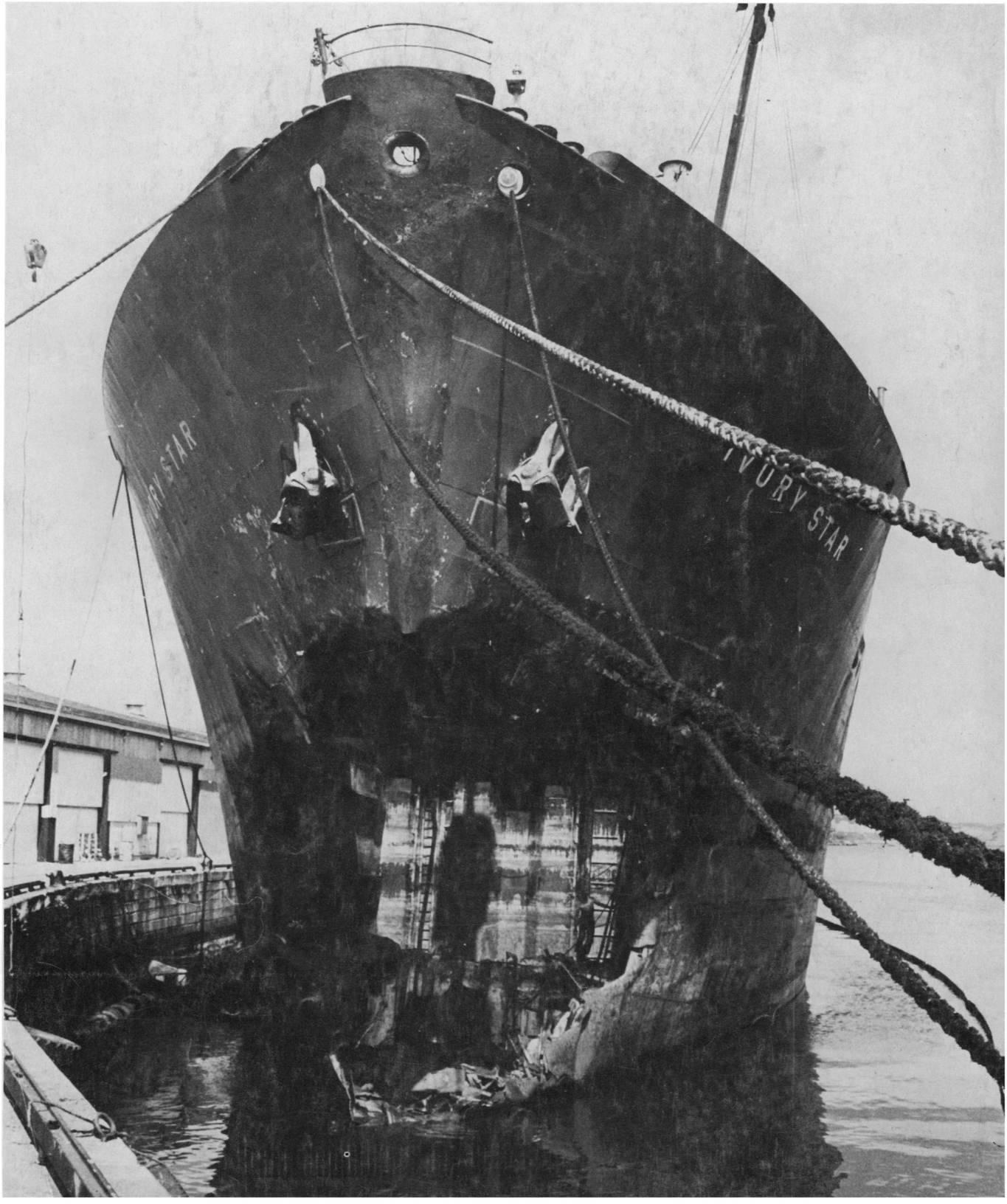
SCIENCE

2 April 1976

Volume 192, No. 4234

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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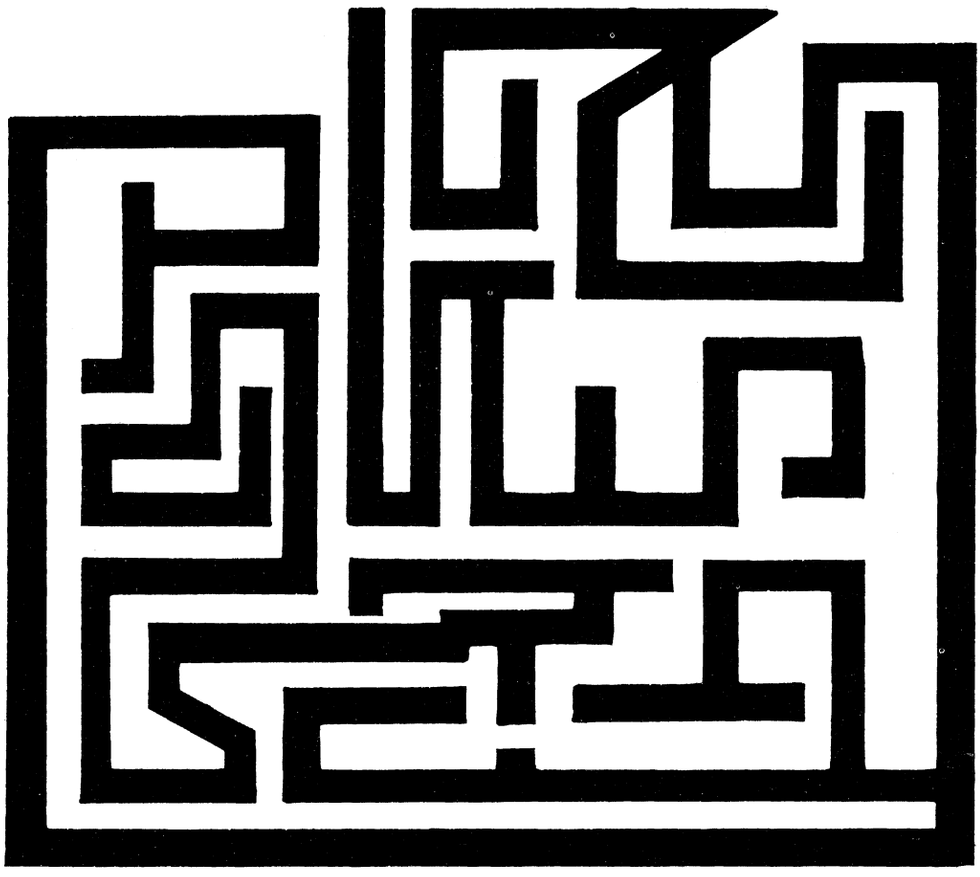

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By **Claude A. Villee,** Harvard University; and **Vincent G. Dethier,** University of Massachusetts. 999 pp. About 700 ill. (in two colors). Just Ready. **Order #9029-7.**

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By **Robert T. Orr,** California Academy of Sciences, San Francisco. 472 pp. 297 ill. March 1976. **Order #7018-0.**

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Sixth Edition

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By **C. Donnell Turner,** formerly of Duquesne Univ.; and **Joseph T. Bagnara,** Univ. of Arizona. About 675 pp., 100 ill. Ready June 1976.

Order #8933-7.

Horn: BIOLOGY OF INSECTS

Written for students in the life and agricultural sciences, this introductory text emphasizes insect function and the importance of insects in relation to man's environment. Illustrated coverage of morphology and taxonomy is also included.

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Edited by **Robert M. May,** Princeton Univ., with 10 contributors. About 250 pp. Illustd. Ready Fall 1976.

Graham & Waering: DEVELOPMENTAL BIOLOGY OF PLANTS AND ANIMALS

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Edited by **C. F. Graham,** Oxford Univ.; and **P. F. Waering,** Univ. College of Wales. 408 pp. About 200 ill. Ready June 1976.

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Christensen: DISSOCIATION, ENZYME KINETICS, BIOENERGETICS—A Learning Program for Students of the Biological and Medical Sciences

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2 April 1976

Volume 192, No. 4234

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COVER

Bow of the *Ivory Star* in Halifax, Nova Scotia, 11 July 1974, after her collision with a "growler" in the Gulf of St. Lawrence. The 612-foot-long vessel displaces 16,320 tons (8,964 tons net) and was carrying 700,000 bushels of grain. A human stands in the lower right of the hole. See page 7. [Wamboldt-Waterfield Photography Ltd., Halifax, Nova Scotia]

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2 April 1976, Volume 192, Number 4234 **SCIENCE**

A Century of Chemical Progress

For nearly three decades following its formation in 1848, AAAS provided the principal "home" for the chemists of the United States—first through a Section of Chemistry and Mineralogy and then through a Section A subsection which later became Section C (Chemistry).

