

The Yungay pictures

(Antoine Cousyn, François Louange and Geoff Quick)

On March 22nd 1967, in the mountains near Yungay (Chile), around 5:30 PM, 4 color pictures were shot of 2 objects that were reported to be flying slowly through one minute from North to South, without any sound and from 30° above the horizon down to behind the roof of a house.

The full story of these photographs is quite lengthy and complicated, reading like a thriller, with a tragic end. On May 31st 1970, a dreadful earthquake destroyed the whole city of Yungay with 70,000 persons, as well as the original negatives. A synthetic report on this case is available [here](#), whilst the key reference is a complete investigation report by Richard Greenwell (APRO-PERU), which compiles all available details.

All this information, as well as scans of first-generation prints of the 4 Yungay pictures, were kindly provided by Thomas Tulien in Paris, during the [CAIPAN 2014](#) workshop organized by the French space agency CNES in July 2014.

This is a short and purely technical analysis of the 4 available prints, taking into consideration the following highlights from the whole story:

- The pictures were discovered by chance, by a Kodak employee, and were made available to APRO-PERU thanks to the support of various investigators, including Prof. Alan Hynek. Augusto Arranda (the author of the pictures) and Cesar Ore (the owner of the camera) never tried to get any benefit out of this story.
- The 4 daylight color pictures are of good quality and they convey measurable information.
- The camera's make and model may be identified.
- The possibility of a hoax using hubcaps, as was done on many occasions by fakers during the sixties, has been raised by APRO investigators.
- Neither the author of the pictures nor the original negatives will ever be retrieved now, which makes any conclusion uncertain.

Here are the 4 Yungay pictures (in time sequence):



Y1 (2 objects)



Y2 (2 objects)



Y3 (1 object)



Y4 (1 object)

Camera and settings

According to available information, the camera was 40 years old and its make was VOIGTLANDER.

Knowing that the format of the original pictures is 6 cm x 9 cm and that the camera could support either 8 or 16 exposures, the only 4 possible models are:

INOS 1 or 2
BESSA
PROMINENT

In all cases, the focal length was:

$f = 105 \text{ mm}$

Possible exposure time values:

$1/250 \text{ s} - 1/100 \text{ s} - 1/75 \text{ s} - 1/25 \text{ s} - 1 \text{ s}$

Each of these 4 models could theoretically be equipped with any of the 4 following lenses (but there is no such mention in the report):

