THE EARTH'S CURVATURE SHOWN BY AERIAL PHOTOGRAPHY.

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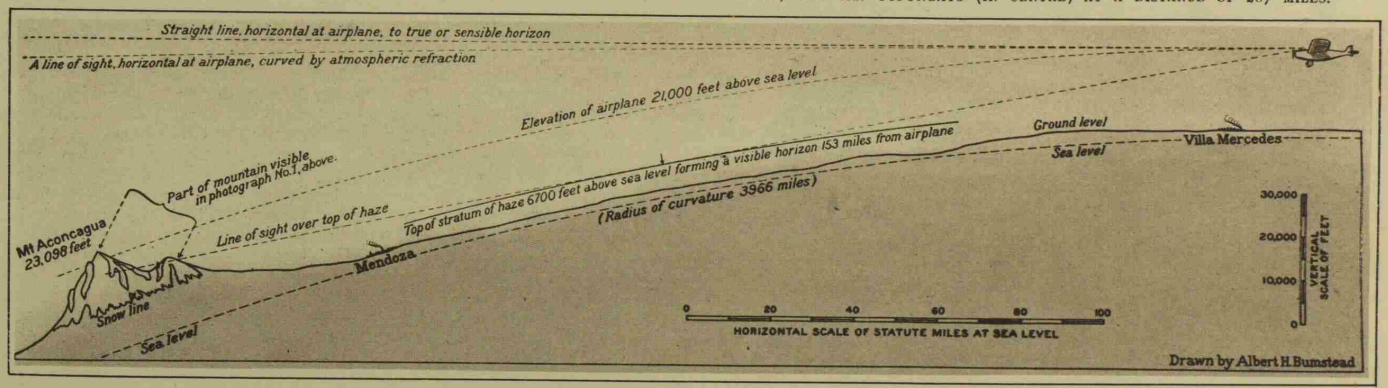
This unusually interesting photograph of the Andes, including Mt. Aconcagua (identified by a white line below the base) at a distance of 287 miles, was made from an airplane, at an elevation of 21,000 feet, by Captain Stevens in the course of his camera survey of the Andean Chain for the National Geographic Society. The mountain range, which shows clearly in the photograph, could not be seen by the photographer at the time he made this picture. Captain Stevens used a lens of 20-inch focus and an infra-red screen which admits to the sensitive photographic plate light that is invisible to the eye. The length of the exposure was 1/20th of a second. Almost exactly in the centre of the range, Mount Tupungato is distinguished.

1. THE FIRST PHOTOGRAPH EVER MADE SHOWING LATERALLY THE CURVATURE OF THE EARTH: A UNIQUE AND WONDERFUL AIR VIEW OF THE ANDES, INCLUDING MT. ACONCAGUA (ON RIGHT; MARKED BY A SHORT WHITE LINE BELOW, AT SEA LEVEL) AND MT. TUPUNGATO (IN CENTRE) AT A DISTANCE OF 287 MILES.



2. A DIAGRAM ILLUSTRATING THE CURVATURE OF THE EARTH, AS SHOWN IN THE UPPER PHOTOGRAPH (NO. 1): (ON RIGHT) THE AEROPLANE FROM WHICH THE PHOTOGRAPH WAS TAKEN; (ON LEFT) MT. ACONCAGUA, 287 MILES AWAY AND 54,900 FT. BELOW THE "SENSIBLE" HORIZON (SHOWN AT TOP).

3. THE ANDES, WITH MT. ACONCAGUA (EXTREME RIGHT) 142 MILES DISTANT FROM THE CAMERA: ANOTHER AIR PHOTOGRAPH SHOWING PART OF THE RANGE SEEN IN PHOTOGRAPH NO. 1.

Captain Albert W. Stevens, of the U.S. Army Air Corps, describes his remarkable photographs in the "National Geographic Magazine," of Washington, in an article on an air survey of the Andes. "The snow-clad mountains" (seen in No. 1), he writes, "form a background that brings into view the surface of a stratum of haze which obscures the lower portions of the snow (see No. 3). The top of the stratum of haze, at an elevation of 6700 feet above sea level, conforms closely to the sea-level surface of the earth and does not share the irregularities of the ground, 4000 feet below. The haze forms a *visible horizon* 153 miles from the camera, and 70 miles of this *visible horizon* appear laterally in photograph No. 1. Although this horizon is only 1/360th of the circumference of the earth, its curvature can be plainly seen. The *sensible horizon*, as distinguished from the *visible horizon*, is the line where a plain surface, level at the point of observation, meets the sky. The white line ruled across the sky in the photograph (No. 1) indicates the position of the *sensible horizon*. Although the highest of the mountain peaks in the photograph are at a greater elevation than the camera, they appear below the *sensible horizon*, due wholly to the curve of the earth's surface. Due to refraction, the path of a ray of light through the air is not straight, but curved downward by a maximum of about 1/7th the amount of the earth's curvature, depending chiefly on the density of the air. The effect of this refraction is to make the earth seem a little less curved than it is, and to make distant objects appear a little higher. This fact has to be taken into account in trigonometric levelling for determining elevations. At the distance of Mount Aconcagua, 287 miles, the earth curves 54,900 feet from a straight horizontal line, but only 47,100 feet from a curved line of sight that is horizontal to the observer. The short white line under Mount Aconcagua shows the position of sea level, above which the mountain rises to a height variously computed at from 22,800 to 23,100 feet, with 23,098 as the figure most frequently adopted." In a note on photograph No. 3, Captain Stevens says: "At the left rises Mount Tupungato, and at the right-centre Cerro de Plata. The horizon line covered in this photograph corresponds to the three inches of horizon between Aconcagua and Tupungato in the other picture (No. 1), which was made at a distance of 287 miles. Note especially (in No. 3) the snow-clad foothills, as compared with the haze-obscured mountain bases (in No. 1)."

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