When nearly 100 chemists met at Northumberland, Pennsylvania, in 1874 to celebrate the centennial of Joseph Priestley's discovery of oxygen, discussions of a national chemical society took place. The plan fell through at the time, largely because of loyalty to AAAS and the belief of some that there never would be enough chemists in the land to sustain a healthy society. These discussions led, however, to establishment of the American Chemical Society (ACS), with 133 founding members, on 6 April 1876. The society has survived in such good health that this year, as it observes its 100th anniversary, it has attained a membership of more than 110,000. Moreover, throughout its first century, ACS has enjoyed a cooperative and mutually beneficial relationship with AAAS, of which it is an affiliate.

The society's phenomenal growth has paralleled the phenomenal development of American chemistry, which ACS has done much to stimulate. Dedicated to the "advancement of chemistry in all its branches," ACS from the start has made the rapid and wide dissemination of chemical knowledge one of its principal objectives. Its *Proceedings*, first published in 1876, became in 1879 the *Journal of the American Chemical Society*, which still flourishes today as part of a diversified family of journals, magazines, books, and secondary publications—notably *Chemical Abstracts*.

A second way in which ACS has promoted the diffusion of knowledge has been by its elaborate network of scientific meetings. With the aid of 175 local sections, in all parts of the country except Alaska, and 28 technical divisions serving all major fields of chemistry, ACS sponsors two national, ten regional, and more than 1000 local meetings each year.

For many years, ACS has made its members' expertise available to public officials dealing with problems affecting, or affected by, chemistry. More recently, the society's Committee on Chemistry and Public Affairs, supported by a staff department, has made significant contributions in this area. It was partly in recognition of this type of service that Congress conferred a national charter on the society in 1938.

The society also has worked through the years to strengthen the chemical profession itself, by exerting a constructive influence on chemical education and by helping chemists protect and enhance their professional status.

The centennial observance provides an exceptional opportunity to pursue another key ACS objective, that of increasing public understanding of the meaning and importance of the work of chemists and chemical engineers. The largest single centennial project is a traveling exhibit, supported by industry and designed to familiarize the public with the myriad ways in which chemistry improves the quality of everyday life. This exhibit will open in New York on 5 April during the ACS Centennial Meeting and later will visit some 14 other major cities over the next 3 years. A special commemorative stamp honoring the science of chemistry will be introduced at the Centennial Banquet on 6 April. At both the New York meeting and the 1976 fall meeting in San Francisco, technical programs of unequaled quality will be presented, with many outstanding foreign scientists participating. Local sections will hold their own celebrations at various times during the year.

All who have helped plan the centennial celebration hope that the gains made in 1976 in scientific reporting, member participation, public relations, intersociety and international cooperation, and overall professional enthusiasm will be maintained as ACS enters its second century.—GLENN T. SEABORG, *President, American Chemical Society, Washington, D.C. 20036*

Western Electric Reports:

Electron beam mask marvel.

Integrated circuits can be seen as the ultimate extension of the art of silk-screening and modern electronics. Using masking techniques which go far beyond those of silk-screen artists, it is possible to generate thousands of electronic components on a tiny chip the size of a matchhead.

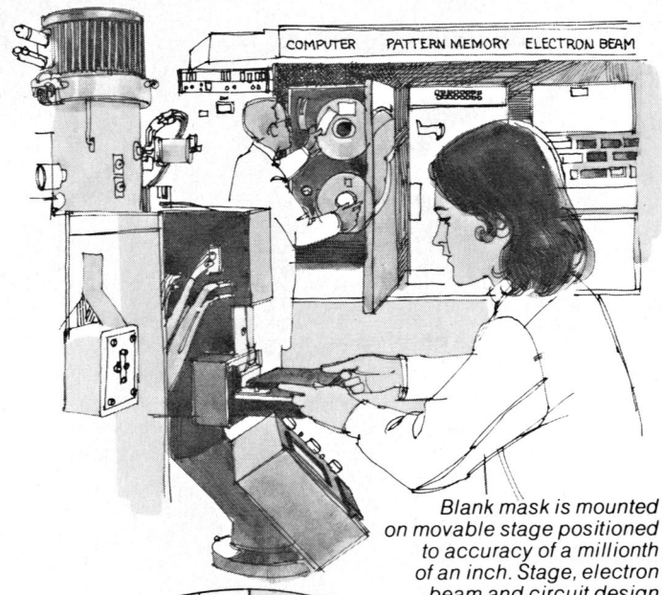
But as designers pack more and more components onto these chips, the masks used to generate them must be made with even greater precision. Conventional photographic mask-making techniques are proving too crude to produce such masks economically, severely limiting integrated circuit technology.

