

PHOTOMICROGRAPHIC  
INSPIRATIONS  
FOR  
GRAPHIC  
DESIGN

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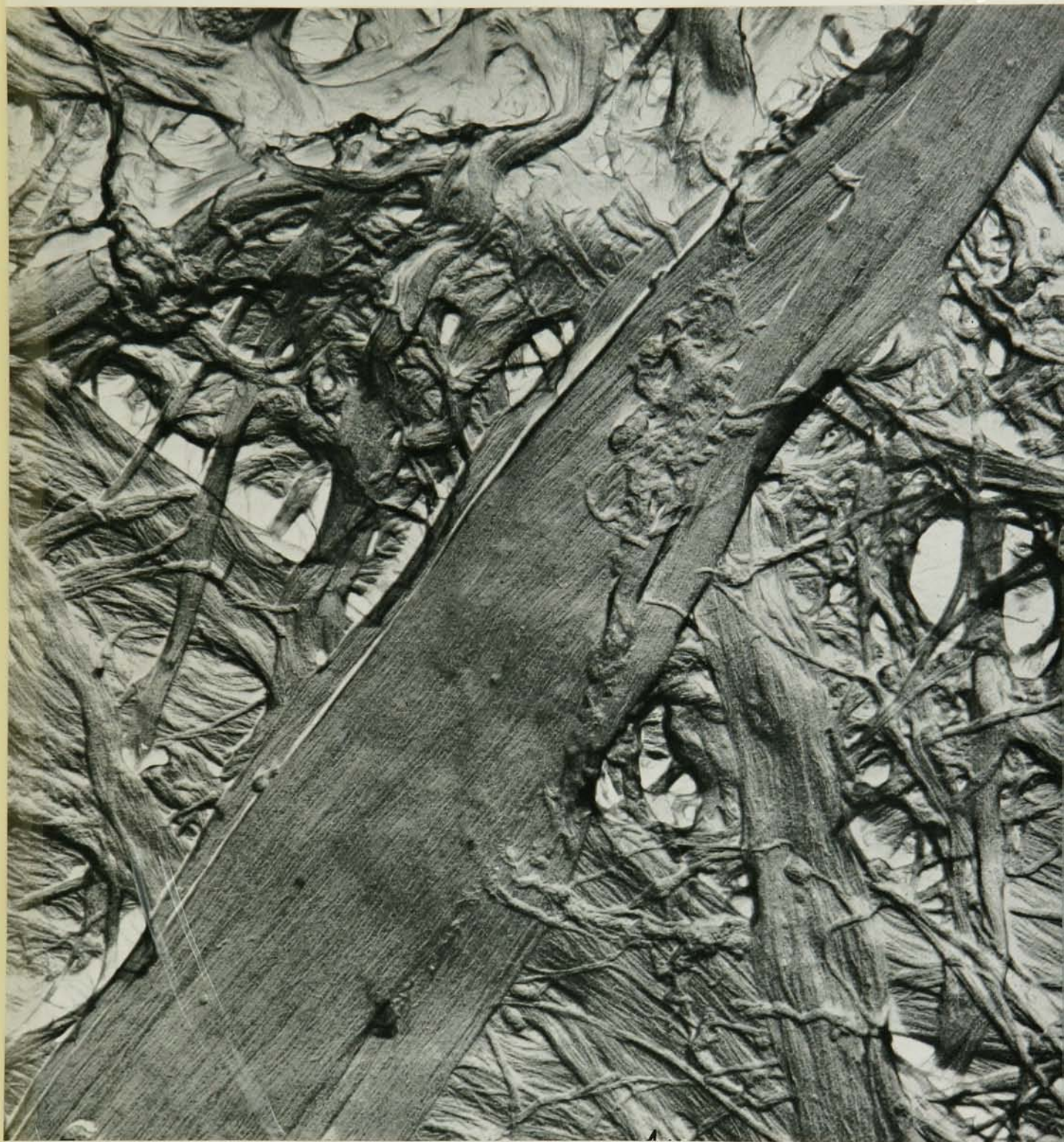
SUBMITTED  
9 AUGUST  
1963

ADVISOR: MR. HANS J. BARSCHHEL

ADDITIONAL INSPIRATIONS AND RESPONSES

8/3/66





Cotton Linters

24,000:1





Tobacco Mosaic Virus...negative staining

240,000:1



Histiocytes in blood 1300:1



Small color sketch; chalk and casein.....

Finished painting 22x32-inches: oils.....





Both paintings on opposite page are responses in oils  
to photomicrographic inspirations

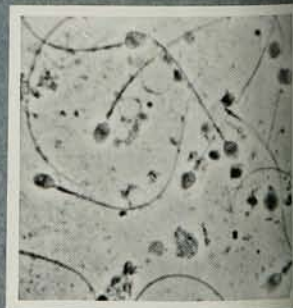






This page: photomicrograph inspiration  
and adaptation in tempera.

Next page: crystalline photomicrograph  
and personal adaptation in  
oils over wood splinters.



