PHOTOGRAPHY

8,000 Pictures a Second

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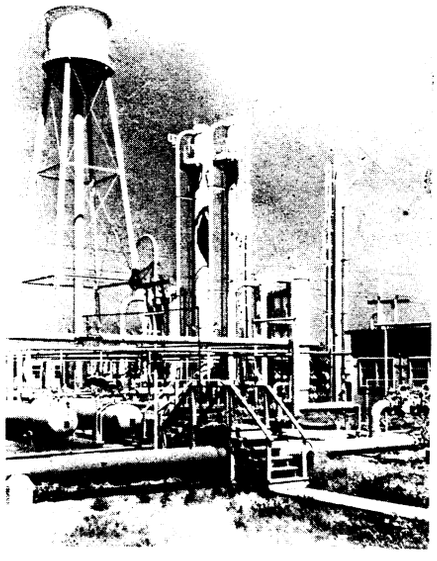
➤ NEW HIGH-SPEED motion picture cameras that will take as many as 8,000 pictures in one second help engineers to see the rapid, complicated movements of their machines "magnified" in slow motion, reported Dr. H. J. Smith, of Bell Telephone Laboratories, at a meeting of the American Society of Mechanical Engineers.

Three new high-speed cameras, developed by Western Electric, use a method of optical compensation to take their pictures. They differ mainly in that they are built to employ different widths of film. The eight-millimeter camera takes 8,000 pictures in one second. The film is the same as used in "double-eight" home movie cameras, Mr. Smith pointed out.



HELIUM EXTRACTION—This imposing array of pipes and towers at the carbon dioxide removal plant represents an important phase at the Bureau of Mines helium plant at Exell, Texas. The plant is the point of origin for a new 2-inch line which permits direct pipe line transportation of helium to the Bureau's Amarillo, Texas, extraction plant or to the Cliff-side natural gas field where an underground helium "warehouse" has been established. (See SNL Mar. 17.)

The exposure time for these pictures is 33 microseconds, and when projected in a standard eight-millimeter movie projector, the pictures are slowed down in the ratio 500 to 1. (A microsecond is a thousandth of a second.)

The 16-millimeter camera, Dr. Smith stated, takes up to 4,000 pictures per second, each picture receiving an exposure of about 83 microseconds. The camera weighs only 35 pounds. By the simple expedient of photographing the action at 4,000 pictures a second, and projecting the pictures at 16 pictures a second on any standard projector, the action that was photographed will be retarded or "magnified" by the ratio of these two speeds, or 250 to 1.

Just recently the Bell Telephone Laboratories has developed a wide angle, 35-millimeter high-speed camera that will take up to 3,500 pictures a second on professional size movie film. Designed primarily for high speed studies encountered in aeronautical and ballistic research, the camera takes a picture with a field of view up to an angle of 40 degrees. This is equal to a 71-foot field of view at a distance from subject to camera of only 100 feet, Dr. Smith declared.

The optical compensation method of high speed photography used in these three cameras, which are sold under the trade name "Fastax," uses a rotating compensating glass prism placed between the lens and the film in the camera, Dr. Smith explained. In the 16 millimeter camera the prism is shaped like a cube, having two pairs of parallel glass faces. This prism is placed inside a housing having four apertures which rotates around the prism. This acts like a barrel-type shutter. The film moves continuously past the picture aperture and four pictures are exposed during each revolution of the prism. The exposure time is controlled by the speed of rotation of the prism housing.

The eight-millimeter camera employs an octagonal shaped prism, having four pairs of faces. The 35-millimeter camera employs a four-faced prism like that used in the 16-millimeter camera, Dr. Smith stated.

The high speed camera used to make slow motion pictures of prizefights, athletic events and horse races seldom run above 128 pictures a second, Dr. Smith advised.

Lighting the subject must be given careful consideration when taking high-speed pictures, Dr. Smith pointed out. Generally speaking, the amount of light required will be in direct proportion to the speed with which the pictures are taken. Thus, about 500 times as much light is needed to take pictures at 8,000 a second as at 16 a second. With a camera operating at 1,000 pictures a second, photo-flood lamps may be used. Pictures can also be taken outdoors in bright sunlight at this speed.

Science News Letter, March 31, 1945

MILITARY SCIENCE

Navy Task Force Lands Fifth Amphibious Corps

See Front Cover

➤ LAUNCHING the Marines in the grimmest battle in a long history of grim battles, ships of a giant Navy Task Force land members of the Fifth Amphibious Corps on Iwo Jima on Feb. 19, as shown in the U. S. Navy photograph on the front cover of this SCIENCE NEWS LETTER.

The pattern is historic; following an obliterating aerial and surface bombardment Marines swarm ashore—to find the Japs have emerged from their well-nigh invulnerable pillboxes and caves to put up a fanatic defense. Battle smoke blurs Navy ships and their targets ashore as the Task Force supports the landing with seaborne artillery.

Science News Letter, March 31, 1945

CHEMISTRY

Continuous-Flow Process For Alcohol Production

➤ A CUBAN inventor, Francisco Alzola of Havana, has received patent 2,371,208 on a continuous-flow process for the production of industrial alcohol, with which he proposes to replace the traditional batch process. His apparatus consists of a series of vats or tanks, into the first of which he introduces the mash of molasses or other carbohydrate, together with the necessary yeast. As fermentation proceeds, the working mash is passed from vat to vat, until maximum alcohol concentration is reached in the last one, when it is withdrawn for distillation.

Science News Letter, March 31, 1945