New South American Volcano

Volcanology

By Joseph H. Sinclair

Mr. Sinclair was leader of the American Geographical Society's Expedition to South America.

An active volcano of the explosive type, hitherto unmapped and unknown to science, was discovered by the American Geographical Society expedition to South America, under my leadership. We have just returned to this country.

The volcano is situated in eastern Ecuador at the point located on the map at latitude zero degrees eight minutes south and longitude 77 degrees 32 minutes west of Greenwich. It is the volcano closest to the equator. The discovery was made on December 21, 1927, by my party, of which Mrs. Sinclair was a member. The purpose of our expedition was to make a detailed topographic survey of this South American area.

So far as we can ascertain, there is no reference to this volcano in history. Although I approached within fifty miles of the region in 1921, I heard nothing of its existence.

Activity of this volcano began suddenly with violent explosions at the end of 1925. The most authentic eye-witness of the eruptions is a native, named Miguel Canchala, who lives in Quijos valley, about 60 miles east of Quito. He stated that the entire top of the cone disappeared in the course of the explosions. Ash filled the sky 100 miles distant and detonations were heard over 65 miles in an air line from the crater. I first heard of the eruption on arrival in Quito, in September, 1927.

From Quito we proceeded east over Guamani pass, 13,350 feet above the sea, carrying a traverse line for survey purposes from the astronomical observatory of Quito. We descended the east slope of the Andes by way of the Quijos valley and reached a point 60 miles east of Quito and 6,000 feet above the sea. Here we met Canchala.

It was necessary, however, to abandon progress in this direction because of the refusal of Indians to accompany us through fear of destruction by further eruptions. We turned south, traversing to Rio Napo, 100 miles from Quito, and then descended this river 100 miles to the mouth of the Rio Coca whose position we determined by our surveys in 1921.

This hitherto unknown stream was ascended and we traversed the route by stadia and plane table. On this journey we were accompanied by Canchala and Payamino Indians.

On December 21 we arrived in the vicinity of the volcanic cone, as calculated from the intersection of survey bearings to center of smoke area from Quijos River and Quito. We were then 75 miles above the mouth of Rio Coca in a canyon 2,000 feet deep, with cliff walls. We were running short of food and the Indians refused to continue farther. We persuaded them to go two days more. We then ascended the ridge to an elevation of 4,000 feet above the sea and found ourselves directly opposite jagged remnants of the cone, which Canchala recognized and which was the only prominent feature in the forested area. Between ourselves and the crater we discovered an unknown river in a deep canyon with cliff walls. The distance of about 6 miles to the crater was impossible to cross, for the way was barred by a mass of dangerous rapids in the river, which would have necessitated detouring far to the north.

It was, therefore, necessary to turn back. We hoped to return down the Quijos valley from the west, but heavy rains set in. There is no possibility of making this further exploration until the next dry season, which is said to begin in August.

The volcano breaks through middle cretaceous sediments in a heavily forested and uninhabited region, whose elevation is about 4,000 feet above the sea. The remnants of the cone attain an elevation of between 6,000 and 7,000 feet above the sea and the crater appears very large. In this region the rainfall is almost continuous, the difference between dry and wet seasons being merely in degree of rain. (*Turn to next page*)

Westward Atlantic Flight Hazardous

Aviation

By Thomas Carroll

Mr. Carroll is chief test pilot of the National Advisory Committee for Aeronautics.

Now that the Atlantic has been spanned by air in both directions it may appear to those who think that luck plays any great part in such undertakings that fortune has smiled more consistently on the east bound.

So it is the more remarkable to note some figures from the U. S. Navy Hydographic charts of the Air Conditions over the North Atlantic Ocean.

The adversity of the winds is common knowledge but is too frequently considered by the landsman as just a little wind more or less. But see what a difference just this wind condition can make.

Take a course between a point near New York and one in Ireland which is just 3,000 miles long and use an airplane that cruises at a speed of just one hundred miles an hour.

If a flat calm maintains and two pilots start in opposite directions at the same time and they are both equally capable of maintaining their course and have engines and instruments that never quit it is easy to see that they will reach their destinations simultaneously in just thirty hours. Trains and all ground transportation operate on such a schedule but we find from the chart that these conditions can be expected for only five per cent. of the time in any reasonable period. Five per cent. of thirty hours is only one and a half hours and is therefore out of consideration.

Take the east bound flyer. His most optimistic prospect is for an average following wind of 28 miles per hour and that it may maintain for 24 per cent. of the time in any hundred hour period. It is therefore possible to expect that his average speed will be increased to 128 miles per hour and even possible that it may maintain for the whole trip. That would bring him to his destination in twenty-three and a half hours.