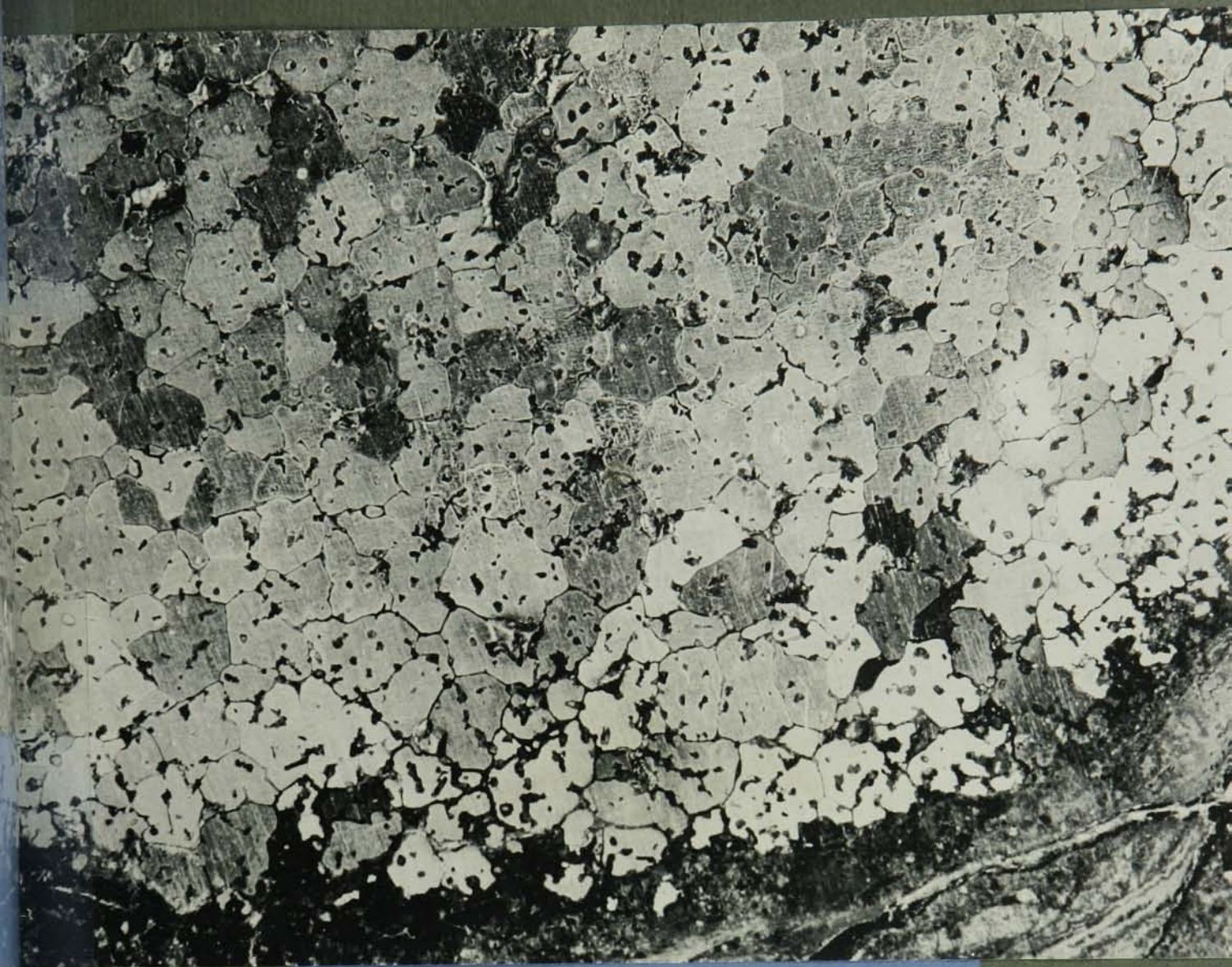












Above: Photomicrograph of metal  
surface

Opposite: Photomicrograph and sketch  
using Prismacolor and tur-  
pentine





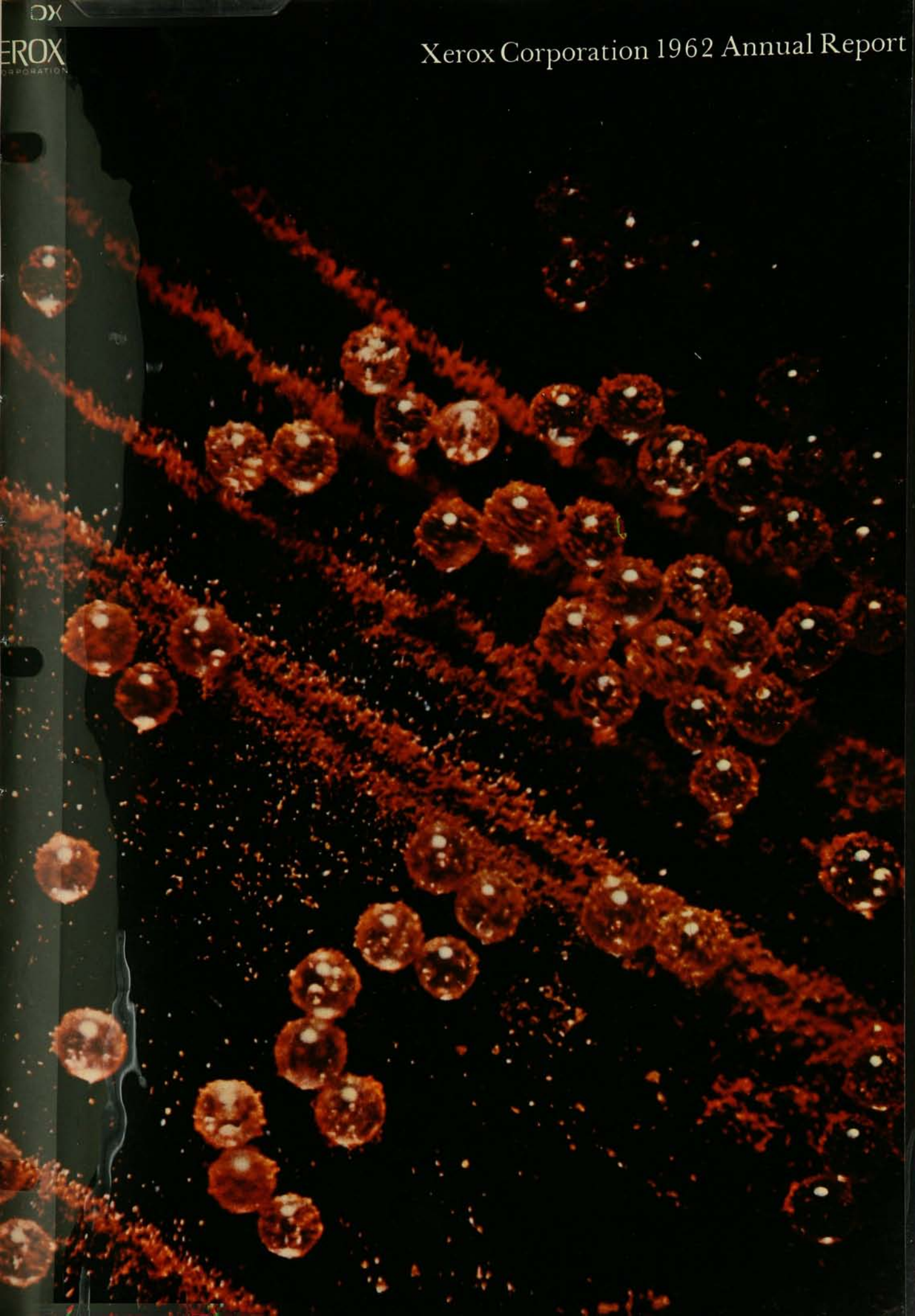
Crystalline Virus: 85,000:1



TYPICAL  
CURRENT  
APPLICATION

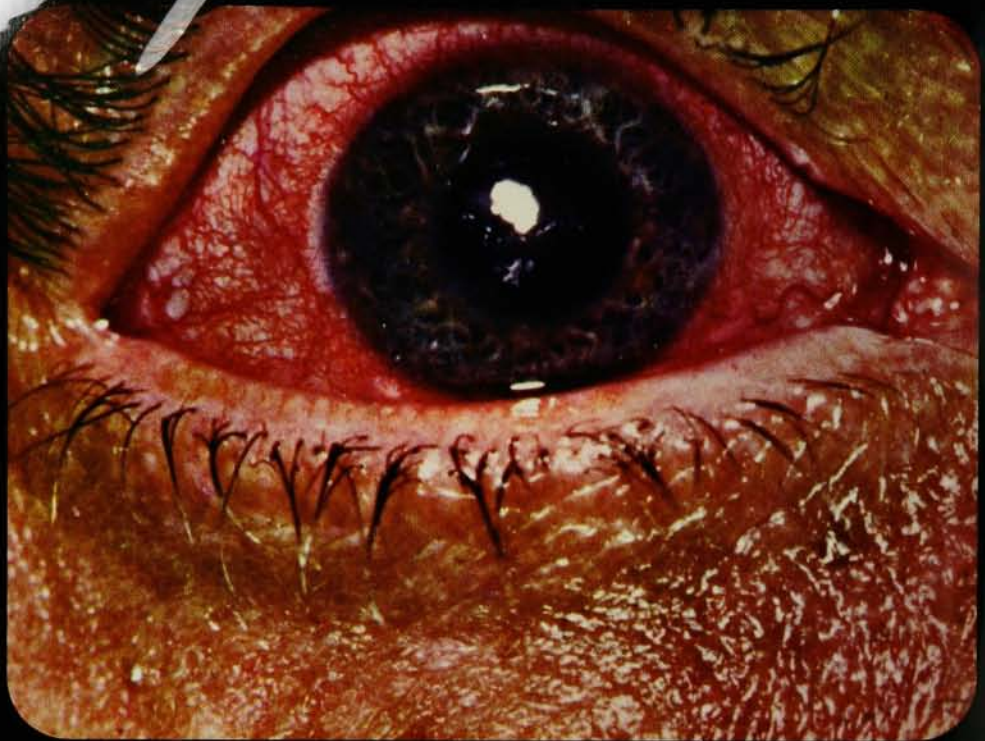
Photomicrograph from Xerox research is adapted  
cover design.







**Cuando vea esto...**



Fotografía debida a la gentileza del Dr. E. L. Whitney,  
Departamento de Oftalmología del Henry Ford Hospital, Detroit

Extreme close-up photography and artist's adaptation on opposite page. Both have visual impact, but artist has removed the smell of the clinic.