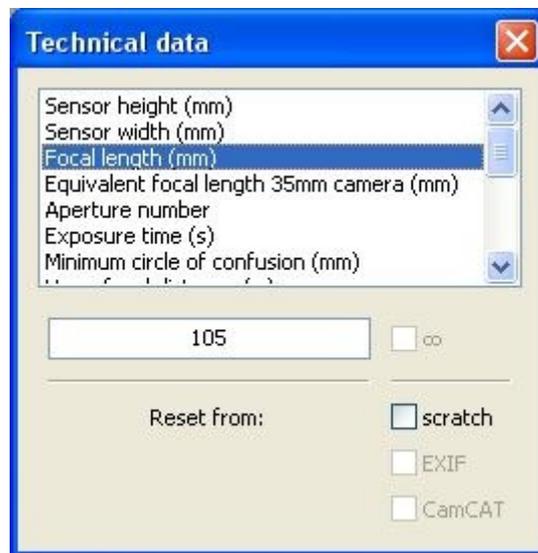
SKOPAR 4.5
VOIGTAR 4.5 or 6.3 or 10.5

Geometric analysis

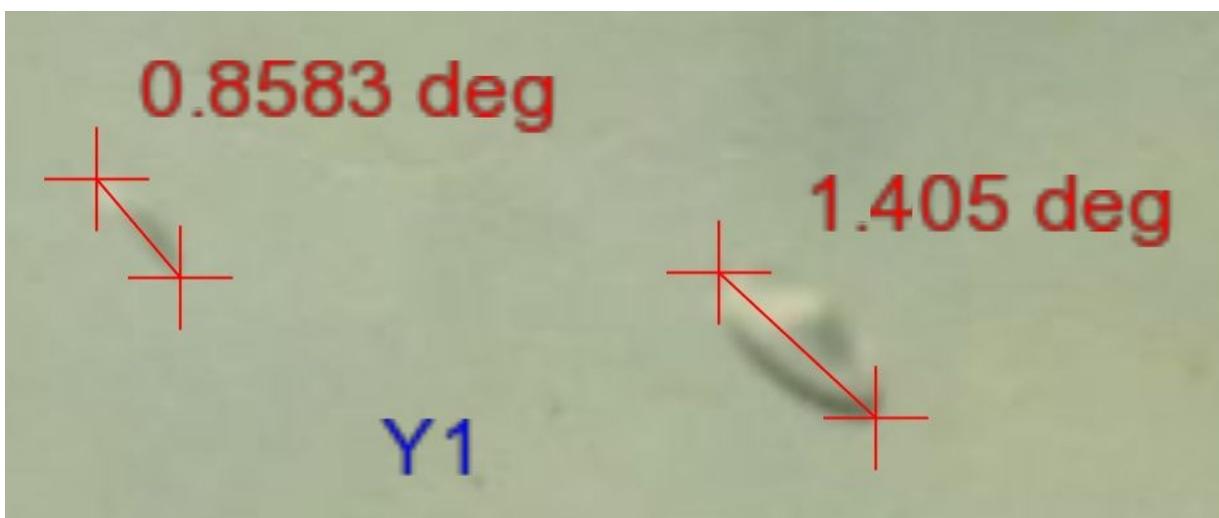
Using the IPACO software, we introduced manually the following technical parameters, to be associated with each of the 4 pictures:

For Y1, Y2 and Y4: Sensor height (mm) : 60
 Sensor width (mm) : 90
 Focal length (mm) : 105

For Y3: Sensor height (mm) : 90
 Sensor width (mm) : 60
 Focal length (mm) : 105



Angular sizes could then be computed by IPACO:



