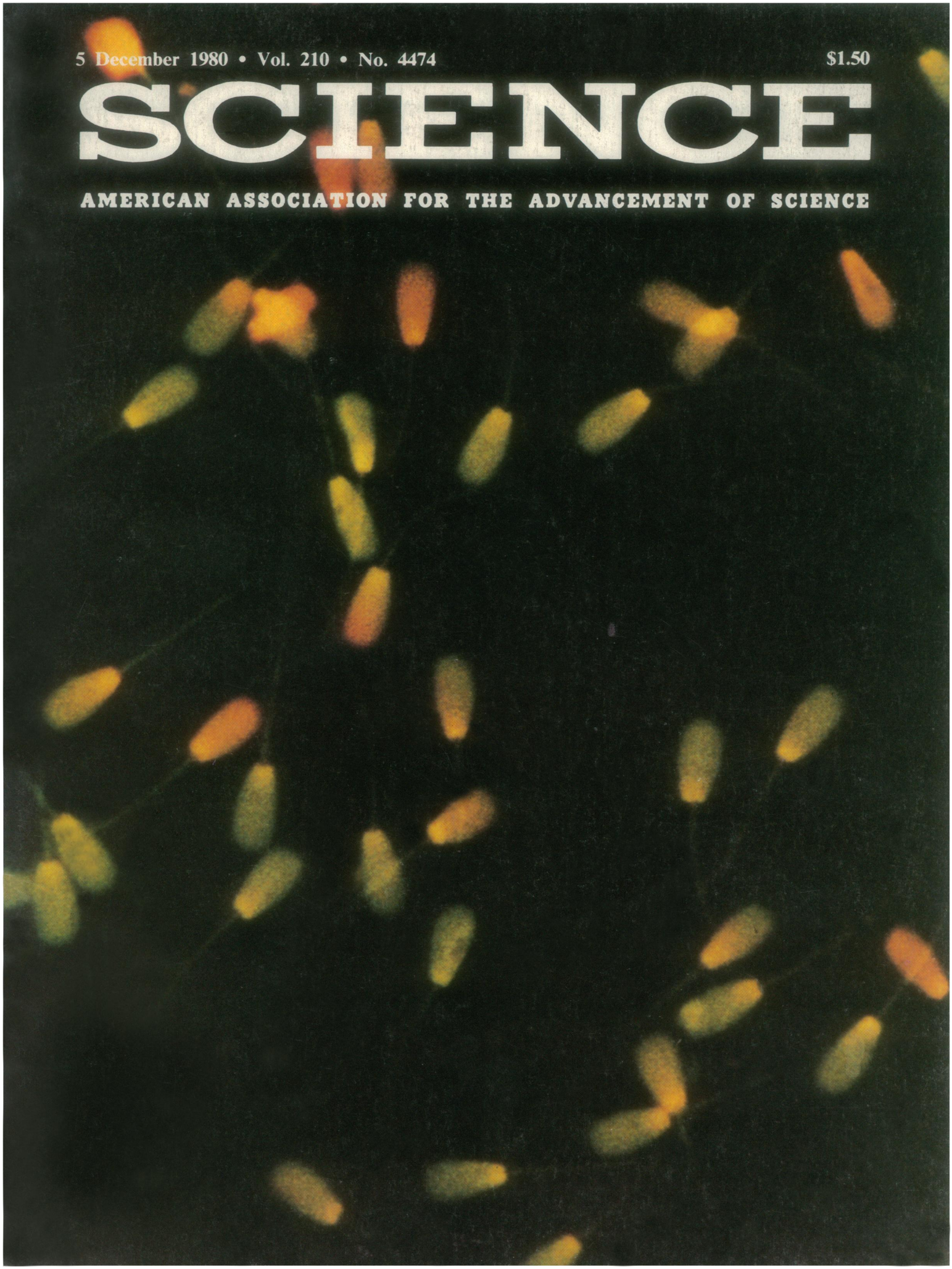
5 December 1980 • Vol. 210 • No. 4474 $1.50

# SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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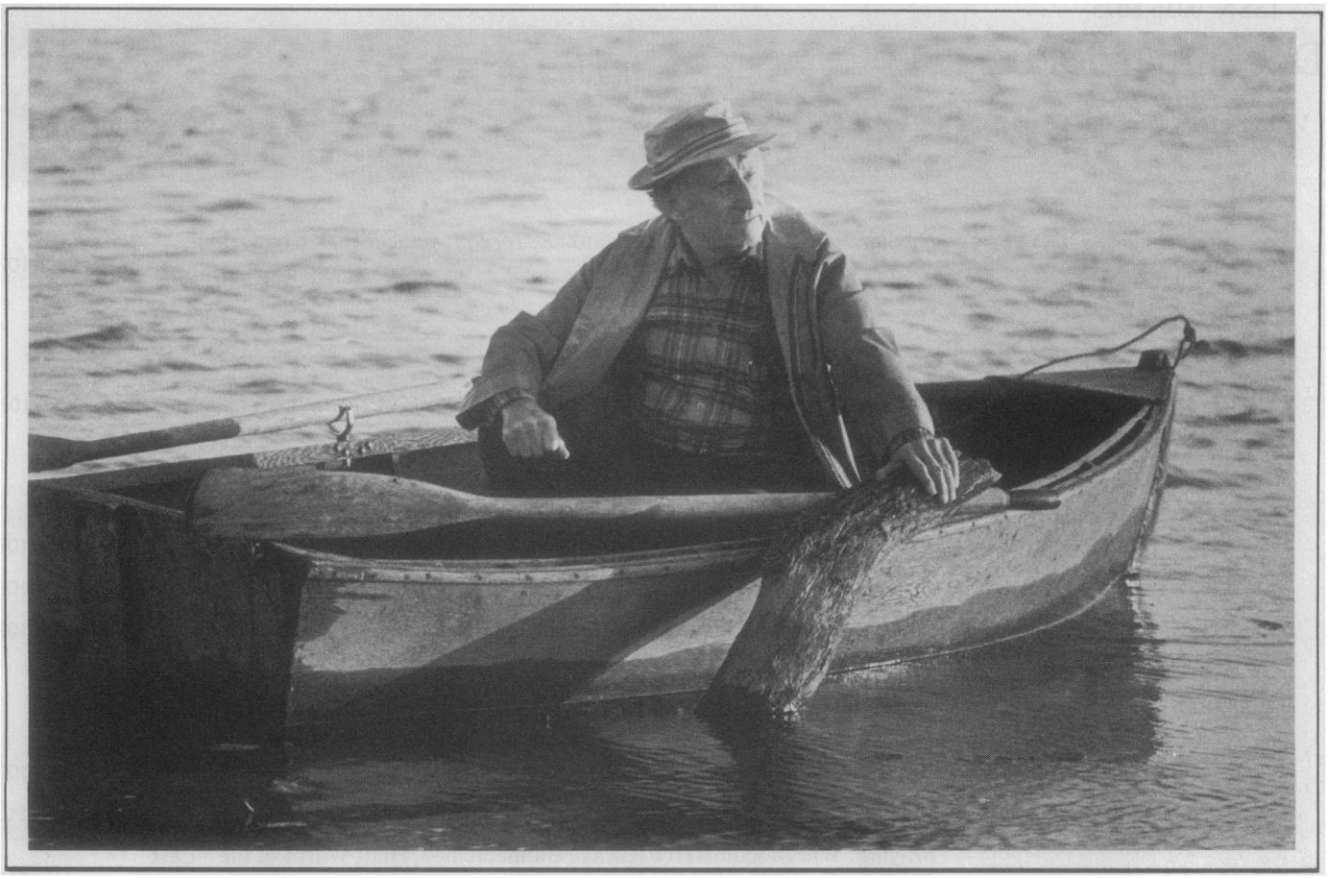

# Some people prefer to push a button and go zipping across the water.

# Some don't.

**If you are that way about photography, write us a letter.**

Although we owe a century of success in business to having made photography blissfully easy, we make no such claim about the film on which this photograph was taken, Kodak technical pan film 2415. It comes in 36-exposure 135 cartridges, 35 mm long rolls, and 4″ x 5″ sheets. Though it is not generally available in 8″ x 10″ sheets, you would judge that it was made with an 8 x 10 camera if the press that printed this magazine did not have to come between your eye and the original print. Such a judgement would be made by a person who looks upon photography as a fine art that goes on making its demands on the photographer *after* the button has been pressed.

Actually, photographer Bob Clemens found an SLR more manageable on the marshy shore than an 8 x 10 view camera would have been. With this film and a special low-contrast compensating developer (which we will tell you how to make up if you write us), he sacrificed nothing to graininess. We estimate that enlargement would have to go to 25X to show the same graininess as an 8″ x 10″ print from a 35 mm negative on Kodak Tri-X pan film.

