

itively and negatively charged particles.

Dr. Millikan concludes that his researches present strong evidence that all but a small fraction of the cosmic rays observed at sea level by cosmic ray counters and other devices used by other investigators are secondary rays produced within the earth's atmosphere.

Most of the cosmic rays, then, according to his interpretation, enter the atmosphere as photons or radiation like light, X-rays or radium's gamma rays, not as charged particles, like electrons or positrons. The new airplane experiments also lend support to Dr. Millikan's theory that the total cosmic ray curve is to be explained by not less than three and probably four or five cosmic ray bands, corresponding to different colors of light in the visible spectrum. Those rays that reach only the upper part of the atmosphere are, he finds, with energies less than 75,000,000 volts.

Dr. Millikan's experiments were supported by funds of the Carnegie Corporation administered by the Carnegie Institution of Washington. In the sounding balloon experiments he had the full and effective cooperation of the U. S. Weather Bureau, and in the airplane test the equally effective cooperation of the U. S. Army Air Force and the Royal Canadian Air Force.

Science News Letter, May 6, 1933

PHYSICS

Liquid Helium Makes Lead Superconducting

L IQUID helium and superconducting lead were produced at the new cryogenic laboratory of the California Institute of Technology at Pasadena, just six months after the beginning of construction and a year after the project was started.

Prof. A. Goetz found that a thirty-foot coil of fine lead wire suddenly lost all trace of electrical resistance because of its immersion in liquid helium. It remained in this superconducting state for twenty minutes while he and Dr. Alfred B. Focke, research fellow, congratulated each other that the apparatus functioned perfectly as designed and needs no modification.

The new low-temperature laboratory is considered a triumph of thermodynamic reasoning and skilful construction. The method used is a series of adiabatic expansions and this method permits the use of small quantities of helium.

Science News Letter, May 6, 1933

PHOTOGRAPHY

World's Fastest Camera Lens Made For Movies of X-Rays

A CAMERA lens having seventeen times the speed of the fast lens usually used on home movie cameras, or fifty-five times that of the ordinary kodak lens, has just been announced by the Carl Zeiss works, of Jena.

The speed of such lenses is called "relative aperture" which is obtained by dividing the diameter of the lens by the distance to the plate or film when it is focussed on a distant object. The smaller this ratio, the more light is admitted through the lens, and the faster the exposure that can be given. With the same exposure, a picture can be taken in correspondingly poorer light.

Good hand film cameras are frequently equipped with a lens of F. 6.3 relative aperture, while F. 3.5 lenses are used on movie cameras. The new Zeiss lens, which is called the R-Biotar, has a relative aperture of F. 0.85, which means that its diameter is larger than its focal length. It is made of five pieces of glass, and has a focal length (the distance from the center of the lens to the film when focussed at infinity) of 45 millimeters. This is intended for the amateur size, 16 millimeter motion picture film, but it is announced that the same lens will soon be available in a longer focal length for the standard 35 millimeter film.

Deep Focusing Not Needed

The larger a lens is, the less is it able to focus near and distant objects sharply at the same time. This is inherent in any lens, and so the new lens has very little depth of focus, as this quality is called. However, this is not objectionable for the purpose for which it was designed, that is, for X-ray motion pictures. In taking such films, the subject is placed between an X-ray tube and a fluorescent screen, on which his insides are visible as a shadow picture.

A fast lens must be used to photograph the image from the screen, because at best its light is relatively feeble. However, the entire picture being photographed is the same distance from the camera, so great depth of focus is not needed. In ordinary still X-ray photography no camera is used at all. The X-rays, after passing through the sub-

ject's body, fall directly on the photographic film, which must be as large as the part of the body being photographed.

Probably the new lens will be found useful in other fields of scientific photography, where great light gathering power is more necessary than great depth of focus.

Science News Letter, May 6, 1933

GENERAL-SCIENCE

Students Predict Decline Of Western Civilization

IS WESTERN civilization doomed?

A future decline of the culture of the Western world is predicted as probable by two-thirds of the research students of the University of Maine, Orono, Me., who were questioned on the subject by Dr. Nathan Israeli, of the psychological laboratories. The results were reported to the *Journal of Social Psychology*.

Interested in the subject by Oswald Spengler's book, "The Decline of the West," 151 research students in the fields of psychology, history and sociology reported their attitudes toward the likelihood of the collapse of Western culture. Two-thirds are in agreement that the decline of Western civilization is probable.

The debacle will be caused by the following factors, listed in the order of the importance assigned: (1) overpopulation; (2) war; (3) political corruption; (4) moral decadence and irreligion; and (5) overmechanization. Other contributing causes listed include: economic problems; unemployment; luxury; exhaustion of natural resources; inadequate adjustment to an increasingly complex civilization; divorce and family breakdown; urbanization, etc., etc.

The average of the years set for the decline by those students who deem it inevitable is 2160.7, and by those who deem it quite improbable, the year 2312.5. Students who deem collapse in the West least probable defer the average date of decadence to the year 13,634.6.

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