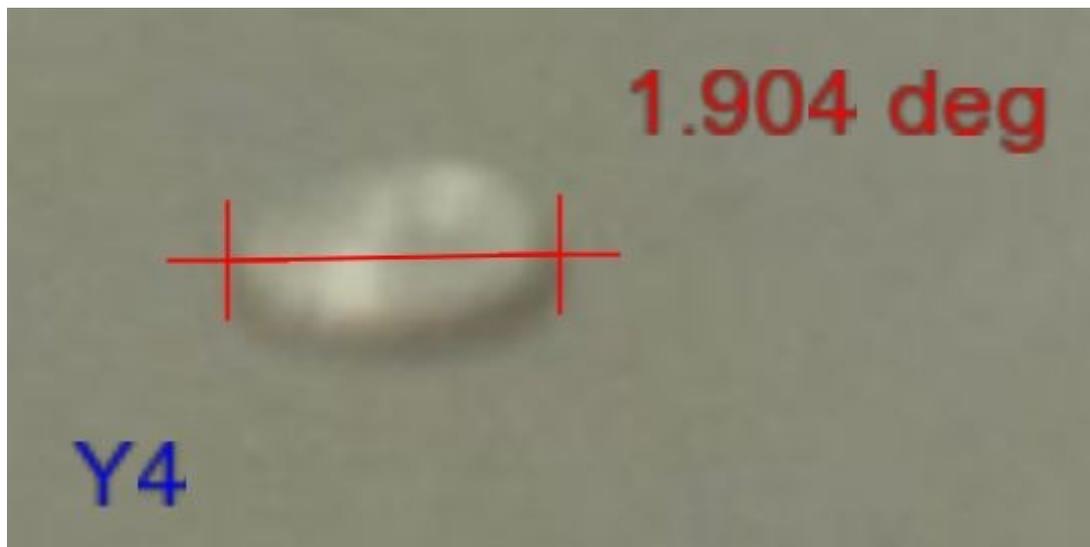
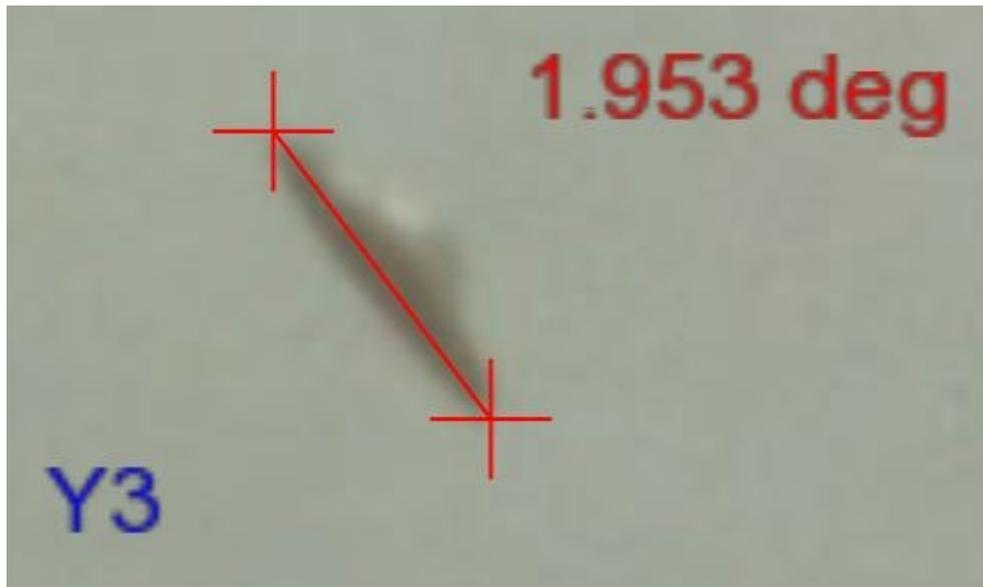
2.151 deg