Seen as a gallery print, this photograph would really show off the breadth of its tonal range. Yet this self-same film is exactly what we recommend for such high-contrast uses as lecture slides to project type matter or a diagram in bright white light on a dark black screen! It's all in how it's handled.

Formerly, this film was available under the designation "SO-115." But not very available, by comparison with better-known Kodak films. Last year's sales figures convinced us how wrong we were in thinking of it as just a technical film for such specialties as sunspots and holograms. Now, as "2415," we've made it an over-the-counter item; but, before shopping for it, request further information from Gordon P. Brown, Scientific and Technical Photography, Eastman Kodak Company, Rochester, NY 14650. Just mention this ad.

Bear in mind, though, that you must enjoy doing what ordinary mortals just don't bother with.

*1880* Kodak *1980*

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# SCIENCE





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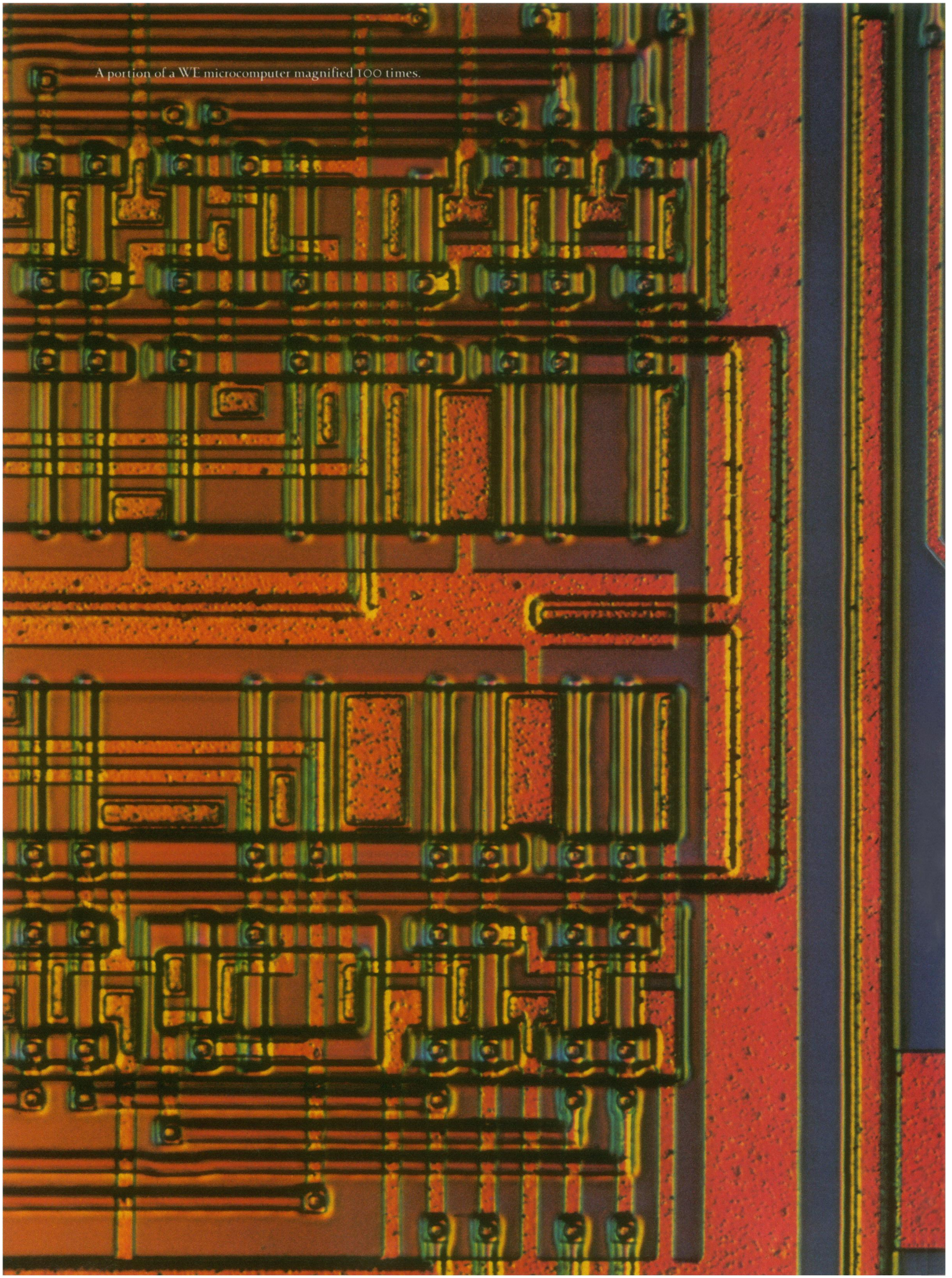
# AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



