

A decorative horizontal banner with a patterned border. Inside the banner, the title "THE REALM OF SCIENCE" is centered in a bold, serif font. To the left of the title is an illustration of a telescope and other scientific instruments. To the right is an illustration of a balance scale and a microscope.

THE REALM OF SCIENCE

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PROFESSOR W. J. HUMPHREYS, of the United States Weather Bureau, one of our leading meteorologists, has a very instructive article on "Holes in the Air" in the Annual Report of the Smithsonian Institution for 1912. He begins it with the words: "The bucking and balking, the rearing, plunging, and other evidences of the mulish nature of the modern Pegasus soon inspired aerial jockeys to invent picturesque terms descriptive of their steeds and of the conditions under which their laurels were won or lost. One of the best of these expressions, one that is very generally used and seems to be a permanent acquisition, is "holes in the air." There are, of course, no holes in the ordinary sense of the term in the atmosphere—no vacuous regions—but the phrase "holes in the air" is brief and elegantly expressive of the fact that occasionally at various places in the atmosphere there are conditions which, so far as flying is concerned, are mighty like unto holes. Such conditions are indeed real, and it is the purpose of this paper to point out what some of them are, when and where they are most likely to occur and how best to avoid them."

Professor Humphreys then proves that if a perfectly vacuous space did really exist in the atmosphere, the air would rush into it with the speed of 750 miles an hour, so that in practice such a hole could never originate. Instead of the perfect vacuum some theorists have imagined a greatly diminished pressure of air in some spots, which would have the same effect upon an airship. This, too, he shows to be impossible everywhere except in the axis of a tornado, in which a reduction of only ten per cent in the barometric

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pressure would produce a most violent gyration. The "pocket of noxious gas" in the atmosphere is equally untenable, on account of the law of the diffusion of gases.

The conditions so dangerous or destructive to aeronauts are of various kinds. One is the aerial fountain, that is, a well-defined column of air rising through the atmosphere as we often notice in a column of smoke rising perpendicularly from a smokestack in a calm. Such an ascending aerial column has a velocity quite different from that of the rest of the air. Any air craft subjected suddenly to such a strong change of velocity, runs the greatest risk of being torn asunder or upset or of falling, since it depends for its support exclusively upon the air pressure below it and itself originates this pressure by its speed.

The air also has cataracts, down plunges, like water, which are most dangerous on the lee side of a prominent hill or mountain. As we may sometimes notice clouds at different altitudes moving in opposite directions, an aeronaut coming from one such layer of air into another, would find his support instantly taken from under, and only the greatest skill would prevent his drop from becoming disastrous.

In addition there are billows in the air, gusts, eddies, torrents and breakers, so much the more dangerous than their watery congeners, because of their absolute invisibility.

Humphreys gives good advice to aeronauts in first studying the condition of the air before ascending into it, tells them where the dangerous places are most likely to be, shows them what to do when they encounter a "hole" and where to make a safe landing.

While the article in question is of service directly to those that navigate the air, it is also very instructive to the general reader, as it shows the dangers to which aeronauts are exposed and how highly unreasonable it is to compel them to ascend in their machines for the amusements of a unthinking populace.

The volume just mentioned, the Annual Report of the Smithsonian Institution for 1912, contains also a lecture by

Roald Amundsen on his "Expedition to the South Pole." It is very interesting and no less sad, after reading of this very successful and first discovery of the south pole, to take up "The Uttermost South, The Undying Story of Captain Scott," as given from his own diaries in Everybody's Magazine for October.

Amundsen had every success. This route was over better ground, the weather was more propitious, he had an abundance and even a superabundance of food, he had dogs in plenty to pull his sleds all the time, he was never pressed for time, and he had strong and healthy companions. Scott was unfortunate in every one of these particulars. His road was over rougher ground and fearful blizzards delayed him and finally were the direct cause of his death. The food and fuel gave out when he was only eleven miles from an abundant supply depot. He and his men had to pull their own sleds themselves. As a consequence of these hardships, first one and then a second of his four companions gave out and died, until he himself and the remaining two were confined in their tent by a raging storm which lasted for a week and finally sealed their fate.

Both explorers, Amundsen and Scott, were really at the south pole. There can be no doubt whatever of the fact. The photograph of the tent that Amundsen left there on December 14-17, 1911, as well as the letter and instruments and general description, are perfectly identical in Amundsen's account of them six months later and in the effects found upon Scott's dead body.

The same intrepid and successful explorer, Roald Amundsen, is now going to the north pole and will be the first that can really prove to the world that he discovered it. His method is to remain in his already-famous ship, the Fram, which no polar ice can crush, and which will be provisioned for five years, and drift with it across the polar sea, making frequent excursions from it as a safe base of supplies. He will thus enjoy to a large extent all the comforts and even some of the luxuries of civilization in his drifting home. He will be

able to utilize the long polar night to find his position from the stars by means of large fixed instruments, and will keep the world informed of his doing by wireless telegraphy. In ever so many ways this novel scheme is immeasurably superior to the old method of Arctic travel, and the ocean at the north pole will be vastly more comfortable to traverse than the high plateau at the south pole. Amundsen will thus be the first man to have stood at both of the earth's poles, and also along with his companions, to give positive proof that he has been there.