But now a Bell System team has made a major advance in the mass production of extremely precise masks. Bell Labs engineers have devised a method of using a beam of electrons to make the masks. And Western Electric engineers have helped design practical production equipment.

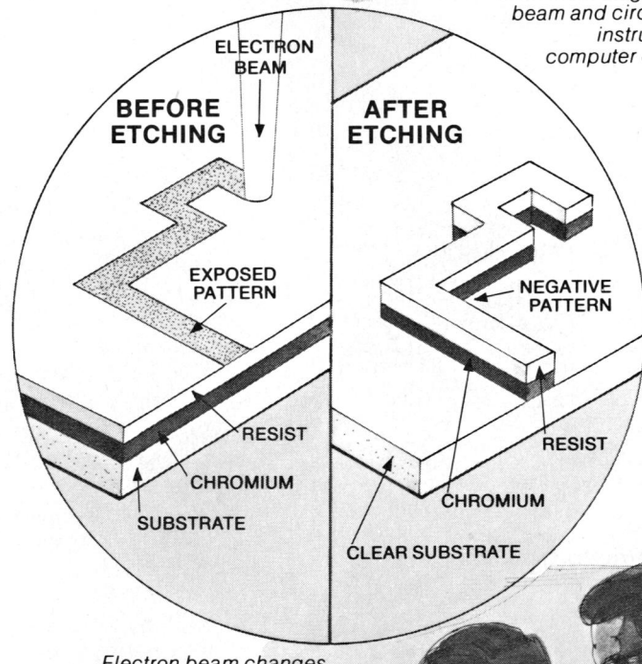
The new method is faster, more reliable, more precise and less expensive than existing photographic techniques. Because an electron beam has a shorter equivalent wavelength than light, it is a much sharper stylus. It can be focused to a spot 10 millionths of an inch in diameter.

The electron beam is used to draw an intricate pattern on a chromium-coated glass substrate, covered with a chemical film sensitive to the beam. The chemical film, called a resist, polymerizes or "sets" after exposure to the beam, becoming impervious to the chemicals that will subsequently be used to etch out the mask. The unexposed portions of this film and the underlying chromium are etched away, leaving a negative mask pattern of chromium on glass.

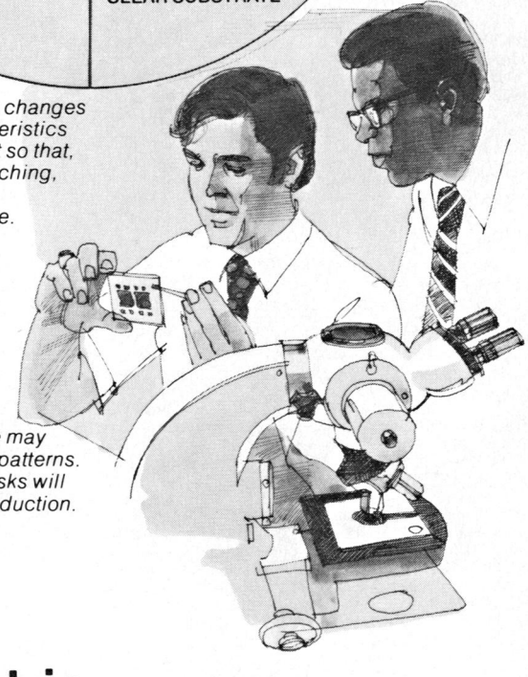
Benefit: Electron beam mask-making is one more manufacturing innovation that allows the Bell System to meet your communication needs reliably and economically.



Blank mask is mounted on movable stage positioned to accuracy of a millionth of an inch. Stage, electron beam and circuit design instructions are computer controlled.



Electron beam changes physical characteristics of exposed resist so that, after chemical etching, pattern is left on clear substrate.



Finished substrate may contain 10,000 mask patterns. Copies of master masks will be used in actual production.

Western Electric