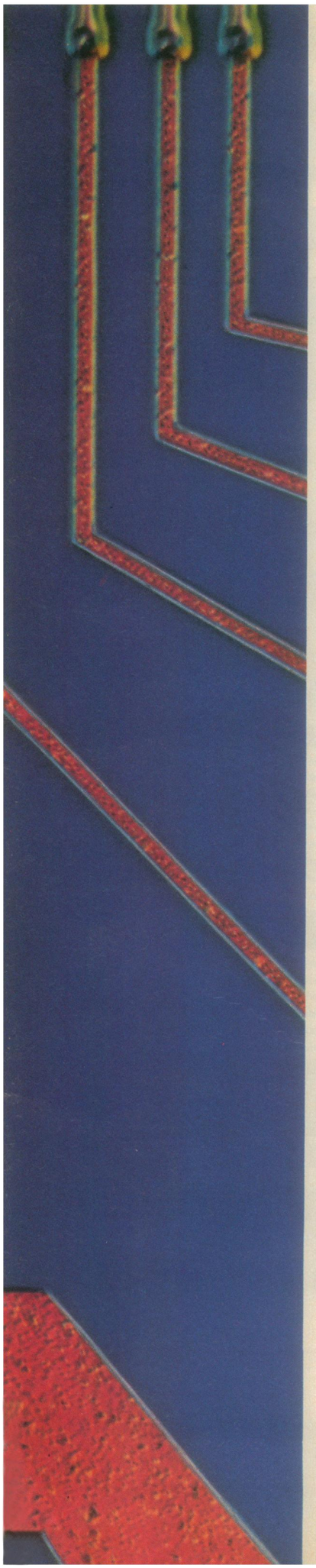


**COVER**

Fluorescence photomicrograph of spermatozoa obtained from a subfertile bull. Cells were heated and subsequently stained with a metachromatic fluorochrome, acridine orange. The orthochromatic green fluorescence represents AO intercalation into native, nondenatured DNA while red metachromasia reflects stainability of DNA denatured in situ. The proportion of metachromatically stained cells was increased in subfertile sample (about × 2000). See page 1131. [D. P. Evenson *et al.*, Memorial Sloan-Kettering Cancer Center, New York]



A portion of a WE microcomputer magnified 100 times.



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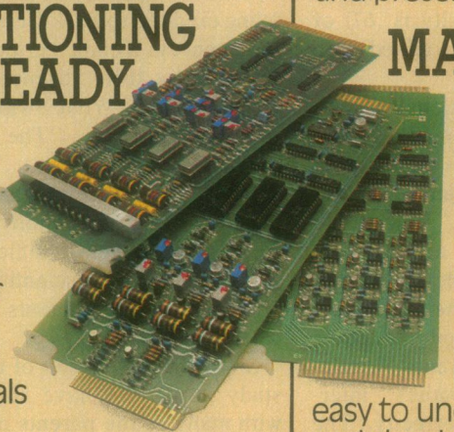

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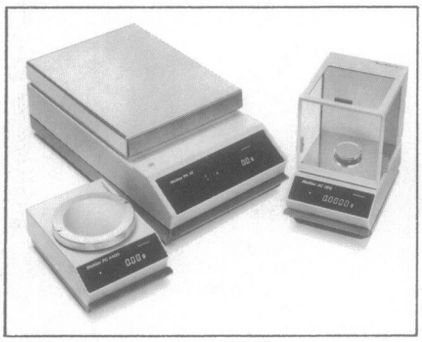

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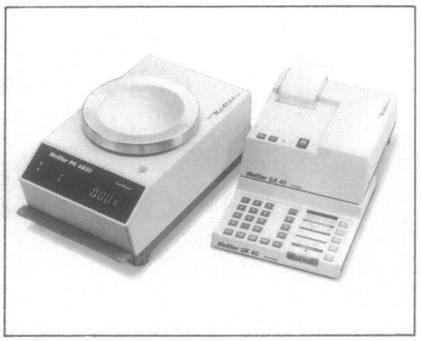

