

source of marine power in 10 to 15 years, predicts C.G.A. Rosen of the Caterpillar Tractor Company. Nuclear power for military but not for commercial aircraft is within the "foreseeable future," but he considers the outlook dim for nuclear-powered locomotives and vehicles.

The combination of gas turbine and nuclear power is not expected to be used for cars or military automotive equipment, mostly because of its weight. A nuclear power plant would be saddled with about 20 pounds of reactor shielding per horsepower and this does not include the weight of the engine.

Solar-powered vehicles are still too far in the future to make definite predictions, but designers admit that use of the vast amount of solar energy falling on the earth is not impossible. In the geographical area of the U.S. alone, as much as 2,000 times the daily energy needs of the U. S. falls as solar energy.

Flying Station Wagons

Future cars, buses and lifting equipment may operate in the air, not on the ground, if the "aerial jeep" under development for the Army Transportation Corps becomes available to the public.

The flying cars make use of "ducted fans" to lift them smoothly and easily into the air. Ducted fans are simply propellers with wings wrapped around them. They look like "flying barrels." The prop blast is directed downward, making it possible to lift heavy objects directly, as a helicopter does.

The aerial vehicles are expected to look much like regular cars, but be flatter and wider to accommodate two to four ducted fans located in conventional tire positions. The vehicles, being designed for the Army as personnel carriers, flying gun and observation platforms, flying cranes and rescue cars, are expected to be able to lift 1,000 pounds as high as a helicopter could and travel at speeds of 50 to 60 miles an hour.

One manufacturer, among the four contracted by the Army to develop the "aerial jeep," envisions the future civilian use of the vehicle as the "station-wagon of the future."

The old reliable conventional piston engines are also in for some improvement.

Fuel Injection Predicted

Fuel injection is becoming more popular with manufacturers as better designs make the system more dependable for gasoline-type engines.

While diesel engines rely upon a type of fuel injection as part of their construction, gasoline engines must be especially fitted for fuel injection. The reason is they were originally designed to have the fuel-air mixture from the carburetor sucked into the cylinder by the action of the piston, not forced in as a pressurized, pre-mixed spray, as in the fuel injection system.

Fuel injection is expected to make gasoline engines more powerful for their size and more efficient. The carburetor is not needed, and the engine can be started cold.

Fuels for the combustion engines of the future may have to pack more power in a smaller volume. For conventional piston-type engines, gasoline is expected to be refined up to 110 octane by 1960.

Some buses and trucks are already running on a fuel called "LPG" or liquefied propane gas.

Fuel-grade propane gas is a mixture of hydrocarbons, similar to natural gas. Propane gas is commonly found as the pressurized fuel gas in small hand blowtorches used for soldering purposes.

When liquefied, propane gas can be a highly efficient fuel if it is burned in properly modified internal-combustion engines. The gas burns clean with an almost invisible, odorless exhaust, forms very little engine deposit and does not burn the oil film on the cylinder walls.

Using LPG also saves considerable money. One bus company fueling their vehicles with the gas reports a savings of about \$2,200 in fuel and upkeep on each bus.

Making use of better fuels, small size, better efficiency and light weight, industrial power plants of the future will be better fitted to deliver power efficiently and cheaply, with the minimum of maintenance.

Science News Letter, November 9, 1957

A series of *stalactites* in the Luray Caverns of Virginia has been "tuned" by grinding away portions of the surface so that they produce organlike music when struck with rubber-tipped hammers.

MEDICINE

Backaches Come From Unsolved Problems

➤ BACKACHES are mostly caused by failing to come to terms with everyday emotional problems, Dr. T. H. Holmes, University of Washington, Seattle, told the Academy of Psychosomatic Medicine meeting in Chicago.

Controlled tests have shown that too much muscle function and electrical activity usually accompany low back pain, and the pain is always set off after the patient's security has been threatened.

Backache is a reaction that sets in when a person tries to solve a "life situation" and does not succeed, the psychiatrist reported.

Chief causes of these insecurity feelings include conflict, anxiety, frustration, humiliation and guilt. The pain they cause may show up in the back, neck or extremities when these interpersonal and social reactions are not properly dealt with.

Available evidence points to the fact that the element potassium is the pain factor in backache. When intense muscle activity continues there is a gradual accumulation of the chemical in the tissues. After the concentration has become high enough, the pain threshold is exceeded and the result is a common backache.

Science News Letter, November 9, 1957

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