Uno de una serie sobre inflamaciones oftálmicas

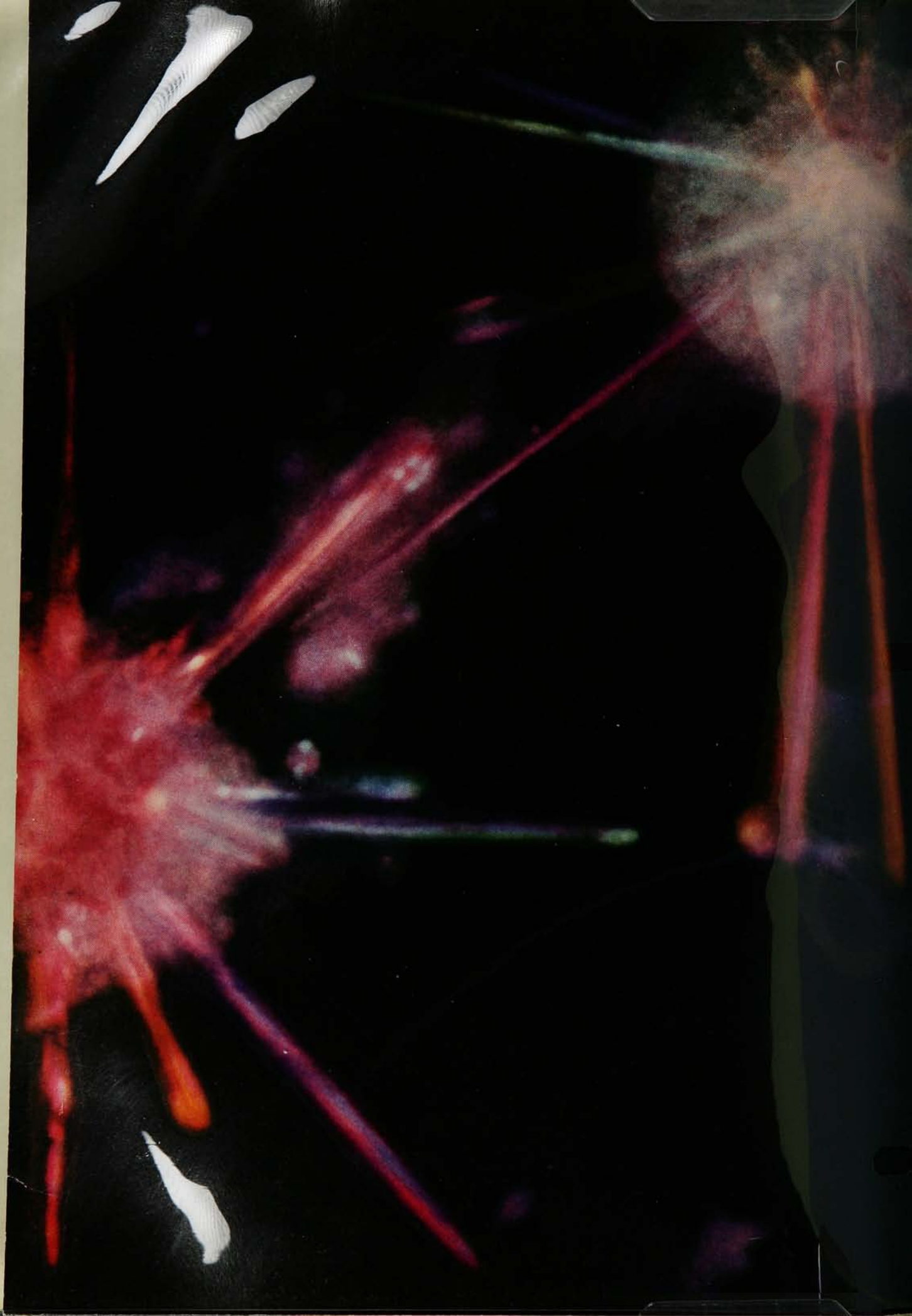
2



**Neo-Cortef<sup>\*</sup>**

PRODUCTOS OTO-OFTÁLMICOS

\*MARCA DE FABRICA



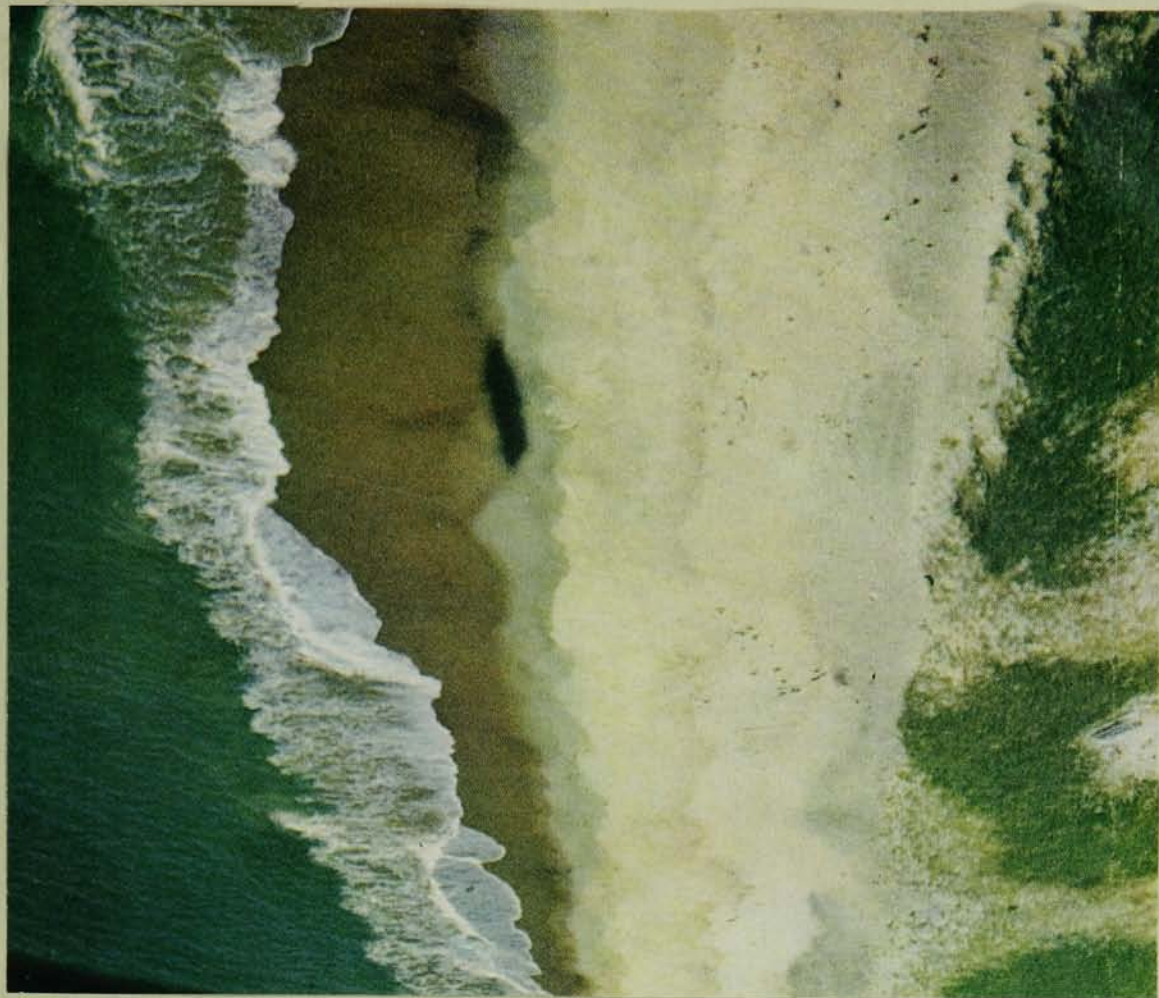


OTHER  
EXTENSIONS  
OF  
VISION

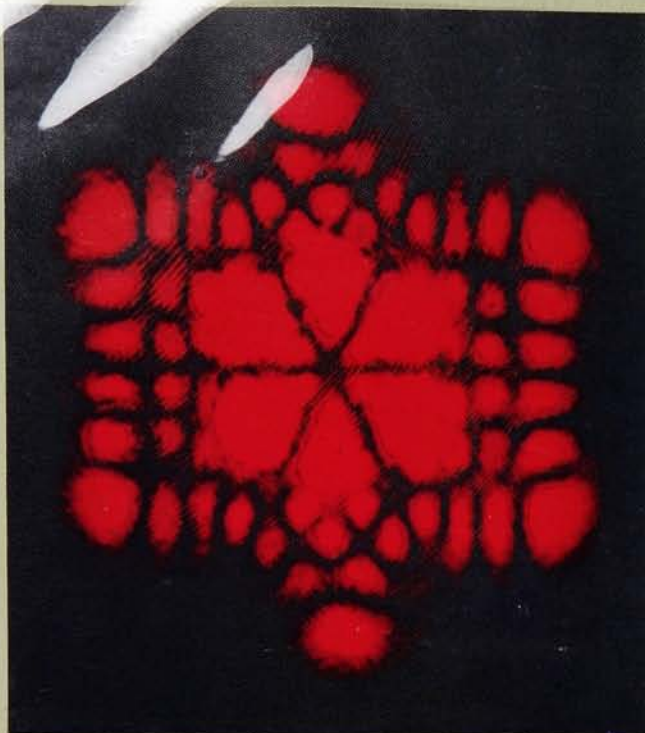
This photomicrograph of a  
chemical reaction was used  
for a cover design by the  
Allied Chemical Company.

The aerial photograph has long been a source of inspiration for the artist-designer.