Y2

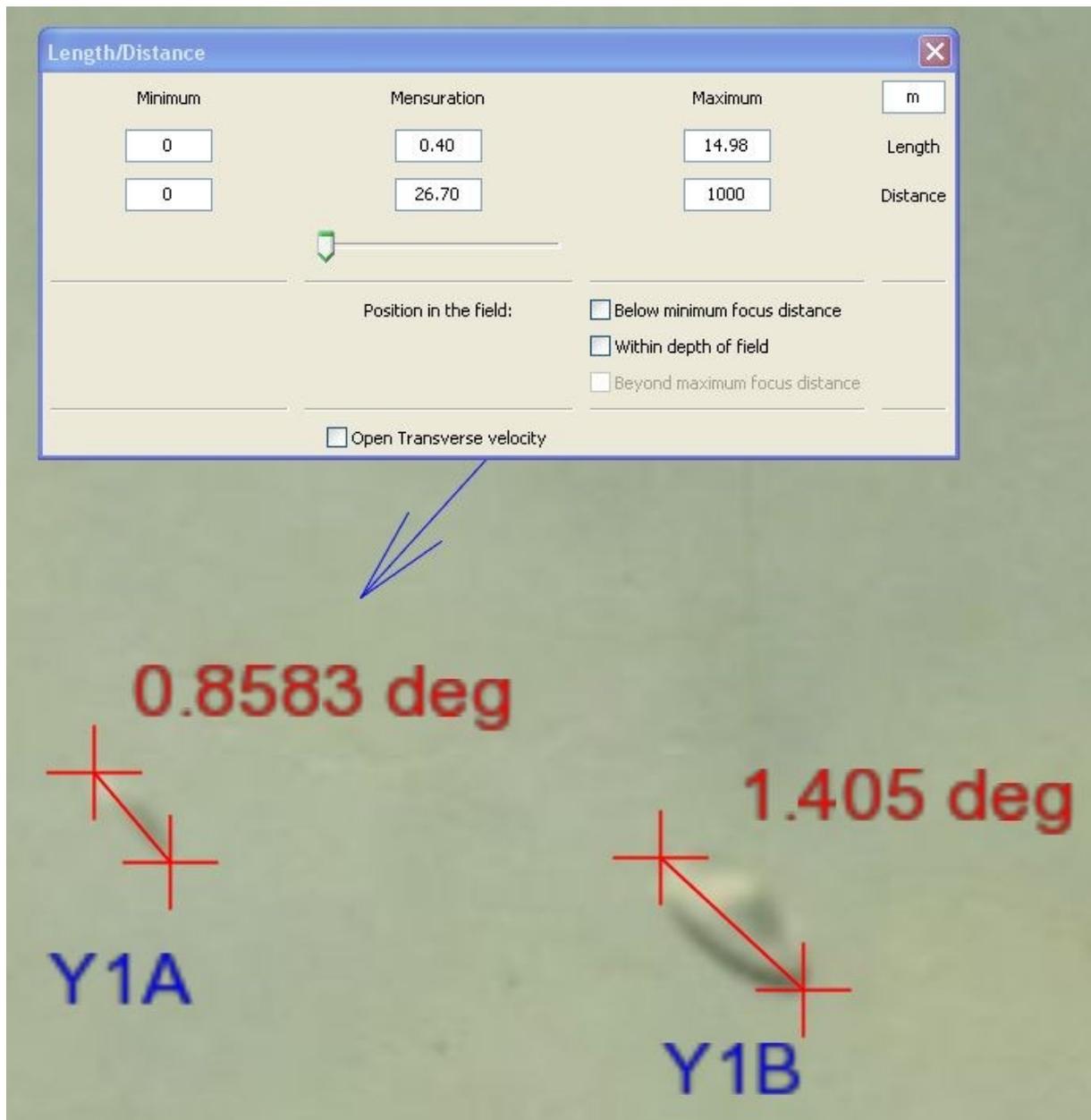
3.305 deg





Assuming that the camera was used without any external lens, thus with a focal length of 105 mm, IPACO could provide the ratio between each object's transverse size and its distance from the camera.

In particular, the possible case of a hubcap (diameter ca. 40 cm) was scrutinized.



If the objects were hubcaps with an estimated size (diameter) of 40 cm, their respective distances from the camera were as follows:

Object	Angular size	Size	Distance
Y1A	0.86 °	40 cm	27 m
Y1B	1.4 °	40 cm	16 m
Y2A	2.2 °	40 cm	11 m
Y2B	3.3 °	40 cm	7 m
Y3	2.0 °	40 cm	12 m
Y4	1.9 °	40 cm	12 m

Possible suspension thread

A surprising feature has been observed in picture Y1, above the object Y1B, indicative of a possible suspension thread.

Using the specific *Suspension thread* tool of IPACO, we obtained the following result:



This strongly suggests the presence of a dark line joining precisely the top of the object, with an angle of -2° from the picture's vertical. The high deviation values are quite significant.

We could also confirm visually this result, through the application to picture Y1 of contrast enhancement plus high-pass filtering:



However, since we could only work with a scan of a print of the original film, no final conclusion about the effective presence of a suspension thread may be drawn, since this dark line could result from any spurious effect on the paper print, including a mark with a pencil.