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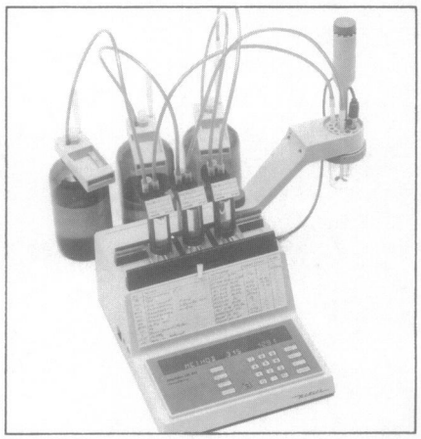

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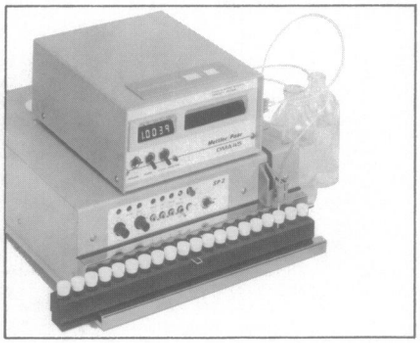

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Scientists interested in presenting poster papers, send abstract to John D. Baxter, c/o Steve Nordeen, 671 HSE, University of California, San Francisco, CA 94143.

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5 December 1980, Volume 210, Number 4474 **SCIENCE**



# America's Vanishing Lead in Electronics

America's scientists, engineers, and entrepreneurs made superb contributions to the electronics revolution, and achieved international commercial leadership in many applications such as television, computers, and communication. Our role in TV production has long since atrophied. Until recently, our status in microelectronics seemed unassailable. But our position is eroding.

Two major factors have been involved in our loss of a clear lead: contrasting policies of the governments of the United States and Japan, and Japanese skills in quality control and robotics. Some years ago the Japanese government determined that a strong position in microelectronics was important for the nation's future. A special fund of several hundred million dollars was made available and the various electronic companies were encouraged to cooperate in advancing the state of the art. (In the United States such cooperation would make the companies targets of the Justice Department.) The companies were also accorded fast depreciation treatment of capital costs for new and expanded production facilities. In a fast-moving field such as microelectronics, production equipment becomes obsolete in a short time. The U.S. government took little heed of what was happening, made no realistic changes in tax policy, and instead persisted in endless, bruising, and enervating antitrust suits against two or our best innovators in electronics—the International Business Machine Company and the American Telephone and Telegraph Company.

Because of financial considerations related to slow depreciation of capital costs, U.S. makers of 16K random access memories (RAM's) did not expand their capacity rapidly enough to satisfy the market in 1977 to 1979. The Japanese moved quickly to fill the gap and now have about 40 percent of the market for 16K RAM's, key components in computers. They did more than produce chips. They produced chips of superior quality.

Testimony in this matter has been provided by Richard W. Anderson, manager of the Data Systems Division of Hewlett-Packard Company.* Hewlett-Packard is the world's largest manufacturer of electronic instruments and one of the three largest users of semiconducter memory in the United States. In 1977, when a shortage of domestic 16K RAM's occurred, they were obliged to turn to Japanese versions. After very rigorous tests, they found that the Japanese 16K RAM's had fewer inspection failures, fewer failures in production cycles, fewer failures in customers' hands, lower rework costs, fewer production interruptions, and lower warranty costs.

I had an opportunity to see something of Japanese quality control at the Matsushita color TV plant near Osaka. At the plant components and products are subjected to accelerated aging tests at extreme temperatures and humidities. Matsushita makes all of its own components and can assure itself that it assembles only parts that are reliable. About 80 percent of the parts for a color TV set are put in place by robots. Their use cut a rejection rate of 5 percent to a small fraction of 1 percent. At the end of the tour, I realized that I had seen only one inspection station—at the end of the line. I asked the official accompanying me why there were no inspection stations at intermediate points. He replied that until a few months ago there were such stations, but they never found any defects and so they were scrapped. When I returned to the United States, I tried to arrange to see a comparable plant here. I was told that none existed.

Visits to other facilities and laboratories in Japan left me with the impression that the Japanese are not supertechnologists. They merely do what is necessary to build things very well. They will be even tougher competitors in the future.—PHILIP H. ABELSON

*R. W. Anderson, "Quality and 16K RAMs: A Hewlett-Packard case history," presented at a seminar sponsored by the Electronic Industries Association of Japan, 25 March 1980, Washington, D.C.