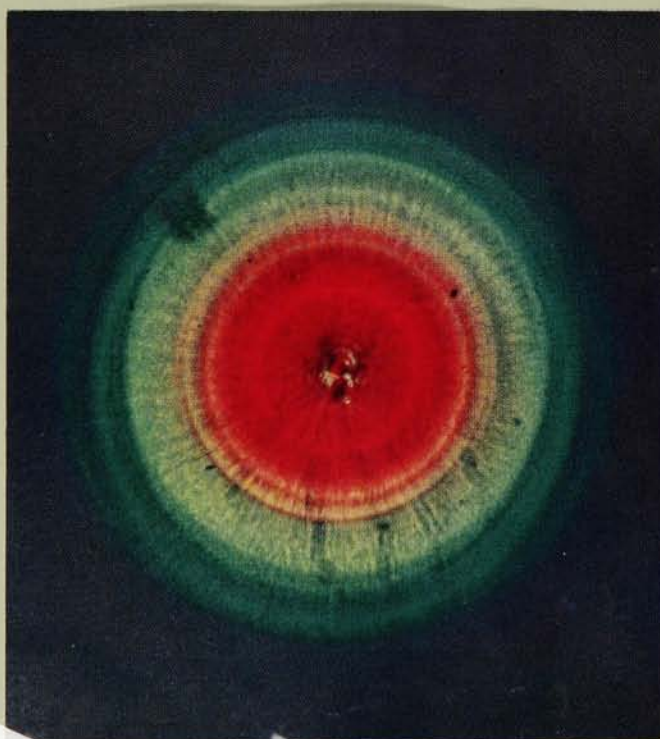






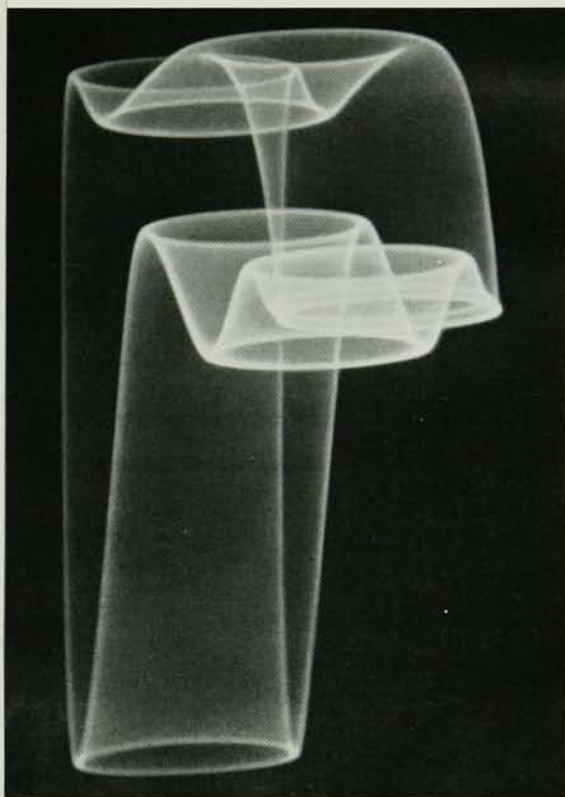
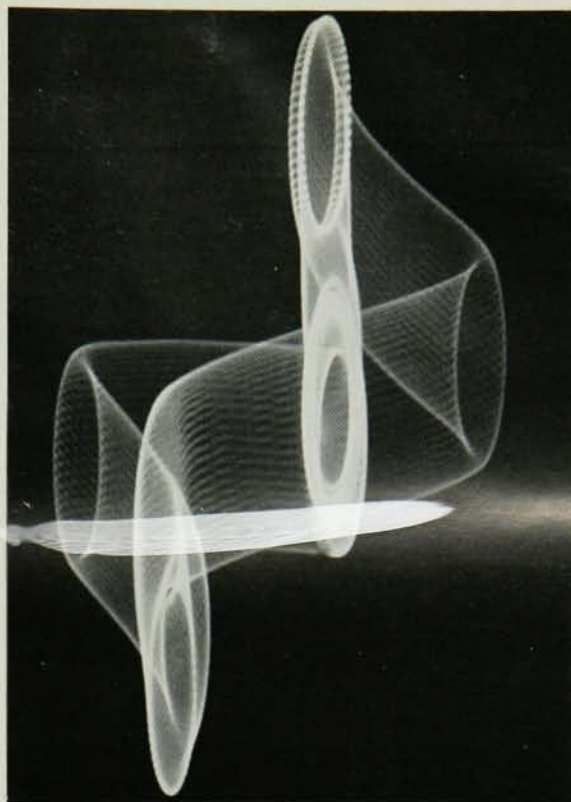


Oscillation modes of a  
gas discharge laser  
yield vivid symmetrical  
patterns.

