

## SCIENCE NEWS

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### HIGH-SPEED CAMERAS

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, according to the report of Dr. H. J. Smith, of the Bell Telephone Laboratories, at a meeting of the American Society of Mechanical Engineers.

Three new high-speed cameras, developed by the Western Electric Company, 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. 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 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 have developed a wide angle, 35-millimeter high-speed camera that will take up to 3,500 pictures a second on a 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.

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. 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.

The high-speed camera used to make slow motion pictures of prize fights, athletic events and horse races seldom runs above 128 pictures a second.

Lighting the subject must be given careful considera-

tion when taking high-speed pictures. 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.

### ITEMS

A SAD story of ill consequences following an effort by farmers to do good in their fields is told by Dr. John T. Middleton, of the California Experiment Station at Riverside. A disease of tomato plants that seemed to be a kind of mosaic appeared in certain California tomato fields. Leaves were mottled, fruits few in number and small in size. However, efforts to reproduce it by inoculating other plants with juice from diseased specimens were unsuccessful. When a check-up was made of the history of the fields in which the trouble occurred, it was learned that in every case a chemical weed-killer, sodium chlorate, had been used at some time in the past in an effort to control bindweed, one of the worst of plant pests. The more recent the treatment, the more severe were the symptoms on the tomato plants. However, effects were noted when the last application of the chlorate had been made five years previously.

A NEW pocket-size solar still assures a continuous supply of fresh water to Army and Navy fliers forced down in tropical waters. The still, under average conditions in the Southwest Pacific, can convert salt water into safe drinking water at a rate of more than a pint in eight hours. Under ideal conditions it can turn out almost double that amount in the same period of time. The basic idea for the sunstill, manufactured by the Gallohur Chemical Company, was conceived by Richard Delano, of Locust Valley, N. Y. It actually harnesses the rays of the sun to make drinking water of sea water. The still itself consists of a vinyl plastic envelope folded into a pocket-size package. It is inflated like a balloon and tied alongside the lifeboat or raft, so that it floats on the water. A black cellulose sponge, stretched through the middle of the envelope, soaks up water and absorbs the heat of the sun. Then, through evaporation and distillation, the sea water is converted into safe drinking water. There are no moving parts, and the device will work indefinitely. Until the development of the sunstill there were only four other methods of providing survivors with water—the first essential to their well-being: equipping the craft with canned or bottled water; catching rainwater in a tarpaulin; the use of desalination briquettes, and the squeezing of water from fish. The sunstill has high priority on the list of equipment used for air-sea rescue in the Pacific.