On the other hand the worst that the east bound flyer may expect according to the chart is an unfavorable wind averaging eleven miles an hour. If this is maintained for the whole trip this would only decrease his speed to 89 miles an hour and he would still arrive in thirty-three and one half hours. But again to his advantage he need only expect that these adverse conditions will continue for but five per cent. of the time and that over very (*Turn to next page*)

The Light Game

Physics

A few years ago there appeared the following item in the afternoon edition of the *Physics Daily News*:

Waves and Corpuscles
In Hard Fought Game

WAVES LEAD, END OF THIRD QUARTER

(By Ray O. Light)

The big game opened with a kick-off by Galileo, veteran full-back of the "Waves." The ball was received by Isaac Newton, the strategic quarter of the "Corpuscles," who stiff-armed Huyghens, the giant tackle of the Waves, and carried the ball for a 45-yard gain. Then by a series of skillfully directed trick plays and forward passes, he led his team through to a touchdown at the end of the first quarter. La Grange failed to kick goal. Score, Corpuscles 6; Waves, 0.

Fresnel, captain of the Waves, elected to receive, and himself caught the ball. Tom Young organized an interference which completely overwhelmed the Corpuscles, and Fresnel ran the length of the field for a touchdown. The electric toe of Maxwell kicked the ball for a goal, giving Waves, 7; Corpuscles, 6.

At the beginning of the second half Maxwell was put in as quarter for the Waves, and with the help of the famous backfield, consisting of Hertz. Kelvin and Michelson, they had things their own way, scoring two touchdowns. Score at the end of the third quarter, Waves, 20; Corpuscles, 6.

As the last quarter opened, Planck, of the Corpuscles, made a long kick-off to Jeans, of the Waves, who was able to return the ball only a few yards. A forward pass was intercepted by Einstein, right end of the Corpuscles, who crossed the line with the velocity of light for a touchdown. The game during the next few minutes was very hard fought, neither side being able to make a first down. At the time this edition goes to press the Waves are in the lead by 7 points, but the Corpuscles seem to have the upper hand.

Prof. Arthur H. Compton brings the report up to date in the *University of Chicago Magazine*:

How, then, about our football game? Let us say that the strategy associated with the scattered X-rays has given the corpuscles another touchdown, and that Wilson, by finding the electrons recoiling from the scattered rays, has kicked a beautiful goal. The score thus stands: Waves, 20; Corpuscles, 20. At this stage the referee must call the game of light on account of darkness.

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Westward Flight—*Continued*

large portions of the route they rarely if ever exist.

Now regard the poor west bound pilot.

With the above conditions reversed you find that the best he can expect is to increase his speed to 111 miles per hour and reach his destination in twenty-seven hours and again that he can hardly expect that assistance for more than five per cent. of the time. His worst condition shows that his speed may be reduced to 72 miles per hour for at least one quarter of the trip while if it holds for the whole trip, which is more than a possibility, he will not arrive at his destination until forty-one and two-third's hours have elapsed. So while his best expectations are only five hours better than his east bound competitors worst, his own worst conditions will require him to be in the air eighteen hours longer than the east bound plane or very nearly twice as long.

As if this is not bad enough, there is the fog hazard to be negotiated. Of course, with fog on the course, and it can be expected from one-third to one-half of the time this month, both east and west bound will encounter it. But the east bound plane can at least maintain land contact through most of it and expect to be out of it in a couple of hours after leaving land, for the worst of the fog is near the coast of Nova Scotia and Newfoundland. They may then expect to approach the Irish coast in clear weather, for fog is expected only ten per cent. of the time there.

But the unfortunate west bound plane must approach a fog bank two or three hundred miles off the coast of America into which he must fly and grope for his destination for twelve or more hours. Remember that landmarks must be good to be recognized in a fog at a hundred miles an hour.

If you ever fly to Ireland it is to be recommended that you come home on a boat.

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Volcano—*Continued*

The crater is constantly covered by mist, which may be in part steam. We only saw the jagged remnants of the cone twice, although it was so close to us and we had an unobstructed view.

Our position on the day of discovery was 300 miles from Quito. Most of our journey was through frightful trails in wet forests and on dangerous rivers. I believe the volcano could be reached from the west with much shorter distance if the Indians could be secured. But many torrential rivers are in the way.

We discovered also that the lowest sedimentary rocks in Ecuador are middle cretaceous and rest upon complicated old volcanic rocks, which we will describe after petrographic studies. An uncharted mountain mass on the equator in longitude 77 degrees 18 minutes west of Greenwich was revealed by our explorations. This is isolated and reaches elevations about 10,000 feet above the sea.

Another interesting feature of the exploration is the extension of volcanic centers from the high Andes to the lowlands east of the main range. About 25 miles south of El Reventador lies the great volcanic cone Sumaco, 12,750 feet above the sea, whose lavas we have recently found to be of feldspathoid type, the first known in Ecuador. We believe other centers will be found east of the Andes.

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