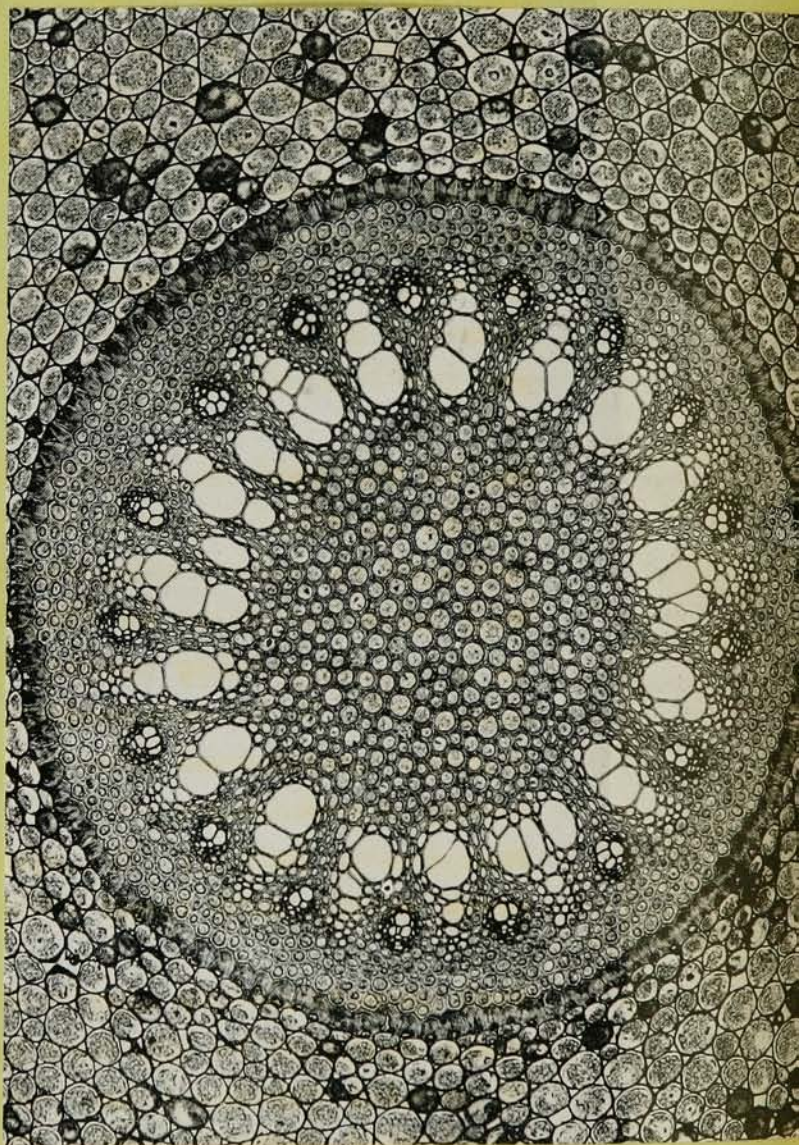
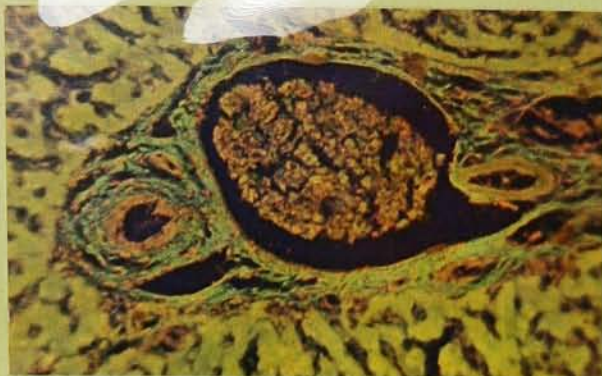




These oscillograms are the work of the physicist and were produced on the screen of a cathode-ray oscillograph.







Nature's coherence ranges  
from a tight symmetry to  
the dynamic ordering of  
unusual configurations...



## COHERENCE OBSERVED

Coherence in a work of art can be thought of as the integration of all compositional elements into a cosmos in which line, color, and light and shadow are interwoven into one ordered whole. When the designer structures all the physical elements which make up a work of art into a coherent entity it becomes pleasing to the senses. "However, 'pleasing to the senses,' is a relative value judgment."<sup>18</sup> Kepes tells us that, "The experiencing of every image is the result of an interaction between external physical forces and internal forces of the individual as he assimilates, orders, and molds external forces in his own measure."<sup>19</sup> Any personal remarks concerning coherence observed in this project must of necessity be subjective and far from absolute.

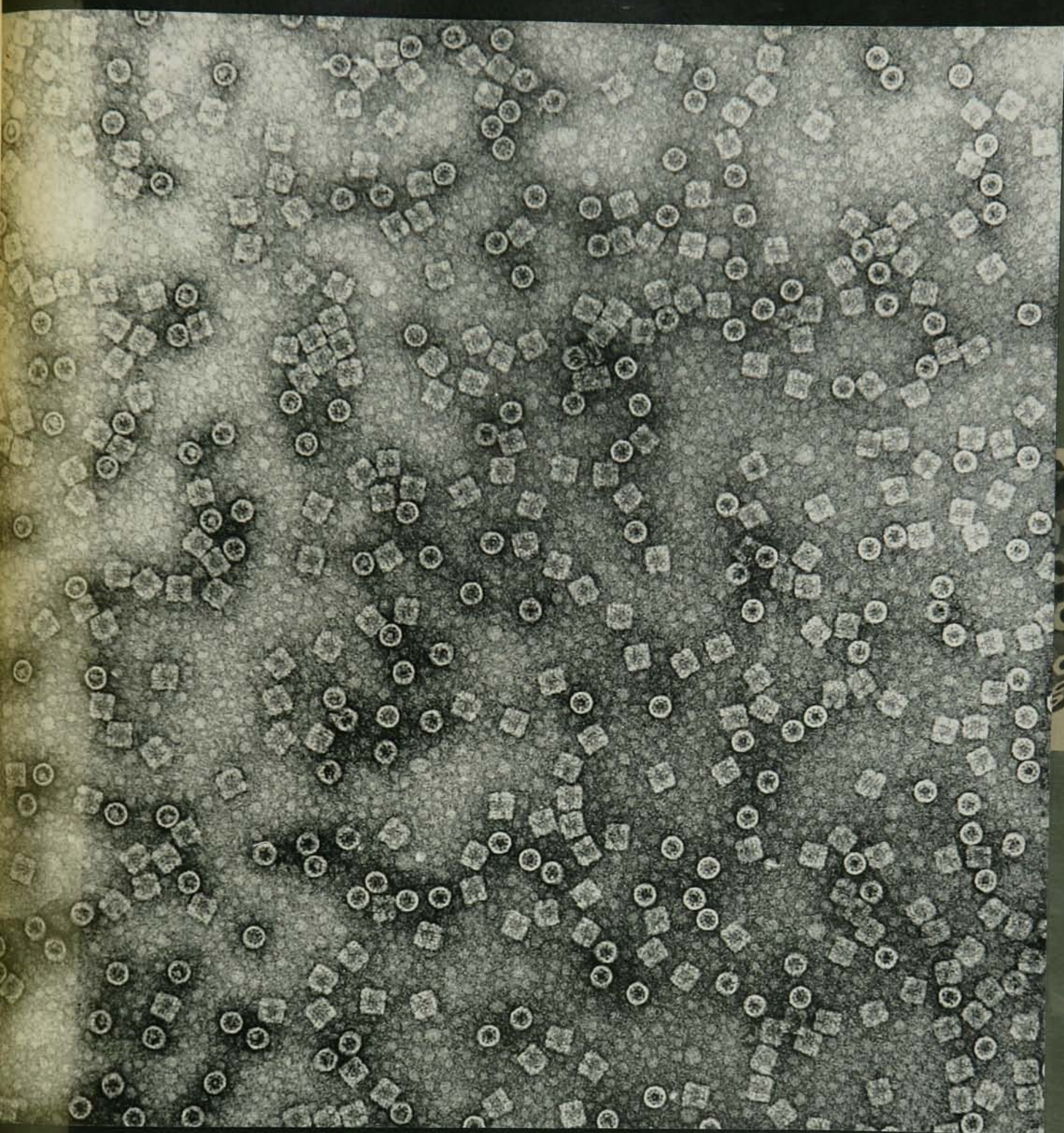
One of the most impressive observations of coherence observed in this research has been the exquisite symmetry revealed by recent electron photomicrographs of viruses. With magnifications of 500,000 and more, the virus is seen in a "...surprising variety of mathematically ordered families."<sup>20</sup> It is interesting to note also, that models of viruses constructed from photomicrographs bear extremely strong resemblances to the geodesic domes of U.S. Architect Buckminster Fuller. The symmetries found in Fuller's books match neatly with those found by the virologists.<sup>21</sup>

