TECHNOLOGY

Nickel Base Alloy Adds Thrust to Jet Engines

➤ THE TRANSCONTINENTAL flight record of three hours, 45 minutes and 30 seconds recently set by three Navy Cougars was partly made possible by a nickel-based alloy that permitted their turbojet engines to deliver greater thrust than previously.

The alloy, Pratt & Whitney Aircraft engineers believe, possesses greater heat-resisting qualities at operating temperatures of 1,500 to 1,600 degrees Fahrenheit than any other wrought alloy known.

The material, designed to resist "metal fatigue," stretch and rupture, is being used for turbine blades in the Air Force's Starfires, and the Navy's Panthers and Cougars.

The basic formula for "Waspaloy," as the material is called, was worked out by R. H. Thielemann, development metallurgist at Pratt & Whitney, who used ingredients most of which are readily available in North America.

Mr. Thielemann used nickel for a base and added chromium, cobalt, molybdenum, and small amounts of titanium and aluminum. All these metals, except cobalt, are abundant in North America.

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PLANT PATHOLOGY

Wonder Drug Prevents Wilt of Chrysanthemum

➤ BACTERIAL WILT disease of chrysanthemums can be controlled by use of both streptomycin and oxytetracycline, or Terramycin.

The antibiotics were applied by holding cuttings in solutions containing the materials, planting in antibiotic-treated sand, and adding antibiotic material to rooting hormone powder.

Tests by the New Jersey Agricultural Experiment Station at Rutgers University showed that amounts of antibiotics were sufficient to give protection to the plants that developed from the treated cuttings.

Streptomycin was more effective than oxytetracycline, since it provided protection at lower concentrations and was less toxic.

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ZOOLOGY

NATURE RAMBLINGS

Toads and Frogs

➤ BOOKS GIVE various clues whereby the layman can distinguish toads from frogs. In general, toads are predominantly landlubbers with bumpy dry skin and broad plump bodies. Frogs are generally aquatic with smooth moist skin and more streamlined bodies.

However, there are so many exceptions in each particular that the distinction often disappears. Both frogs and toads are amphibians, a class they share with newts and salamanders.

The name amphibian comes from a Greek word meaning living a double life. Amphibians are equally at home on land or in the water. This versatile ability to thrive in either element is nowhere more startlingly demonstrated than in the tadpole stage of frogs and toads.

When a frog egg hatches, the newborn offspring is a strange-looking little creature that seems to be a tiny fish. It swims like a fish and it has gills that enable it to breathe like a fish. But in the course of a few weeks the tail grows longer and hind legs begin to develop. Eventually the two forelimbs, which have been forming unseen beneath the skin, are pushed out through the gill slits.

By now it has ceased to be an exclusively aquatic creature and is well on its way to fulfill its destiny as an adult frog or toad. It develops lungs. The tail, which at this stage is less a swimming instrument than a food reservoir to tide the youngster over the transition period, gets slowly smaller and smaller until it disappears altogether.

Since most waters abound with predatory enemies which spend the better part of their time cruising about looking for a bite of lunch, the life expectancy of tadpoles is not very high. To compensate for this, nature produces tadpoles in great numbers so that enough will survive into maturity to insure the perpetuation of the species.

Some frogs skip the tadpole stage entirely. There is one African frog which carries its fertilized eggs in its mouth, not eating until the baby frogs are hatched out. Some Latin American species carry the tadpoles on their backs, affixed by specialized sucking mouths.

One of the most remarkable is the Surinam toad of Brazil and the Guianas. Its back looks as though it had caught a shotgun blast, being pockmarked with innumerable hollow cavities. By dint of the most strenuous cooperation of the male, the fertilized eggs are forced into the pockets. In time the eggs hatch out, and the youngsters play mid-wife to their own births, clambering into life on their own power as they squirm out of their mother's back.

Science News Letter, July 24, 1954

PUBLIC SAFETY

25-City H-Bomb Raid

➤ THE PARALYSIS and death of the American nation would follow a 25-city Soviet air raid any time within the next three years, the *Bulletin of Atomic Scientists* (June) predicts.

"The obliteration of the central national government, combined with the destruction of emergency staffs in the target cities," the publication charges, "would leave the country with no recognized authority to take the lead in meeting the crisis."

Bombing only 25 top targets, the article says, would blast the heart out of the "cities in which 90% of the crucial records, money reserves, bookkeeping equipment, skilled personnel and executive knowledge and ability of American banking are located.

"The coal needed to operate the majority of our railroads and electric generating plants would be cut off by knocking out the cities in which 75% of the coal is wholesaled, by strategic bombing of coal-carrying railroads, and by blasting the major terminals and intersections of all the leading railroads.

"The petroleum products needed to operate auto trucks and cars, Diesel locomotives, and oil-burning electric plants would be destroyed and cut off by bombing the wholesale centers, the major refining centers, the pipe-line terminals and the shipping ports."

In a 1957 air raid, "of the 30,000,000 inhabitants of the target cities, about 9,000,000 would die immediately, 11,000,000 more would be casualties, and additional millions would be homeless."

Proposals for dispersal, evacuation and civil defense are unworkable and radically inadequate, it is charged.

Dr. Hornell Hart of Duke University wrote the article before the announcement of a deliverable hydrogen bomb, which now serves to increase the figures of destruction he projected in his graphic article.

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