

the peninsula. If Germany is resource-starved, Italy's condition defies description.

Some war supplies for Italy and the Reich both are believed to have leaked through the Allied contraband control, but Rome newsmen are unanimous in agreeing that the quantities were small.

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AERONAUTICS

Lightning Not Menace To Modern Planes

MODERN all-metal transport planes have successfully withstood at least 50 cases of lightning discharges since their introduction five years ago. In no case has there been serious damage to the plane and the risk to flight from this cause is no serious menace, says E. J. Minser of Transcontinental and Western Air in a report to the Civil Aeronautics Authority.

For the aviation industry the General Electric Company has been making a survey of the small holes produced by the lightning strokes and correlating them with laboratory studies on artificial lightning.

It is found that the cumulus type of cloud that brings summer showers is the most dangerous cloud formation, especially in the temperature zones around freezing: 25 to 35 degrees Fahrenheit.

Zones of positive and negative charges are built up in such clouds, says Mr. Minser, and it is believed that as the metal plane passes through the transition region between these inner cloud zones it acts as a conductor and "igniter" of the lightning discharge within the cloud.

Initial warning to the pilot when flying in a cloud is a strong increase in static and the appearance (at night) of a brush discharge of electricity known as St. Elmo's fire. The static crescendo builds up and ends in the crash (like a shotgun discharge) about the plane.

New pilot rules are helping prevent the lightning hazard. Pilots are cautioned now to avoid instrument flying through cumulo-type clouds especially on a level when the temperature is between 25 and 35 degrees Fahrenheit. Also to drop down and reduce speed when conditions indicate imminence of a lightning strike. And finally to turn on all lights in the cockpit if they must continue the flight in the lightning hazard region. This last rule minimizes the blinding blast of light when the lightning strikes and prevents temporary blindness to the pilot.

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TRAINING PLANES

Advancing toward the open end of the Stearman Aircraft Division of Boeing are these training planes, part of the largest peace-time order ever placed by the United States Government.

AERONAUTICS

British Fighter Plane Has Turrets That Fire Broadside

Unusual Gun Arrangement Gives "Mystery Ships" Superiority But They Are Too Few to Affect Issue

IF LONDON reports are accurate, a rising toll of Nazi warplanes is marking as a success a new British development in air fighting—the mounting of broadside-firing turrets on fighters.

The R.A.F.'s Boulton Paul Defiants, first sent into action a few weeks ago, have won a marked ship-for-ship superiority through their unusual gun arrangement, although the English "mystery ships" are too few in number to affect the issue decisively now, and it should be possible for the Nazis to contrive an adequate defense.

Conventional fighters are armed with fixed guns which fire forward. Bombers carry weapons with a limited field of fire mostly front and rear and designed to deal with the tail-on attack of ordinary

fighters. Both types are thus vulnerable to the broadside fire of a power-driven turret in a plane cruising alongside. The Defiant's bullets, in other words, come from a quarter in which most bombers and fighters are largely blind. All three standard Luftwaffe bombardment types, the Heinkel 111K and Dornier 17 and 215, and Junkers 88, are at present without real protection against attack from the side, for example.

The Defiant's turret, which fires four machine guns, is a development of the R.A.F.'s bomber turret, whose success in defending British bombers convinced the Air Ministry that special fighters should be built around it. The Defiant and the Blackburn Roc, a naval combat ship, resulted. Continued success of these

planes will mean that the Reich, too, will have to counter with broadside weapons of its own.

Superiority of the Defiant can be attributed mostly to its armament and not to other features. A single-engined two-seater, its top speed of less than 330 miles an hour makes England's "secret weapon"

slower than most fighters, little faster than most bombers and not as fast as some of the newest. Single-engined multi-seaters have been abandoned by the U. S. Army Air Corps for that reason, but it should not prove impossible to utilize the Defiant's principle of gun-power on twin-engined combat planes.

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mother, Alpha, nor his grandmother, Dwina, accepted and properly cared for their first babies. Instead they behaved as if surprised and bewildered. The babies might have died had it not been for the intervention of human care.

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PSYCHOLOGY

Ape Babies To Be Trained In New Experimental Nursery

Infants Separated From Mothers at Birth Will Have Benefit of Scientific Care and Will Wear Diapers

See Front Cover

SOMETHING new in experimental nurseries has just been completed at Orange Park, Florida.

Infants separated from their mothers at birth will be brought up entirely under a scientific, controlled regime directed by an experienced psychologist, Dr. Henry W. Nissen.

Behavior problems will be studied. Growth and development will be watched and measured. Comparison will be made between the infants in this spic-and-span scientific nursery and those brought up by the "instinctive" care lavished by a mother.

If you could walk into this nursery, you would be charmed by the infants, dressed simply in the conventional three-cornered garment of babyhood, but you would not try to enroll a baby from your own family. Reason: The nursery is exclusively for chimpanzees.

At Orange Park, the Yale Laboratories of Primate Biology are building up a colony of apes—close relatives to man—of known birth date and recorded life history. Now the young of animals born in the colony are providing for science the second and third generations of animals for whom family and life records are available. With individuals from this third generation enrolled in "nursery school," it will be possible to control factors of training and to a certain extent those of heredity.

Little Alf, now a six-month-old baby, and one of the first in the new nursery, represents the first step taken toward breeding the chimpanzee to specification as a laboratory animal, Dr. Robert M.

Yerkes said in reporting the new nursery. (*Science*)

His father, Frank, is extraordinarily gentle, intelligent and co-operative. The mother, Alpha, daughter of famous old Pan and Dwina, is a docile creature used all her life to cooperating in psychological experiments.

Should little Alf "take after" father and mother, and should he respond to the careful training he will receive in the new nursery, he will be "peculiarly valuable" both as a subject for scientific study and as a future parent for new experimental animals with desirable characteristics.

Incidentally, the new nursery serves a real and necessary purpose in the colony. For apes, surprisingly, are not always good mothers. Neither Alf's

INVENTION

Hall of Inventions Opens At N. Y. World's Fair

TO SHOW America's inventive progress and to honor the more than 2,000,000 inventors of the past 150 years, a new Hall of Inventions was dedicated on June 7 at the New York World's Fair.

At ceremonies participated in by U. S. Commissioner of Patents Conway P. Coe, and Harvey D. Gibson, chairman of the board of directors of the World's Fair of 1940, the Hall of Inventions and its many displays was formally opened. Watson Davis, director of Science Service, was master of ceremonies.

The display marks the 150th anniversary of the founding of the American patent system. Occupying a prominent location on Rainbow Avenue, many historic inventions are shown. The U. S. government is participating by loaning priceless patent models. One display is the original Selden automobile. In a garden adjoining the building, patented plants will be seen growing, many of them flowers of great beauty.

Science Service will have a continually changing display, showing the latest inventions.

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MAMMA

PAPA

Here are Alpha and Frank, gentle, cooperative parents from whom have been taken little Alf, one of the first pupils in the new experimental nursery at Orange Park. These excellent portraits were taken by Dr. Robert M. Yerkes.