Such symmetries are fascinating to contemplate for anyone whose interest is the ordering and structuring of images. Of greater immediacy and fascination, however, for this particular research, have been the microcosms with less obvious coherence. It is the feeling of this observer

that the elements of emotion and reason must both be present in a design, more or less balanced , if a work is to be satisfying.

My inspection of the photomicrographic image has been against a reference of order relations such as dominance, repetition, variation, rhythm, unity and pleasing proportion. In this search for microcosm the need to satisfy these principles has been felt. To delve into great details of explanation would in itself be a consuming thesis project. It is thought that with the amount of illustrative material included in this report the observer might make value judgements of his own. It should suffice to note that even in the minutiae of photomicrographic vision, as in the everyday world of vision, the perceiver must practice selective perception. Of the examples studied, many, when viewed in their entirety amounted to visual chaos. In almost all, however, there were areas of harmonious relationships, areas which satisfied the requirements of a microcosm.





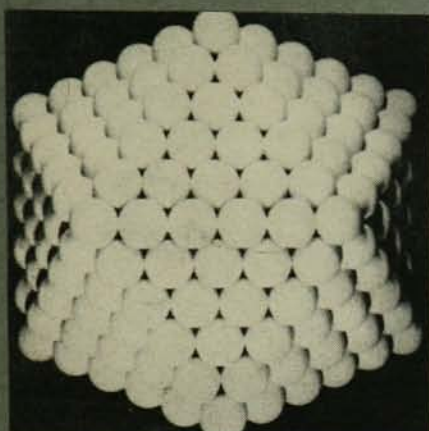




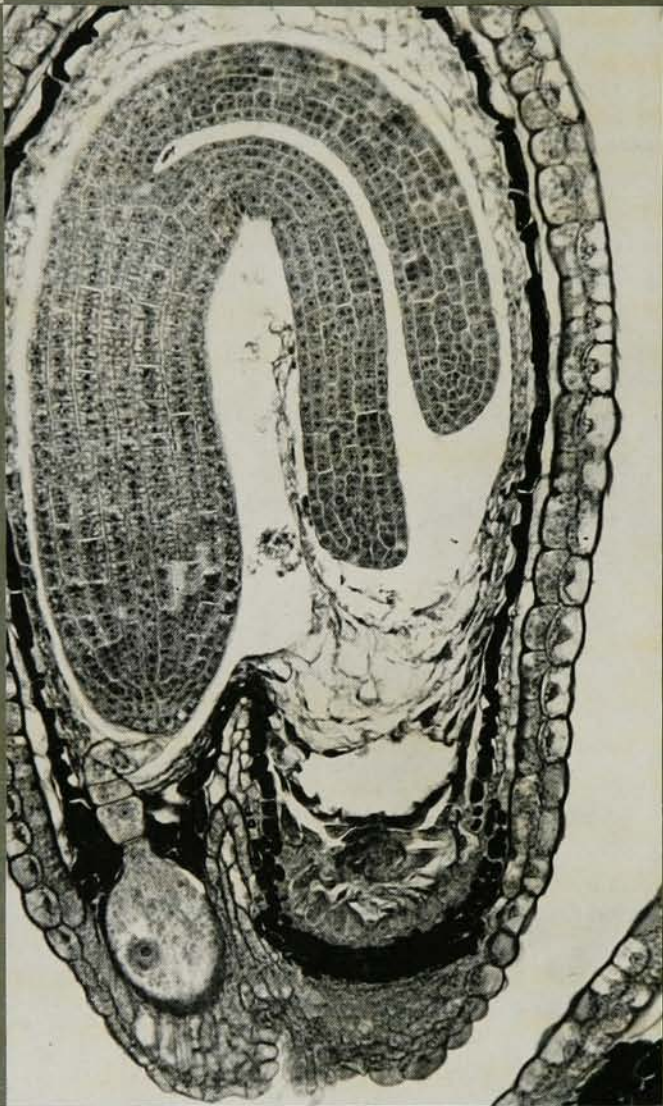


.....Viruses in the usual electron photomicrograph have the appearance of fuzzy tennis balls.

The models below were developed from unusual magnifications of about 500,000:1. It was found that the symmetries in their structures bear a close resemblance to the Geodesic Domes of Buckminster Fuller.







Varieties in nature's coherence





## SOME THOUGHTS CONCERNING FURTHER RESEARCH

This project has been a stimulating one, but it has also been fraught with frustration. Stimulating in the sense that it has detonated a whirlwind of creative possibilities, and frustrating in that there has been so little time to exploit these possibilities. It is cliché but accurate to say that the surface has barely been scratched.

It is hoped that the mention of a few thoughts concerning my own further involvement will prove helpful to the person interested in acquainting himself with this fascinating medium.

Present plans include a larger collection of photomicrographs gathered through the techniques used to acquire examples in this report. Additional back issues of Scientific American will be used as a source along with other magazines such as JAMA, the Journal of the American Medical Association. It should be noted that extra copies of most articles from Scientific American are available for a nominal charge from W.H. Freeman and Company of San Francisco. Correspondence with optical manufacturers will continue and local photomicrographers have offered assistance in accumulating material.

Through the guidance of Eastman Kodak experts, some degree of knowledgeable proficiency in the use of specialized equipment will be sought.