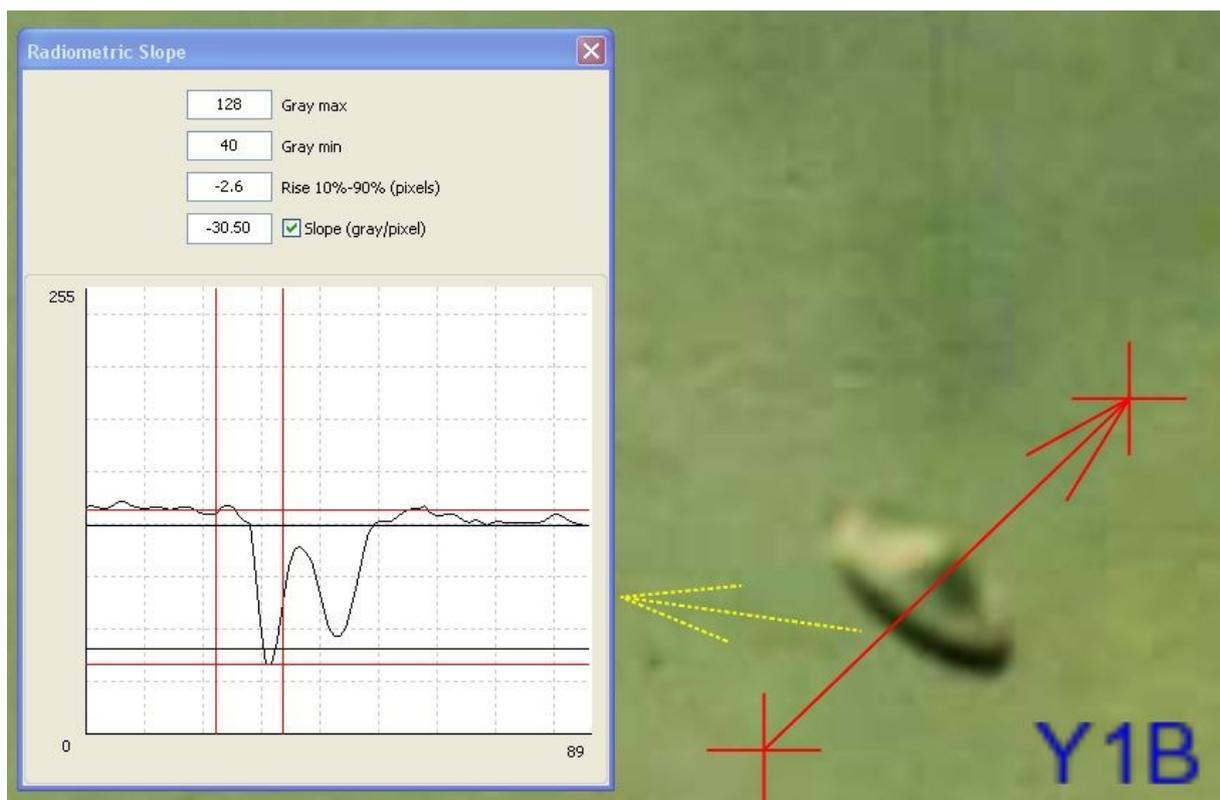
Important remark: such a feature does not appear anywhere else in any of the 4 Yungay pictures.

Radiometric analysis

Unfortunately, the objects are clear and do not comprise of any part sufficiently dark to be compared to the dark parts of the landscape, so that there is no reliable way to use radiometric values of the pixels directly to evaluate a possible range of distance.

However, when looking at the Yungay pictures, the initial impression is that the objects are not very far from the camera. This is due to the relative sharpness of the objects' contours.

