cently by the high initial vapor pressure of cracked and natural-gas gasolines. No dope has been proposed to remedy this fault."

With regard to knock prevention, Dr. Dickinson said that some of the antidetonants are essentially fuel improvers. Among these the best known are iron and nickel carbonyls and organic compounds of lead, selenium and tellurium. Tetraethyl lead, the anti-knock agent that has found general application, is sold only mixed with gasoline.

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AERONAUTICS

Scientists Fortunate to Return From Region of Black Skies

PROF. Auguste Piccard and Dr. Charles Kipfer, whose balloon rose to a height reported to be over 50,000 feet on May 28, have been more fortunate as well as more successful than previous balloonists, many of whom have been martyrs to the conquest of the atmosphere.

The record balloon ascent in November, 1927, by Capt. Hawthorne C. Gray of the U. S. Army ended fatally for him. After several previous narrow escapes, Capt. Gray reached 43,000 feet but, accidentally cutting his oxygen tube, died from suffocation before reaching the ground at Sparta, Tenn. On a previous ascent he lost consciousness only to find himself falling at about a thousand feet per minute. Throwing ballast overboard frantically he fortunately landed on some telegraph wires without harm. On another occasion he had to use a parachute to save his life.

The record for heavier-than-air machines is about the same figure. A height of 43,168 feet was reached by Lieut. Apollo Soucek of the U. S. Navy.

A new method for finding high altitudes and a record for two men was the outcome of a more recent and fortunate flight with an airplane, piloted by Capt. St. Clair Street of the Army Air Corps. Photographs of Dayton, Ohio, were taken from this machine by Capt. Albert W. Stevens at a height of 40,000 feet.

Lightning Hazard

Lightning, another hazard of high flying balloons that depend on inflammable hydrogen instead of the helium such as used in the airship Los Angeles, caused the deaths of Dr. C. L. Meisinger of the U. S. Weather Bureau and Lieut. J. T. Neeley of the Army Air Service in 1924 over central Illinois. In making a series of balloon flights to learn the behavior of storms at great heights, Dr. Meisinger and Lieut. Neeley were finally the victims of a thunderstorm that set fire to their balloon, an accident they had feared but luckily escaped in previous ascents.

The height reached by the Piccard balloon is only half as great as the 20 miles reached by small unmanned balloons.

There is some doubt as to whether anything of value will be added to our knowledge of cosmic rays as a result of the flight. In 1922 Dr. Robert A. Millikan and Dr. I. S. Bowen of the California Institute of Technology sent their cosmic ray electroscopes to a height of nearly ten miles, slightly higher than the reported Piccard record.

Dr. W. J. Humphreys of the U. S. Weather Bureau stated that the two scientists, imprisoned within their aluminum globe, could hardly expect to observe anything by means of the instruments fastened to the outside that has not already been made known by registering apparatus sent aloft on free balloons that have ascended to much greater heights than that reached by the German bag.

In reaching their record-breaking height, the two venturers passed through all the weather there is, for all clouds, as well as the highest winds, are found below the ten-mile level that marks the top of the "troposphere," or region of really active air. Above this, in the "stratosphere," the sun shines brightly in a black sky, the winds are constant but moderate, and the temperature drops to a level of about 70 degrees below zero Fahrenheit at the 50,000-foot mark.

The Piccard ascension was the first balloon flight in which a sealed cabin has been used.

Experts believe that the stratosphere explored by the aluminum globe offers the best hope for fast-flying airplanes as the resistance of the air at these heights is very small.

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