be incorrect, is obviously, or even trivially, absurd. But the converse reasoning has failed in such an impressively large number of important cases, that it seems to be a relatively weak and unconvincing method of scholarly procedure.

Arthur M. Lesk
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References
1. J. L. Alloway, J. Exp. Med. 55, 91 (1932); 57, 265 (1933).
2. O. T. Avery, C. M. MacLeod, M. McCarty, ibid. 79, 137 (1944).

Reciprocity in War

Are the "thirteen hundred fellows and active members of the American Sociological Association" (22 Dec., p. 1553), also planning to send an open letter to Ho Chi Minh, protesting the recent North Vietnamese massacre of Montagnard women and children with flame-throwers? I urge them to do so, for it is obviously hypocritical to protest "the continued . . . killing of civilians" by the United States and remain silent when the other side does the same thing, and deliberately at that. I think the sociologists should conduct an "orderly, phased withdrawal" from this sort of advocacy, lest they open their own "credibility gap."

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Our Age of Elegance

I was pleased to note that, in the program for the recent AAAS meeting, female leaders of section meetings and symposia were listed as Chairlady. It seems that, in spite of our slacks and miniskirts, all respect for womanhood is not lost! However, in order to forestall a demand from the other sex for equal rights, may I suggest that at the 1968 meeting male leaders of section meetings and symposia be listed as Chairgentleman.

Ruth S. Bitter
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Calendar of Events

National Meetings

March


10-15. American Soc. of Photogrammetry/American Congr. on Surveying and Mapping, annual mtg., Washington, D.C. (W. B. Overstreet, 1819 Franwall Avenue, Silver Spring, Md. 20902)


11-13. American College of Surgeons, sectional mtg. for Doctors and Nurses, Williamsburg, Va. (Communications Department, 55 E. Erie St., Chicago, Ill. 60611)


11-14. Canaveral Council of Technical