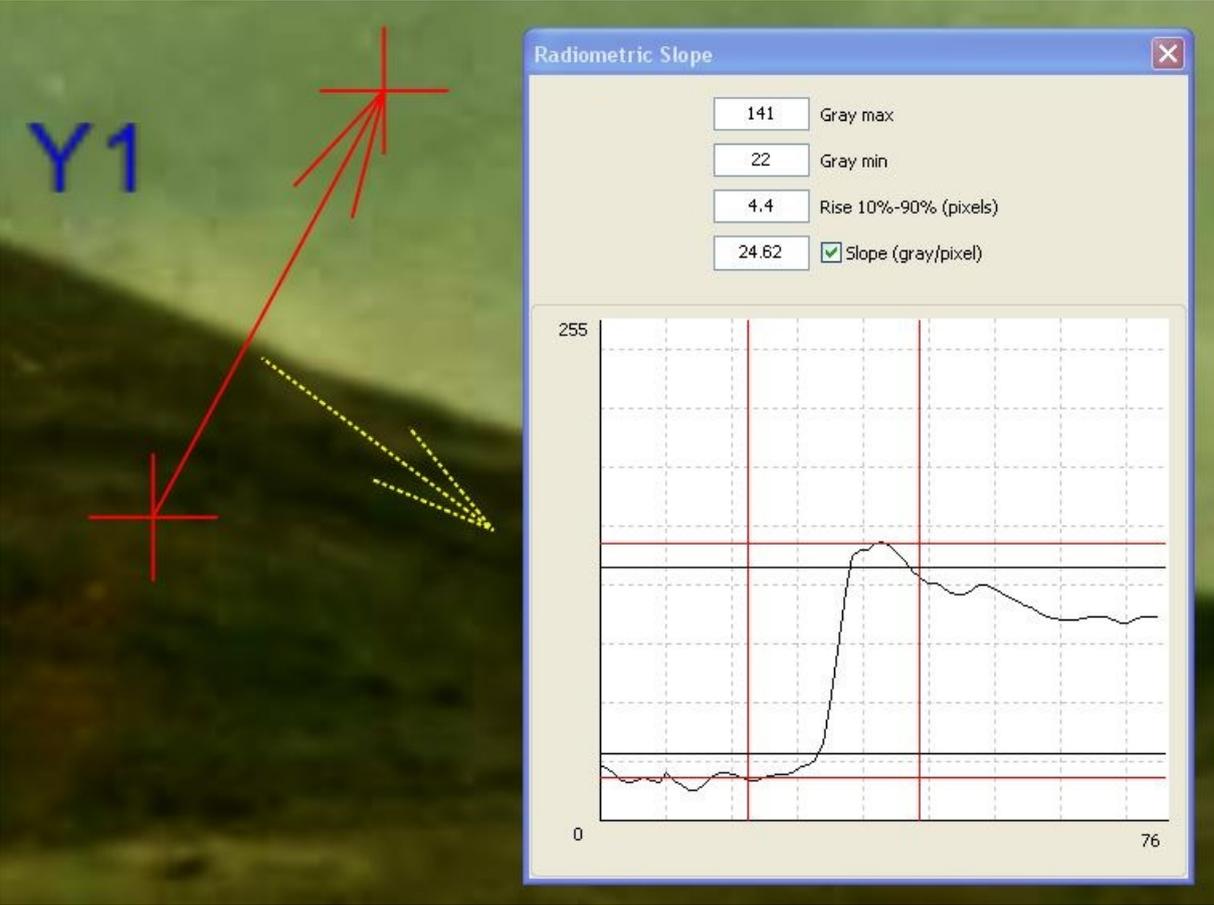
It was possible to quantify this, using IPACO's *Radiometric Slope* tool with one of the pictures which display part of the landscape. On picture Y1, we measured the radiometric slope across the Y1B object's contour:



The result is given by the length of the transition slope between 10% and 90%:

$$L_{\text{contour}} = 2.6 \text{ pixels}$$

The radiometric slope across the horizon line was also measured:



$$L_{\text{horizon}} = 4.4 \text{ pixels}$$

Obviously, the object's contour is far sharper than the horizon line, which proves that the object was far nearer the camera than the horizon line.

Partial conclusion

As mentioned in the beginning, no final conclusion may be reached about a case for which the witness and the original documents are not available. In principle, such a case should not even be looked at.

However this particular case, with several clear daylight color photographs and an incredible story where nobody tried to get publicity, calls for attention.

The partial results presented above seem to converge toward a possible (but not proven) logical explanation of relatively small objects – such as hubcaps – thrown in the air or suspended by a thread (or a mixture of both) at a distance of less than 30 meters from the camera.

This case should remain archived in the **C class** (possibly explained, but with a lack of reliable information).