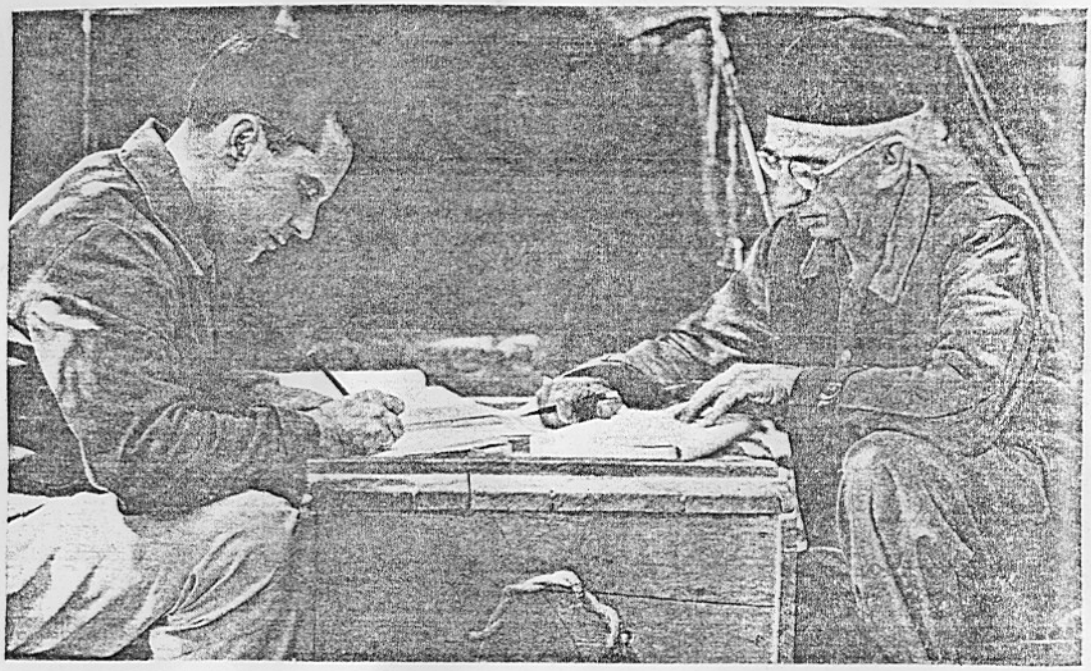
ECLIPSE Hubting in Brazil's Rachland. **The Nathional Geografic Magazine,** Volume 92, Number 3, September, 1947. p.297 e 299.

The National Geografic Magazine
Volume XCII Number Three
September, 1947



Brazilian Scientists Calculate the Camp's Exact Location

Dr. Allyrio Hugueney de Mattos (right) and Senhor Lysandro Vianna Rodriguez, with two assistants, made observations of stars from which they computed the latitude and longitude of a concrete marker within a few feet of perfect accuracy. This was essential for precise observations of the moon's motion (page 299).

General Pinheiro, of the Brazilian Air Force, Pays a Friendly Visit to Camp

On an inspection tour the general (center) confers with a group including, left to right: the author; Capt. John M. Rice, camp commander; Maj. Everett J. Burlando of the AAF, and Melvin M. Payne, Assistant Secretary of the National Geographic Society and the expedition's project officer.

mass of stars because we are looking out through the thickness of the wheel from the inside toward the rim.

Years ago Dr. Frank E. Ross, now of Mount Wilson Observatory, made a series of fine photographs of the northern Milky Way which constitute a standard atlas of reference.

Father. Heyden borrowed his camera and photographed the southern part of the Milky Way, not visible from the Northern Hemisphere, on the same scale.

His photographs, added to those taken by Ross, will give a continuous picture of how this great star wheel looks from within, so to speak, looking outward all the way around from the inside.

Balloon "Trains" Measure Cosmic Rays

Cosmic rays, raining down into the earth's atmosphere from outer space, were measured on the ground, and at altitudes up to 50,000 feet by Geiger counters carried aloft by "trains" of eight balloons launched from camp and on an AAF B-29 and B-17 (p. 313).

The balloon trains, sent up by Martin Pomerantz and Peter Morris, were equipped to radio back to earth the number and intensity of cosmic rays, which increase with altitude. At 50,000 feet the total number of cosmic rays was 50 times that at sea level, and the intensity of the more penetrating rays was 10 times greater than on the ground.

All this was part of the great cosmic-ray measuring project being carried out under joint auspices of your Society, the Bartol Research Foundation of the Franklin Institute, and the Army Air Forces.

Weather information was collected continuously for more than two months by Maj. William E. Walk and his 18 enlisted specialists of the AAF Air Weather Service. They measured temperature, pressure, humidity, and the speed and direction of the wind from the ground up to altitudes as high as 69,000 feet.

Their job was not to forecast the weather, but to gather data to be used by some of the expedition's scientists in calculating results of eclipse observations (page 311).

Their weather facts also will be added to the collection of world-wide weather information which is constantly being gathered by the Army Air Forces and filed for use by commercial air lines and others interested.

Measurements of the light from all parts of the sky at various times of day were made by Dr. E. O. Hulburt and Ralph E. Richardson of the Naval Research Laboratory.

This information will be utilized in development of an instrument which airplane navigators may use for seeing stars in the daytime at altitudes of 10,000 feet and above as an aid to navigation. Brightness and polarization of the sky's light determine what stars can be seen in the daytime at various altitudes (pages 294 and 310).

As eclipse day drew nearer, preparations were intensified. One essential task was establishing the exact location of our little clearing on the vast curving surface of the earth, for the observations to time the motion of the moon would be worthless unless the precise point from which they were made was known. This job was done for us by genial Dr. Allyrio Hugueney de Mattos and three of his assistants from the National Council of Geography of Brazil.

Bringing with them from Rio a complicated array of precision instruments, they calculated the latitude and longitude of a concrete monument in our camp within less than 20 feet of perfect accuracy, no small accomplishment on a globe nearly 25,000 miles in circumference! That monument, incidentally, will become a permanent landmark in Brazil's national survey system (page 297).

Other Brazilian friends, too, came to visit us in increasing numbers—civil and military officials, newspaper reporters and photographers, groups of scientists, engineering students, even school children with their teachers—all made the trip out to camp over the miles of rough, dusty road (Plate XI). One Sunday afternoon the Bocaiuva Boy Scout troop arrived in full uniform with its drum corps and staged a snappy drill.

All Brazil displayed a genuine, friendly interest in our expedition. Military and civil officials alike smoothed the way for us, lent us road-building machinery, tents, water pipe, water-tank trailers, and many other things.

A Brazilian engineer had charge of building our airport and improving our road. Brazilian Air Force planes helped fly our equipment from Rio to Bocaiuva. Many of us were hospitably entertained by friends both in Bocaiuva and in the progressive city of Montes Claros, near by.

Why Observe an Eclipse?

Why is it important, people ask, to travel so far and spend so much time, effort, and money to observe only a few fleeting moments of an eclipse of the sun? What can you learn, and what good comes of it?

Scientists can do a surprising number of things during the short space of an eclipse of the sun. They can time very accurately the motion of the moon through the sky. They can measure how much a ray of light from a distant star is bent as it passes the sun,