

GENERAL SCIENCE

# Science Enters Olympics

Remote-control gun, sand leveler and an improved photo-finish camera are among the new scientific instruments which will insure a higher degree of accuracy.

► WHEN the athletes of 59 nations line up at Wembley Stadium in London on July 29 for the opening shot of the fourteenth Olympiad, science will be at the trigger of the starter's gun.

This year's Olympic track and field events will be the most scientifically conducted athletic meet ever held. Right down to the construction of the pole vault standards and the leveling of the sand in the broad jump pit scientific ideas have been brought into play to insure the highest degree of accuracy in timing and measurement.

The starting guns will be operated by remote control. In the usual start with a gun in the hand of the starting official, the man on the inside of the 400 meter race, for example, would have heard the shot more than one-tenth of a second before the man on the outside lane. Because this race starts on the curve of the track and is run in lanes, the outside and inside runners are nearly 150 feet apart. The use of remote control firing will make it possible to site the gun equidistant from all runners, while the starter will be free to take up his normal position where he will most easily be able to see all the competitors.

Even the photo-finish movie cameras of the 1932 and 1936 Olympiads are now obsolete and have been superseded by more modern equipment. The improved camera to be used at Wembley will, by an ingenious movement of the film, produce within 90 seconds of the finish of the race a print showing the exact order of the runners as they pass the post. It also will give the exact time between runners.

The judges will have an almost instantaneous photographic record which they can examine right in their stand. In the event of a disputed finish they won't have to go trotting off to a projection room to see a film run off, as was necessary with the old cameras.

In the pole vault, newly designed standards of aluminum will be fitted with pulley and hoist to haul the cross bar back into place. No longer will judges have to perform tricky and precarious feats of balance to replace the bar. The bar, too, is of aluminum and is claimed to be completely non-sag. The standards are fixed with a pointer and a sliding scale registering in meters and feet. They are placed so that officials can read all heights while standing on the ground.

Bumpy sandpits, that old bogey of the broad jump and the hop, step and jump, have been scientifically eliminated. This year the rough judgment of the eye will

no longer be relied upon to check that the entire surface of the sand in the pit is in the exact same horizontal plane as the top of the take-off board. A mechanical leveler, consisting of a metal scraper which slides on rails, will dish up a surface on which not one grain of sand will be out of place.

Scientific precision will also be observed in the measurement of jumps. The sand used will be moulding sand as used in iron and steel foundries. This will take a firm, clean-cut impression of the jumper's heel. Then a hinged frame, sliding on a metal runway fixed on a concrete base at the side of the jumping pit, will carry a hair-line which can be lowered exactly over the back edge of the heel imprint. As a final precaution, a special no-jump indicator will show if the jumper steps over the take-off board—like the "TILT" indicator on a pinball machine.

In the throwing events, too, the judges' task has been considerably lightened and the degree of accuracy of measurement greatly increased by a bit of scientific application. Measurements for the hammer, shot and discus will no longer have to be carried back to the throwing circle. Accurately placed pegs will describe a series of parallel arcs at suitable distances from the circle. Over the pegs will fit a special arc-shaped framework and it will be from this framework arc that the distance is measured. In this way only a very short distance will have to be measured, making for greater accuracy. A special device will insure that the steel tape measure is at right angles to a tangent drawn on the datum line arc so that the shortest distance between arc and throw mark is measured.

Here are some of the other applications of science to the Olympic games:

An electric timing device will be used in the rowing events.

A new type of starting block will be individually adjustable to the taste of each runner.

Standards and bar of the high jump will be of weatherproof, non-warp, non-sag aluminum.

Hurdles have been redesigned of tubular aluminum. They will fold flat for storage and, in use, will be adjustable to 2 feet 6 inches, 3 feet, and 3 feet 6 inches, as may be called for by the event. They will be accurately weighted to meet the prescribed eight pounds "toppling force" requirement at each height.

The Olympic Committee of the XIVth Olympiad is using science to make the Olympics a more accurate meet.

Science News Letter, July 17, 1948



**STRESSES AND STRAINS**—These are revealed by use of plastic counterparts in operating machinery which can be examined under polarized light.

ENGINEERING

## Plastic Affords Inside View of Deformities

► INSIDE views of stresses and strains in operating machinery are made possible by the temporary use of plastic counterparts long enough to make interior records for later study.

The deformities are examined at leisure by use of polarized light, and they appear as a series of colored lines. Not any plastic may be used. The satisfactory kind is a new type developed by Westinghouse research engineers. It can be molded and cut into exact models of tools and machine parts, and it can be cast into chunks from ten to 20 times larger than any resin available formerly for such strength tests.

Stresses in a rotary shaft, nuts and bolts, crane hooks and other parts can be studied. To determine where a crane hook should be strongest, an exact model of the hook is made in the plastic. This is heated to about the boiling point of water, and any block of the desired weight is hung on it. The hook, with the weight on it, is then allowed to cool to room temperature.

By this process the distortions due to the load are "frozen" in the translucent plastic hook.

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*Meteors*, often called falling or shooting stars, are pieces of stone or iron that enter the atmosphere and burn, heated by the friction of the air; they travel some 60 miles a second, the glow becoming visible about 60 miles above the earth.