Another avenue for continuing exploration affords the myriad possibilities of combining the photomicrograph image with other visual materials in the communicating

of an idea. Images from different visual planes such as unusual photographic techniques, the oscillograph, and art work, used in various combinations with the photomicrograph. This presents a fertile field for studying visual communication. Using images from several visual planes simultaneously the graphic artist appeals to a wider range of man's perception and response. The problem of bringing miscellaneous elements into harmonious fusion is a characteristic of the picture image of the advertising message and familiar to the graphic designer. The works of Herbert Bayer and Gyorgy Kepes offer excellent guidelines for this study.<sup>22</sup>

Further experimentation will be carried out to uncover fresh new ways of interpreting the images revealed by the microscope, whether for painting, printmaking, fabric decoration, advertising design, or whatever. The possibilities for further research are seemingly endless. In addition, associated fields, such as macrophotography, and oscillography with its electronic calligraphy, beckon the artist to "new realms of form."<sup>23</sup> One has but to get started and an amazing variety of inspirations blossom forth.



## CONCLUSIONS

It would be redundant to dwell further upon the fact that the photomicrograph constitutes a rich source of inspiration for the designer. The examples included in this report speak for themselves. And, although it would be naive to presume that the photomicrograph would guide the designer in all the imagery he must employ for visual communication, several values do seem apparent from this investigation.

It would seem that to combine elements from the photomicrographic world of vision with elements from other visual planes would provide the designer with a broader potential for communicating. By integrating these diverse elements, his work would have a space-time relatedness, so prominent in current articles discussing visual reorientation. Microcosmic elements could be used as a decorative adjunct to other elements, or used because of their intellectual relationship to an idea, corporation, or product. Such unusual configurations would exert a visual command or impact necessary to the communication of an idea. They would stimulate the imagination of the observer and cause him to pause and contemplate the message.

In addition to providing ammunition for the graphic designer the photomicrograph offers the painter, whose prime intention is aesthetic, a rich source of imagery, or at least a springboard for creative possibilities. Photomicrographs themselves are not works of art but a basis for the making of visual images, structures to be transformed by the artist. It is interesting to note

that there is no great feeling of incongruity in viewing some contemporary paintings alongside the photomicrograph.

Many photomicrographs have an extremely decorative quality. They offer the designer whose intention is decorative, such as the fabric decorator, a source worthy of investigation.

To all whose work involves the ordering of visual elements, the creating of a personal cosmos, I would recommend an inspection of the photomicrograph. A feeling of personal satisfaction has been derived from my own brief investigation. The study of the photomicrographs coupled with reading from Kepes, Moholy-Nagy and Dorner, in addition to experiencing with materials and discussions with my advisor, have resulted in a sense of personal growth.



The search for nature's cosmos continues.....





# FOOTNOTES

- 1 Nathan Lyons, Under the Sun: The Abstract Art of Camera Vision, New York, 1960, p. 3.
- 2 Charles Morris, "Man Cosmos Symbols," The New Landscape, Gyorgy Kepes,
- 3 Gyorgy Kepes, The Language of Vision, Chicago, 1951, p. 6 ff.
- 4 Ibid.
- 5 Herbert W. Franke, "Microcosmic Structures," Graphis 102, July, 1962, XVIII, pp. 444-51
- 6 Ibid.
- 7 Ibid.
- 8 R.W. Horne, "The Structure of Viruses," Scientific American, Jan., 1963, Vol. 208, pp. 48-56.
- 9 Douglas F. Lawson, The Technique of Photomicrography, New York, 1960, p. 1.
- 10 Franke, op. cit., p. 47.
- 11 Roy M. Allen, Photomicrography, Princeton, 1958
- 12 Ibid., pp. 41-90.
- 13 Lawson, op. cit., p. 3.
- 14 Franke, op. cit., p. 447.
- 15 Lawson, op. cit., p. 2.
- 16 Photomicrography, Pamphlet No. P-53, Eastman Kodak Co., Rochester, 1962
- 17 Thomas B. Hess, "Embarkation from Nature," Art News Annual, 1951, XX, p. 155.
- 18 Viktor Lowenfeld, Creative and Mental Growth, New York, 1957, p. 418.
- 19 Gyorgy Kepes, The New Landscape,
- 20 "Medicine," Time, Feb. 16, 1962, pp. 58-59
- 21 Ibid.
- 22 Alexander Dorner, The Way Beyond Art, New York, 1957, pp. 130-91. Gyorgy Kepes, The Language of Vision, Chicago, 1951, pp. 207-28.
- 23 Herbert W. Franke, "New Realms of Form," Graphis 103, Sept., 1962, XVIII, 540-43

## BIBLIOGRAPHY

- Allen, Roy M., Photomicrography, Princeton, 1958
- Dorner, Alexander, The Way Beyond Art, New York, 1947, pp. 130-91.
- Franke, Herbert W., "Microcosmic Structures," Graphis 102, July, 1962, XVIII, 444-51
- Franke, Herbert W., "New Realms of Form," Graphis 103, Sept., 1962, XVIII, 540-43
- Hess, Thomas B., "Embarkation from Nature," Art News Annual, 1951, XX, pp. 129-58.
- Horne, R.W., "The Structure of Viruses," Scientific American, Jan., 1963, Vol. 208, pp. 48-56.
- Kepes, Gyorgy, Folio: "Art in Science," Simon and Shuster, New York, 1954, plates 8-24.
- Kepes, Gyorgy, Language of Vision, Chicago, 1951
- Kepes, Gyorgy, The New Landscape, Chicago, 1956
- Lawson, Douglas F., The Technique of Photomicrography, New York, 1960.
- Lowenfeld, Viktor, Creative and Mental Growth, New York, 1957, pp. 392-419
- Lyons, Nathan, Under the Sun: The Abstract Art of Camera Vision, New York, 1960
- "Medicine," Time, February, 1962, pp. 58-59.
- Moholy-Nagy L., Vision in Motion, Chicago, 1947
- Perrin, Porter G., Writer's Guide and Index to English, New York, 1942, pp. 319-47.
- Pousette-Dart, Nathaniel, American Painting Today, New York, 1956
- Stajuda, Jerzy, "The Unknown Face of the Earth," Poland, Feb., 1962, No. 2, pp. 36-37.



EASTMAN KODAK PUBLICATIONS

Motion Pictures Through the Microscope, Pamphlet No. N-2

Photography Through the Microscope, Publication No. P-2

Photomacrography, Pamphlet No. P-53

Photomicrography of Metals, Publication No. P-39

Photomicrography with Simple Cameras, Pamphlet No. N-6

Some Sources of 2x2-inch Color Slides, Pamphlet No. S-2

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