

## PHYSICS

# Flying 60 Miles Aloft

**Repairing plane flying very high in the sky is no trouble, but bailing out from that altitude, pilot is either too hot or too cold.**

► IF YOU are flying 40 to 80 miles up and something goes wrong with your plane, you can get out, walk on the outside of the plane to the trouble and repair it.

If, at the same height, something is irreparably wrong with your plane, you can bail out as easily as though you were getting out of a parked car in not more than a 25-mile-an-hour wind.

If you have to bail out, you are in danger of being too hot for safety before you get to 30,000 feet. After that you will be in danger of freezing to death.

If you bail out over New York, you will land as far away as Washington, or any point on a circle with a 250-mile radius from New York.

But, if you venture out of your plane, or rocket ship, or guided missile at such great heights, you will need either a pressure-tight space suit or a capsule encasing you, or else you will not live.

These are some of the conclusions based on a study of the problems of bailing out at high altitudes conducted by Dr. Fritz Haber at the Department of Space Medicine at the U. S. Air Force School of Aviation Medicine, Randolph Field, Texas.

"We should face the fact," he said, "that flight in the aero-pause is the next step, with speed in the range of Mach number 10 to 20 (10 to 20 times the speed of sound) and with altitudes in the range of 200,000 to 400,000 feet."

He pointed out that, at such altitudes, practically all of the entire air mass is left below with the exception of only about one-millionth. In these conditions, at 300,000 feet, the air resistance to a body is less than one-tenth of body weight, a force which will by no means hamper the pilot in leaving his cockpit.

However, he has the problem of getting back to earth alive, and in one piece. According to Dr. Haber, he is diving into the air "ocean." With no wind resistance before he falls into an appreciable amount of air, his terminal velocity becomes very high, so great that it is the order of Mach number three.

But, Dr. Haber pointed out, as the air resistance increases, the falling body slows down, until, at about 30,000 feet, it has just about the speed of a man who has been ejected from a plane flying at "conventional" heights.

Above that height he is surrounded by temperatures that reach 5,000 to 7,000 degrees Fahrenheit. But, because heat transference is so small at such altitudes, the problem, although still serious, is greatly lessened. Below 30,000 feet he enters a very cold atmosphere. Therefore, according to Dr. Haber, his space suit or capsule must be built to withstand both extremely hot and extremely cold temperatures.

Science News Letter, July 12, 1952

## VETERINARY MEDICINE

# Find Anti-TB Substance

► DISCOVERY OF an anti-TB germ substance in lymph nodes of tuberculous cattle is announced by Dr. M. A. Soltys of the department of veterinary pathology, University of Liverpool, England.

The substance checks the growth of both human and bovine tuberculosis germs. Dr. Soltys mixed the gland extract with TB germs virulent enough by themselves to produce tuberculosis in guinea pigs within six weeks after injection.

The mixture of germs and gland extract was kept at room temperature for four or seven days and at the higher incubator temperature of 98.6 degrees Fahrenheit for 48 hours. All guinea pigs injected with mixtures treated in these ways were free of visible signs of disease at the end of six weeks.

Shorter contact between the tuberculous lymph gland extract and the TB germs,

however, was not enough to inactivate the germs.

Lymph glands from non-tuberculous cattle and from guinea pig spleen failed to produce any substance that would inactivate TB germs.

Dr. Soltys has not yet done enough experiments to know whether the anti-TB germ substance he has found is an immune body developed in the course of the TB infection in the ox or whether it is similar to spermine which Drs. J. G. Hirsch and R. J. Dubos of the Rockefeller Institute, New York, have reported.

The value of the extract-treated TB germs as a vaccine against tuberculosis and the possible value of the extract in treatment of the disease are now under study and will be reported later, Dr. Soltys says in his report in *NATURE* (June 28).

Science News Letter, July 12, 1952

## Do You Know?

About 67% of all adults wear eyeglasses.

*Crabs* sometimes put sponges on their backs for camouflage purposes.

Marbles thrown into a *fish hatchery* stimulate spawning.

*Fires* kill or seriously injure an average of 84 persons daily.

The mercury column in fever *thermometers* is about one-tenth the breadth of a human hair.

Treatment and prevention of *gum disease* depends largely upon the patient's own care of his mouth.

*Citronella oil* is used not only as an insect repellent, but also as an oily base and as a fragrance in perfumes and soaps.

If caught in *quicksand*, a person should try to float on his back as he would in water; his movements should be very slow to eliminate the "sucking" effect.

At least 5,000 different kinds of *insects* in the United States cause an annual loss between three and five billion dollars in terms of ruined crops, sick cattle and spoiled plants.

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