

MICROPHOTOGRAPHY

Ultraviolet Reveals Details Shorter Than Visible Light

Blurred Ring Becomes Sharp Spines in Highly Magnified Pictures Taken With Short Wavelength Light

A NEW method of taking photographs through the microscope, that will reveal about a fifth again as much as ones taken with ordinary methods, was announced by Dr. A. P. H. Trivelli, of the Eastman Kodak Co., and Leon V. Foster, of the Bausch and Lomb Optical Co., before the Optical Society of America meeting at the University of Virginia last week.

The new method involves taking the photomicrographs with ultraviolet light, which, in itself is not new, but which has formerly required the use of special lenses of quartz or fluorite and special slides for the preparation of the material to be examined. For the short ultraviolet rays formerly used, glass is opaque, and so ordinary glass lenses and slides could not be employed.

Though Dr. Trivelli and his associate use ultraviolet light, they use waves just a little shorter than visible violet light, that is, waves about 1/70,000 of an inch in length. Expressed in the scientist's units for wavelength, this is 3650 angstroms, an angstrom being a ten millionth of a millimeter, or about a 250 millionth of an inch. Visible light includes the range of wavelengths from about 4000 angstroms for the shortest violet rays to around 7000 for the longest red. Ultraviolet light down to even less than 3650 is transmitted by ordinary glass lenses and slides, though very much shorter waves are absorbed.

Mercury Arc Is Source

The source of the light is a mercury arc lamp, giving the purple light often used in photographic studios. As the ultraviolet light is not visible, and it is necessary to focus the microscope, they make use of a band of green light in the illumination for this purpose. Two filters are used. One transmits only this green color, and is put between the light and the microscope when it is being focussed. Then another filter, that transmits only the ultraviolet component of the light, is sub-

stituted and the photograph made. The lenses are constructed so that both the ultraviolet and the green light rays are focussed at the same place.

Dr. Trivelli showed examples of photographs made with the new equipment. One was of hollyhock pollen magnified 300 diameters. With the picture made by ordinary light a gray ring appeared around the grains, but in the ultraviolet pictures this appeared distinctly as a number of sharp spines.

May See Molecules

Ultraviolet photography with the microscope has been used to reveal germs invisible with ordinary means, and with it so much simplified by the method of Dr. Trivelli and Mr. Foster, it is likely that more research workers will be able to use it. The reason that it shows greater detail is found in the short wavelength of the ultraviolet light. The microscope will not show details smaller than the length of a single light wave, so by using shorter waves, smaller things are revealed. With X-rays, far shorter yet, very much

more minute objects might be seen, even the molecules of matter themselves. Unfortunately, no one has yet invented a method of focussing X-rays and so they cannot be used in this way.

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PALEONTOLOGY

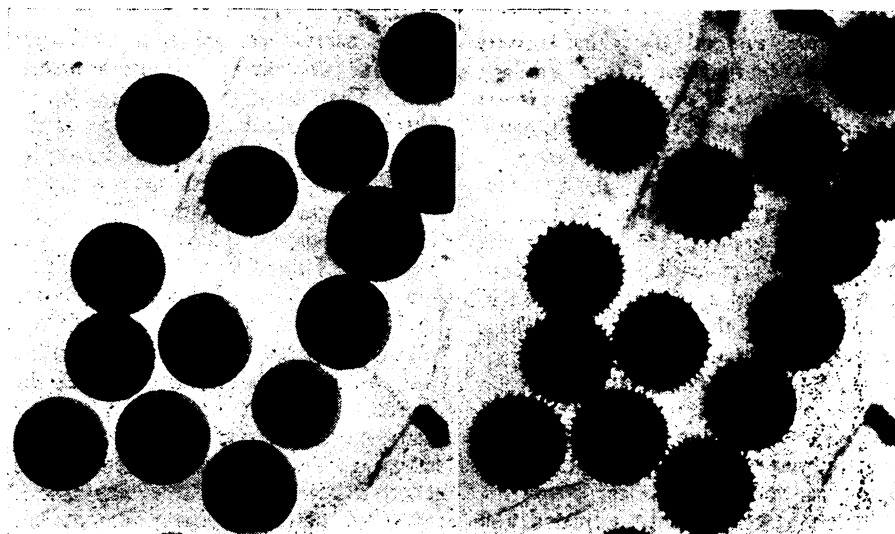
Ice Age Whale Fossils Found in Michigan

EXCELLENTLY preserved fossils of sea-going whales which visited the Michigan peninsula during the ice age have been discovered in two Michigan localities, Prof. Russell C. Hussey of the University of Michigan geology department has announced.

Some twenty to thirty thousand years ago the whales swam inland by way of the St. Lawrence or the Hudson waterway, through the prehistoric glacial lakes and into shallow rivers at the edge of the retreating ice sheet which then covered northern North America. The whales caught in the rivers could not turn around and find their way out, and Prof. Hussey believes they must have died of starvation. Their bones were cast upon the beaches of those times and are found today in gravels.

As found at both localities, one ten miles out of Ann Arbor and the other in Oscoda county in the northern part of Michigan, the bones are bleached white with backbone and ribs perfectly preserved. The University of Michigan hopes to acquire one skeleton for exhibition purposes.

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INVISIBLE LIGHT TOOK THE SECOND PICTURE

The first shows hollyhock pollen, 200 diameters, ordinary light used. The second, in which the blurred rings become sharp spines, is the product of a new method of using light of 3,650 angstroms, a wave length shorter than those of visible light.