PHYSIOLOGY—GENERAL SCIENCE

Dropping Two or Three Miles Makes Jumper Think Better

New Type Parachute Prevents Jumper in Free Fall From Going Into Dangerous Spinning Tumble

DROPPING without a parachute through two or three miles of thin air will not cause a man to lose consciousness unless he is scared. On the contrary, the experienced jumper thinks faster and more clearly. His sight seems to be improved but his hearing is poorer. He breathes more rapidly but his heart action is little affected.

These, in summary, are the physiological effects of long drops, as reported by Prof. Andrew C. Ivy of Northwestern University, before a Symposium arranged by the American Association for the Advancement of Science in connection with the semi-centennial celebration of the University of Chicago.

The data were gathered during five high-altitude delayed-opening jumps by A. H. Starnes, veteran of the parachute-jumping game. Mr. Starnes was described by Prof. A. J. Carlson, of the University of Chicago, one of the group of scientists conducting the research, as "one of the coolest-headed, most courageous men I have ever met." He keeps his wits about him even when tumbling and spinning through space in the most hazardous positions. He has made some 300 jumps from all altitudes up to 10,000 feet.

Delayed-opening parachute jumps are the safest kind to make from modern high-speed planes, Prof. Ivy pointed out. Air resistance slows down the rate of drop to approximately 120 miles an hour, at which it is safe to let the parachute open. At the 300- to 400-mile speeds of present-day war planes, immediate opening of the chute is likely either to injure the jumper or start a fatal tear. Also, an aviator dangling beneath an opened chute is an easy target for the enemy, but he is safe while falling free.

Greatest danger in free falls is from the body going into a flat spin or beginning to tumble. This is confusing, and in some positions may tangle the parachute shrouds. To obviate this, experiments with an auxiliary anti-spin parachute have been tried, with hopeful results.

In his jumps, Mr. Starnes carries a motion picture camera to record type and rate of spin, a baragraph to record atmospheric pressure changes, a broadcasting transmitter, an altimeter, an automatic stop watch, and special oxygen mask and helmet. With his aviator's suit, all this apparatus increases his own body weight of 190 pounds to a jumping weight of about 300 pounds.

Science News Letter, October 4, 1941

Distinct Variety of Humans

A NEW physiological variety of man has been produced in the people of the Andean uplands by life at two or three miles above sea level where the breath contains only a little more than half ration of oxygen.

The report by Prof. Carlos Monge, of the University of San Marcos, Lima, Peru, stimulated speculation that a new race of high altitude flyers might be developed in a similar way.

Lowlanders going into high country become acclimated after an initial period of "mountain sickness"; but the permanent dwellers at great altitudes are not merely acclimated, they are adapted, and have measureable differences in both physique and chemical constitution from the lowland peoples, the eminent Peruvian scientist stated.

There are certain similarities between a height-acclimated lowlander and the permanent altitude dweller. In both, the blood is actually "thicker" than it is at sea level: the fluid is more viscous and the corpuscles are both larger and more numerous. There are also notable chemical changes in the blood, especially in relation to oxygen and carbon dioxide exchange.

However, the highlander's heart is larger in proportion to his body, his lungs have larger air capacity and their capillaries bring the blood more efficiently into contact with the air. Pulse rate is definitely slower, and even severe exertion fails to speed it up very much.

This adaptation to living at great elevations has its reflection in the sociological behavior of the people, Dr. Monge pointed out. Every year, large numbers of Andean men, driven by necessity, migrate to the coastlands to work in the fields. But they never stay. They have as hard a time becoming acclimated to the "thick" air of the lowlands as a lowlander has becoming used to the "thin" air of the high plateaus.

Hygienic regulations of the ancient Incas, as well as of the early Spanish governors, took cognizance of the inability of plateau people to live successfully at low altitudes. In recent generations, however, the various South American governments have tended to ignore it, with fatal consequences. During the war between Bolivia and Paraguay a few years ago, more Bolivians died of lowland climate in the Gran Chaco than of enemy bullets.

Science News Letter, October 4, 1941

TB Germs Change Blood

WHEN tuberculosis germs are present in the body, the blood makes chemical signals. First readings of these were presented by Prof. Florence B. Seibert of the Henry Phipps Institute, Philadelphia.

A recently developed, highly accurate method of electrical separation has shown that there are four proteins in blood serum. One of these is an albumin; the other three are globulins, designated respectively as alpha, beta and gamma globulins.

In rabbits inoculated with tuberculosis bacteria, Prof Seibert found that the albumin always decreased. It was always lower than the lowest figure for a normal animal.

The globulins, on the other hand, showed increases. The alpha form usually showed first and most pronounced increases, but the gamma globulin also frequently became higher in animals in which the disease had not yet become very serious. But when beta globulin increased, death usually followed.

Possibility of making diagnostic use of these chemical signals that spell "TB" immediately suggests itself, but Prof. Seibert conservatively declined to commit herself on this point.

