



**TWO-HORNED RHINOCEROS**—Josephine, the two-horned black African rhinoceros recently received at the National Zoological Park, weighs about 800 pounds and is about two and a half years old.

## ENGINEERING

## Trolleys More Economical Than Buses, Study Shows

► **TROLLEY COACHES** are more economical to operate than motor coaches, a 15-year study has revealed.

L. W. Birch of the Ohio Brass Co., Mansfield, Ohio, reported to the American Institute of Electrical Engineers meeting in Atlantic City that a survey of 14 transit companies showed trolleys averaged at least 3.5 cents less to run per mile than buses.

Chief advantage of the trolley is that it can be left out in the open during bitter winter weather. Buses must be garaged. Trolleys have a 15-year depreciation, whereas buses have a life expectancy of about 10 years.

Buses, however, are cheaper to operate from the fuel standpoint. They cost about 4.28 cents per mile. Trolleys consume about 5.22 cents of electricity per mile.

Science News Letter, June 27, 1953

## PUBLIC HEALTH

## Silicone Cream Protects Skin

► **SILICONE FLUIDS** are widely used in industry, and now one of them, polymethyl siloxane, has been made into a cream to protect the skin of industrial workers.

Good results with the cream in a trial in one industrial plant were reported by Dr. Raymond R. Suskin of the University of Cincinnati College of Medicine at the meeting of the American Medical Association in New York.

The cream is made with 52.5% silicone fluid mixed with the inert clay, bentonite. It can be put on the skin as a thin, inconspicuous film at the beginning of the work day and removed at the end of the work period. No harmful effects from it were seen after seven months continuous use.

Science News Letter, June 27, 1953

## ENGINEERING

## Tiny Motor to Power Aircraft Instruments

► A **TINY** electric motor that you can mail for six cents has been designed to fit into standard aircraft instrument cases only two inches in diameter.

Smaller than most women's thumbs, the precision induction motor is only 1.2 inches long,  $\frac{3}{8}$  inch in diameter and weighs about an ounce. Its spinning armature has about the same diameter as a pea.

L. T. Akeley and J. R. MacIntyre, General Electric Co. engineers, told the American Institute of Electrical Engineers meeting in Atlantic City that the motor works on two-phase, 400-cycle current, and that it has exceptional acceleration, stall torque and efficiency.

Science News Letter, June 27, 1953

## CHEMISTRY

## New Synthetic Rubber

Polyester rubber, made from chemicals other than those used presently in synthetic rubber, is developed. The material is tough with reinforcing agents.

► A **NEW** synthetic rubber has been produced by research that does about everything that other man-made rubbers do and outdoes the rubber tree as well — for tire treads, for inner tubes, for oil resistance, for resistance to aging due to oxidation, for toughness against cuts and gouging.

It is polyester rubber, not made from the chemicals used for the nation's present supply of synthetic rubber. N. V. Seeger of the Goodyear Tire & Rubber Co., Akron, Ohio, told the American Chemical Society's rubber chemistry division meeting in Boston of the researches done by himself, T. G. Mastin, E. E. Fauser, F. S. Farson, and E. A. Sinclair.

Polyester rubber has twice as great abrasion resistance as the best cold rubber now used for long-wearing tire treads. It is comparable to butyl rubber for holding air in inner tubes. It stands up against oil as well as neoprene and resists oxidation with the best butyl and acrylate rubbers. Its tensile strength is 50% to 100% greater than any other type of rubber-like material.

Coatings of the new rubber can be applied to protect shoe soles and heels, belts, flooring and truck tires that receive hard wear. The

Goodyear name for the new rubber is Chemigum SL and it is described as an elastomeric polyester urethane.

The basic ingredients of polyester rubber are ethylene glycol and propylene glycol, familiar as antifreeze fluids. These are mixed with adipic acid, an intermediate in the production of nylon, and the resultant chemical is the polyester base of the new rubber.

This polyester is then treated with the chemical diisocyanate in an amount determined by the "reaction factor," the secret of the Goodyear development. This stops the solidifying reaction of the chemicals at a point where the mixture is just solid enough to be further processed into shapes in conventional rubber processing equipment.

When needed in the production of final assemblies, the rubber is given another diisocyanate treatment and formed into shape without the use of sulfur or accelerators for vulcanization. Carbon black and other reinforcing agents are not required to toughen the compound, although they may be used if desired.

Science News Letter, June 27, 1953