PHYSICS

Nobel Prizes Awarded

Dr. Hermann Staudinger wins Nobel Prize in chemistry for his work on high polymers. Dr. F. Zernike awarded Nobel Prize in physics for his development of the phase microscope.

See Front Cover

► BETTER UNDERSTANDING of how cancer cells grow, by allowing scientists to spy upon living body cells in color as they carry on their important life functions, is resulting from the pioneering studies of Dr. F. Zernike, the Dutch physicist who won this year's Nobel Prize in physics.

The new technique of "color staining" living cells by light waves without killing the cells is Dr. Zernike's most recent refinement of the phase microscope, which he visualized and developed about 20 years ago.

Dr. Zernike, professor of physics at the University of Groningen, the Netherlands, since 1920, was visiting professor in physics at the Johns Hopkins University in Baltimore in 1948. He participated in a symposium on optics at the National Bureau of Standards in October, 1951.

The ordinary phase microscope uses two transparent rings to reveal, in black and white, previously unknown details concerning delicate cell structure. Two optical companies—Bausch & Lomb Optical Co. and American Optical Company—now make instruments of this type in the United States. Only a few phase microscopes that work in color are being used in experimental work in this country at the present time.

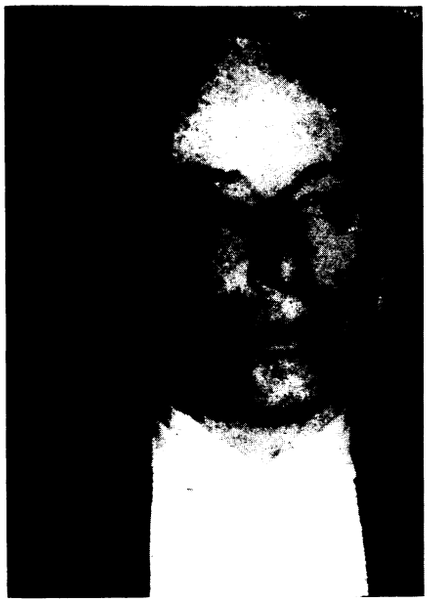
In the black and white phase microscope, a ring separates a small portion of light and distributes it over the whole field of view of the microscope, taking advantage of the fact that light travels in waves. This separated light, spread over the whole image, gives an evenly illuminated background.

The image of the cell being viewed appears bright where the phase of the direct light used for viewing is the same as that of the background light, so that the two light beams reinforce each other. It shows dark when the phases of the two light beams are different, so that by interference they nullify each other.

Rings such as the one shown on the cover of this week's SCIENCE NEWS LETTER cause details in transparent objects to stand out in marked contrast in Dr. Zernike's phase microscope.

In the phase microscope by which cells can be seen in color, the ring that separates the light works in an opposite way in the red end of the spectrum than it does in the green end. Thus it gives some details more red light, some more green, depending on their thickness, enabling scientists to see the living cell in color.

Science News Letter, November 14, 1953



DR. F. ZERNIKE — Awarded the Nobel Prize in physics for 1953, Dr. Zernike visualized and made the first phase microscope about 20 years ago, recently refined it to allow study of living cells in color.

CHEMISTRY

Nobelist Pioneered in Chemistry of Synthetics

► THOSE WONDERFUL synthetic fibers, plastics and rubbers that play such an important role in the modern world owe their existence in large measure to the German chemist, Dr. Hermann Staudinger of the University of Freiburg, who has been awarded the 1953 Nobel Prize in chemistry for researches that began over three decades ago.

Pioneering in what has become known as high polymer chemistry, Dr. Staudinger is credited with establishing that the molecules of the synthetics like nylon have their atoms in long chains. Either by natural processes or by the skill of the chemist's reactions, big molecules are made out of little ones by a process called polymerization. This is fundamental to many fields of industrial chemistry today, with products that gross many millions of dollars.

DR. HERMANN STAUDINGER— Winner of the Nobel Prize in chemistry for 1953 is Dr. Hermann Staudinger, whose work laid the foundation for macro-molecular chemistry, basis of synthetic fibers, plastics and rubbers.

Hardly any scientific compilation on polymers in the years since World War I has failed to give references to the fundamental work of Dr. Staudinger and a host of fellow workers. Some American chemists between the two world wars studied in his laboratories.

A relationship between molecular weight and viscosity was discovered by Dr. Staudinger in 1930 and aided in the development of the new synthetics.

Molecules of the high polymers are composed of 2,000 or more atoms. The way the molecules regiment themselves determines the differences between springy rubber, hard plastic and tough fiber. Natural substances such as cellulose, starch, proteins, chitin and rubber also have the long-chain structure.

Science News Letter, November 14, 1953

PALEONTOLOGY

Museum Gets Spider 250,000,000 Years Old

► A RARE 250,000,000-year-old spider of the hypochilid family has been added to the collection of the American Museum of Natural History in New York. The spider was one of 45,353 specimens of nocturnal spiders, beetles and moths collected by three Museum expeditions this summer.

Science News Letter, November 14, 1953

Permanent *magnets* made of ceramic material have recently been produced.

The *earth* would look 80 times as bright from the moon as the moon does from the earth.