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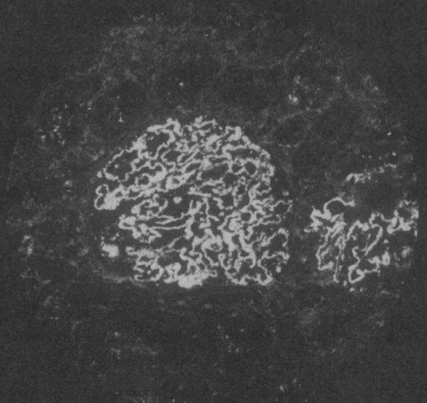

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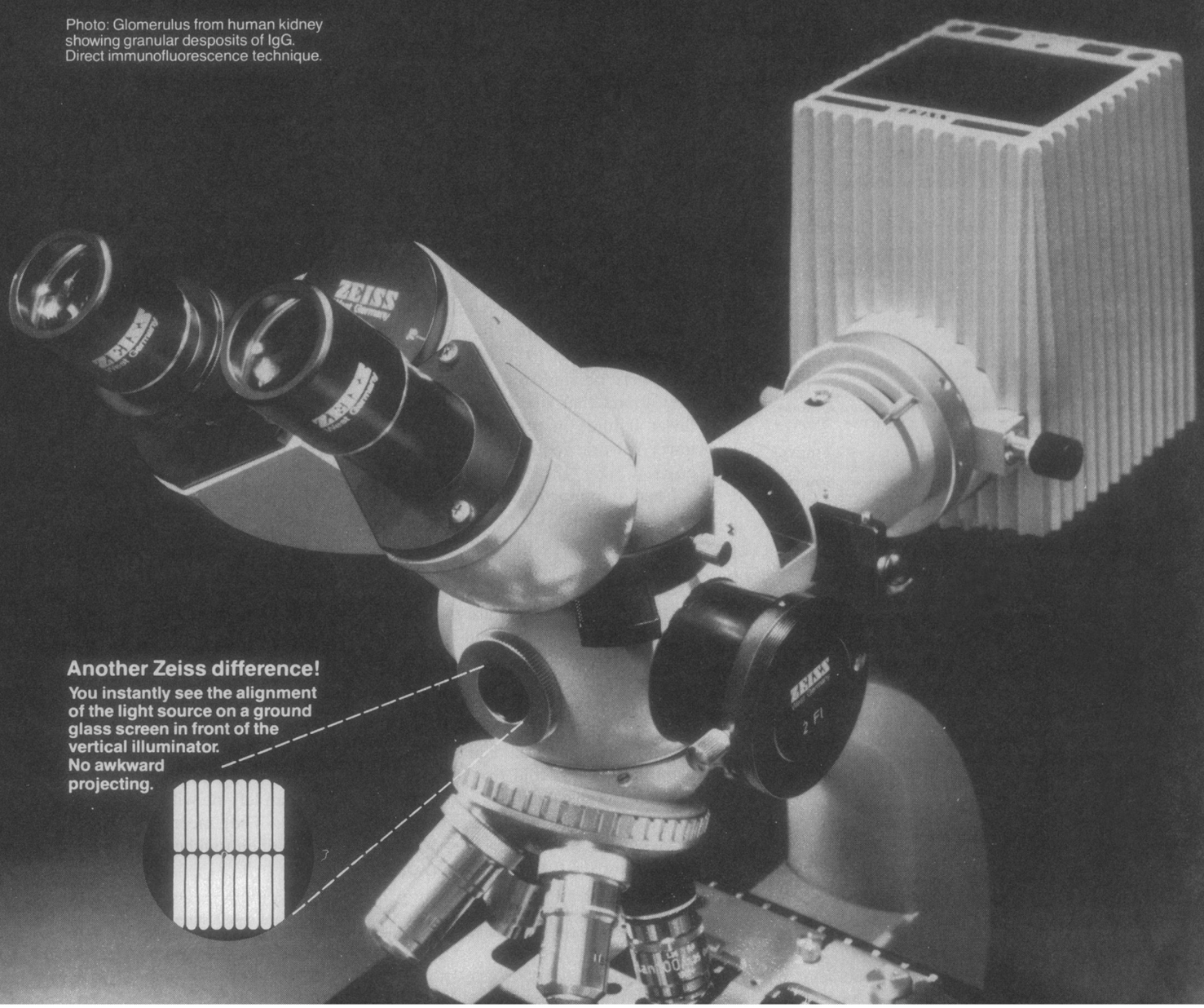
Photo: Glomerulus from human kidney showing granular desposits of IgG. Direct immunofluorescence technique.

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