Science News Letter, October 4, 1941

Viruses Stay, "Enslaved"

VIRUSES of diseases like smallpox and yellow fever, that are followed by years-long or lifelong immunity to further attacks, are not cast out of the bodies of recovered patients. They remain with them as long as the immunity

lasts. However, they are no longer monsters to be dreaded, but like conquered genii in ancient Oriental tales, they become the servants of those who have bested them, steadily stimulating the production of substances that protect against new invasions.

This theory of immunity following virus diseases was presented to the meeting by Dr. Thomas M. Rivers, director of the hospital of the Rockefeller Institute, New York City.

Other diseases caused by viruses leave the recovered patient immune for only a relatively short time. This is the case, for example, with influenza and the common cold. Following these maladies the body does rid itself of the virus. As a consequence, it has no continuing stimulus to produce immune substances, and when a new infection attacks there is no effective defense ready to repel the invader.

Science News Letter, October 4, 1941

Held Together by Chemical

WHAT KIND of perfume does Paramecium use?

Paramecium is a microscopic one-celled animal that swims in stagnant waters. Its aggregations, forming the most elementary kind of social groupings, are held together by chemical attraction, more irresistibly than a "swell" is drawn to his belle by the exotic scent that breathes from her dainty person.

The chemical basis of this simple society was described by Dr. H. S. Jennings of the University of California at Los Angeles.

The water around an individual Paramecium becomes faintly acid, Dr. Jennings said. Another Paramecium, chancing into this acidified zone, becomes unable to leave it. Every time it approaches the boundary, it is impelled to turn back. Others swim into the charmed circle, and are held as if by the fumes from an ancient magician's potent philtre.

Dr. Jennings found that he could reproduce this chemical social attraction simply by introducing a bubble of carbon dioxide into the water. It set up a charmed chemical boundary just like that of the Paramecium's natural secretion, which the little animals could enter but which they could not leave. Since carbon dioxide is a product of respiration by Paramecium as well as by Man, it is just possible that the only chemical foundation for the charmed social circle in the world of the waterdrop is nothing more than an attractive "breath".

Science News Letter, October 4, 1941

PHYSICS

Cosmic Rays Created by Self-Annihilation of Atoms

Discovery of Identifying Bands for Five Elements Critical for Hypothesis Proposed by Prof. Millikan

COSMIC RAYS are created by the suicide of atoms in the loneliness of interstellar space, in the same manner that light is created by the partial self-destruction of atoms in the densely packed interiors of the stars. Prof. Robert Andrews Millikan, Nobelist of the California Institute of Technology, proposed this hypothesis at the symposia arranged by the American Association for the Advancement of Science in connection with the fiftieth anniversary celebration of the University of Chicago.

The hypothesis, said Prof. Millikan, rests on discoveries made in five recent research projects by his fellow-workers in the Norman Bridge Laboratory of Physics. In sum, these researches indicate that atoms of five elements are far more abundant in interstellar space than those of any other element, and that such atoms are capable of transmutations, giving rise to high-speed particles like those that constitute cosmic rays.

The broad surface of the earth itself is the spectroscopic screen on which should be spread the distinctive bands of cosmic rays, each characteristic of the element from which it originated. If they actually are found distributed in accordance with Prof. Millikan's prediction, this will constitute substantial evidence in favor of its validity. They are predicted as being thus distributed because the magnetic field of the earth should bend each band aside in proportion to the energy or speed of the incoming rays.

The five elements for which the five identifying bands are sought are: helium, carbon, nitrogen, oxygen and silicon. At least partial evidence has already been discovered that some of the bands exist, Prof. Millikan stated. The discovery or non-discovery of the remaining ones will be critical for his hypothesis.

Science News Letter, October 4, 1941

Cosmic Rays Are Protons

COSMIC RAYS are protons, "hard," high-speed atomic particles, when they arrive at the outer boundary of the earth's atmosphere, it is indicated by experiments reported by three University of Chicago physicists, Dr. William P. Jesse, Dr. Marcel Schein and Dr. Ernest O. Wollan. On striking the atmospheric atoms, they give rise to the "middle-weight" particles known as mesotrons. Evidence supporting this conclusion was obtained by sending recording instruments aloft attached to free balloons that reached heights as great as 14 miles.

Science News Letter, October 4, 1941

Earth Mostly 9 Elements

NINETY-NINE per cent of the weight of the earth is made up of only nine of the 88 known elements, Prof. Henry Norris Russell, Princeton University astronomer, told the meeting. All the rest have only one per cent to divide among them.

The same group of elements also make up the bulk of the other objects in the visible universe: stars, nebulae, comets, and the meteorites that bring to us the only samples of the cosmos that we can actually get our hands on. Proportions are different, however: hydrogen, for example, makes up only one-half of one per cent of the accessible earth-parts, whereas it constitutes the bulk of some of the stars.

Science News Letter, October 4, 1941

PSYCHOLOGY

Women More Susceptible To Glare At Night

THE HIGHLY debated question of whether men or women are the better automobile drivers has been studied from a scientific viewpoint by researchers at the University of California. Tests devised by Dr. C. W. Brown, associate professor of psychology, show that men are probably better drivers, at least at night.

Glare blindness resulting from facing oncoming headlights is doubtless responsible for many of the after-dark highway accidents.

"During the normal hours of darkness, from 6 p.m. to 6 a.m., deaths from