

than the population has. In 1960, 61.9% of all housing units were lived in by the owners. In 1950 only 55% of all housing facilities were home-owned.

The five cities having the largest land area are: Los Angeles, 454.8 square miles; Houston, 328.9; Oklahoma City, 321.5; New York City, 315.1; Hilo, Hawaii, 292.4. Of these, New York has 24,697 persons to the square mile whereas Hilo has only 89.

The five most populated cities are: New

York with 7,781,984; Chicago, 3,550,404; Los Angeles, 2,479,015; Philadelphia, 2,002,512; and Detroit, 1,670,144.

Girls and women outnumber boys and men, except in the Mountain and Pacific states and the Dakotas. In Alaska, women are outnumbered: there are 132.3 men for each 100 women. At the other extreme, Massachusetts has only 93.4 men for each 100 women.

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#### INVENTIONS

## Patents of the Week

**A rocket launching and fire control system to make interceptor attack aircraft more maneuverable, versatile has been patented. A new radiation shielding material was made.**

► AN IMPROVED rocket launching and fire control system, aimed at boosting the maneuverability and tactical versatility of rocket-armed interceptor attack aircraft, has been patented by four Californians.

Rights to patent No. 2,992,423 were assigned to Hughes Aircraft Company, Culver City, Calif., by inventors George F. Floyd of Rolling Hills, Jack Howard Irving of Santa Monica, Harold R. Kaiser, Woodland Hills, and Ruben F. Mettler, Los Angeles.

The system features a computer-run fire control mechanism capable of directing attacks against bombers or other aircraft "from any direction, and from above or below the target." Split-second accuracy would enable interceptor planes to fire rockets at target craft broadside, rather than being limited to the conventional tail-zone attack course. The target would be bigger and the danger from return fire less.

Computers in the attacker craft would produce signals from tracking radar to guide the craft by the shortest possible route to a correct launching position and fire the rockets. Pilot errors and maneuvering effects would be automatically corrected by continuous recomputation.

Adding a barium sulfate aggregate to the cement, sand and water normally used in concrete mixes gives a shielding material effective against neutron radiation, according to inventor Dr. Lyle B. Borst of New York University. He won patent No. 2,992,175 for the material, described as capable of "slowing down fast neutrons as well as shielding against gamma radiations." Rights were assigned to the Atomic Energy Commission.

The use of a drug compound that reportedly controls epileptic seizures is the subject of patent No. 2,992,163, obtained by Nelson R. Easton, Indianapolis, Ind. The patent covers both the treatment process and "a solid pharmaceutical dosage form for oral administration." Rights were assigned to Eli Lilly and Company, Indianapolis drug manufacturers.

The compound bears the technical name 4-chloro-1,2-pyrazole. Its anticonvulsant action has been successfully tested with adult epileptic patients given daily doses varying

from 50 milligrams to two grams, the inventor reported.

A mechanical chicken plucker capable of defeathering the birds in batches of 12 or more was given patent No. 2,991,497. Inventors Robert W. McKinley and Joseph Howard Ernestes, Greensburg, Ind., assigned rights to the Ashley Machine Company, a Greensburg firm. The concept is not new, but a previously patented feather picking machine handled only one bird at a time, with the operator required to hold the bird. The McKinley-Ernestes device provides for an automatic operation with the birds "confined loosely in batch formation."

Freshly scalded poultry is dropped into a stationary chamber containing a rotating drum, its surface sloped so that small birds fall to the bottom and larger birds stay near the top. Both the inner surface of the chamber and the outer surface of the drum are covered with flexible rubber "fingers." When the drum starts spinning, its fingers remove the feathers through rubbing or stripping action. At the same time, the fixed fingers on the chamber wall slow the speed of the birds but keep the entire batch in a state of agitation.

The machine is adaptable to ducks, turkeys and other fowl, its inventors claim.

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#### SPACE

## Pilots Learn to "Fly" Rings Around Moon

► PILOTS HAVE LEARNED to "fly" rings around the moon.

This was done while "flying" a space craft simulator in an attempt to find out if a pilot could change his flight path as he approached the moon from earth.

The paths of the simulated space ship "shot toward the moon" were set to miss the moon surface by 40 to 80 miles at speeds of from 8,200 to 8,700 feet per second at closest approach.

The pilot was given control of the thrust and torques about all three axes of the craft. The pilot saw a graph of the vehicle rate of descent and circumferential velocity, an altimeter, and vehicle attitude and rate meters.

The pilots soon became adept at "flying around the moon" and learned to establish orbits within a range of 10 to 90 miles above the lunar surface. M. J. Queijo and Donald R. Riley of Langley Research Center, Langley Field, Va., reported to the National Aeronautics and Space Administration.

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#### TECHNOLOGY

## "Flash Evaporator" Produces Fresh Water

See Front Cover

► A NATIVE in Kuwait drinks fresh water produced from sea water by a "flash evaporator" seen in the background of the cover of this week's SCIENCE NEWS LETTER.

A new distillation plant ordered from Westinghouse Electric Corporation, Pittsburgh, Pa., for the Arabian Oil Company will produce 500,000 gallons daily and bring the capacity of the desalting units in the Kuwait area to 5,230,000 gallons a day—the largest concentration of sea water units in the world.

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#### PUBLIC SAFETY

## Urges Making Autos Safe for Accidents

► ENGINEERS should try to design an automobile "safe to have accidents in" under normal conditions of daily use, an accident causation expert with the New York State Department of Health said.

If automobile occupants "were properly packaged, instead of riding like a teacup in an empty barrel," deaths and injuries would be substantially reduced, Dr. William Haddon Jr. of Albany, N. Y., said.

He pointed out that design modifications could eliminate such injury-causing protrusions inside automobiles as knobs, screws and sharply hooded projections above instrument panels. He also quoted a medical textbook citing the fronts of some modern autos as close approaches to an ideal design for "a pedestrian-injuring mechanism."

Dr. Haddon said four percent of all vehicles manufactured strike and injure pedestrians during their period of use, and between one-fourth and two-thirds of all vehicles are involved in accidents in which their occupants are injured or killed.

Safety measures have to be devised that depend on "passive acceptance" by the public, rather than "any degree of continued, active cooperation," he believes. The advance engineering approach is more effective than safety education, just as putting fluoride into public water supplies to prevent tooth decay is more effective than trying to get parents to give their children fluoride pills daily.

"The claims made for highway safety activities are being found to be very largely based on inadequately documented opinion and not on even reasonably scientific evidence," he told the Society of Automotive Engineers in New York.

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