

have shown that the temperature diminishes to about minus 67-degrees Fahrenheit at a height of 8 miles and then remains sensibly constant up to the greatest heights reached. Moreover, it is difficult to see why there should be a rise in temperature at greater heights, unless the upper layers of the stratosphere are more strongly heated by the sun's rays.

To test this temperature theory, experiments were made in the polar regions during the polar night 1932-33. Twenty-eight explosions were set off, using 13,500 pounds of explosives. The return sound was heard despite the fact that the sun's rays had not reached the air at a height of 65 miles for six weeks. The delay in the sound was about the same as in middle Europe, so that the sound must again have reached this height before returning earthward.

The conclusion drawn was that if there is a rise in temperature in the upper stratosphere, it cannot be due to the sun's rays. It might be due to the cosmic rays or to the ozone layer.

*Science News Letter, July 28, 1934*



**A HIGHWAY MODEL**

*This model of a highway is very lifelike even to the pedestrian and the dog. It is built to a scale of one-eighth, its 240-foot length representing a 2,000-foot stretch of highway. The purpose of the model is the comparison of tungsten-filament illumination with the more recently developed sodium-vapor and mercury-vapor lamps as sources of light in research conducted by the General Electric Company.*

ASTRONOMY - METALLURGY

## Scratch-Proof Mirrors Made for Telescopes

**A** NEW improvement in the coating of mirrors for astronomical use with aluminum wherein a hard, tenacious, nontarnishing and highly-reflecting surface is attained is reported by Robley C. Williams of the physics department of Cornell University in a letter to the Editor of the *Physical Review*.

Carefully cleaned mirrors are coated with chromium by evaporating the metal on the glass surface. Onto the thin chromium layer is evaporated a film of aluminum sufficient to produce an opaque layer. When washed with alcohol and water such laminated films have remarkable properties, Mr. Williams reports.

Rubbing the film with a blunt steel instrument or even steel wool affects the layer only slightly. Rubbing the film with cheesecloth as hard as possible by hand reduced but little the reflecting power of the layer. Even when kerosene soot containing sand and grit was placed on the film and then cleaned off with alcohol and water 20 successive times only slight surface scratches were

observed. The same test for a hardened aluminum film alone showed comparable scratching with only four washings. So tenacious is the layer that several kinds of adhesive tape attached on the film may be ripped off without bringing the film away also.

The film of chromium and aluminum, reports the Cornell scientists, is essentially an aluminum film as far as mirror optics are concerned for the aluminum is evaporated on thickly so that it alone causes reflection. The backing layer of chromium is employed to gain the properties of adhesiveness and hardness.

The Cornell work is the latest in the rapidly expanding field of covering mirrors for astronomical and other scientific work with coatings of aluminum having superior properties of reflection in certain portions of the spectrum.

Engaged in this field of research are three groups of workers; the Cornell University group including S. L. Boothroyd, H. C. Ketcham, R. C. Williams, and G. H. Sabine; the California Institute of Technology group including Dr.

John Strong and Dr. C. H. Cartwright and the University of California at Los Angeles group headed by Dr. H. W. Edwards.

The largest mirror so far coated with aluminum is the 36-inch diameter Crossley reflector at the Lick Observatory of the University of California, which was coated by Dr. Strong. While no predictions are being made it is hoped that the process will be sufficiently well developed so that by the time the great 200-inch mirror now being built for California Institute of Technology is complete, it too may be given a coating of aluminum.

*Science News Letter, July 28, 1934*

### HUNTING EARTHQUAKES

an address by

**Rev. Joseph Lynch, S. J.**  
Professor of Physics and  
Director of the Seismic Observ-  
atory, Fordham Univer-  
sity

Wednesday, Aug. 1, at 3:30  
p. m., Eastern Standard  
Time, over Stations of the  
Columbia Broadcasting Sys-  
tem. Each week a prominent  
scientist speaks over the  
Columbia System under the  
auspices of Science Service.