The motion of IAA was then of the order of 2 degrees per hour. Object S-H was moving at 2 degrees per 20 seconds of time. This is a factor of 180 larger, which could be accommodated if the object were roughly 180 times nearer. But then its size would have been roughly 180 times larger than IAA, in which case it should have covered the whole sphere, and not 2 degrees as seen.

If it were 180 times nearer than Comet IAA, its distance would be 2.6×10^4, a value smaller than the coma size by a factor of 10! Thus we would be submerged in the comet's coma, and there would be a glow over the whole sky! The photograph would look like a very diffuse central condensation, trailing over the sky, and not as sharp as shown in the published image.

In other words, we get the same discrepancy. Speed and diameter are inconsistent if the object was a comet.

5. Other Hypotheses

The object could be the remains of the exhaust of a Soviet rocket. Several cases have been known of the 3rd stage of a Soviet rocket separating over Chile, producing spectacular clouds of geometric forms (Noel, 1985; Morales, 1989).

The object could have been a "round cloud" or a "round haze". When the atmosphere is very stable, or in laminar flow, as it frequently happens in Chile, it can support round clouds, or round hazes, a spherically symmetric region of saturated water vapour. They do not last for long, but look remarkably as comets. They are even transparent, since bright stars can be seen through them.

I have seen two of them, one of about 1–2 degrees in diameter. The other one was of 5 degrees of diameter. I remember it distinctly because it was located on top of comet Halley, with the rest of the sky completely clear (a good example of the way nature sometimes behaves)! It lasted for about 15 minutes and then went away. If such a round cloud is located at 10 kms from the observer, at dawn, it may look remarkably as a comet. Its speed can be calculated from Equation 3, and comes out to be 60 kms/h depending if the diameter is 2 degrees or 0.2 degrees. This is compatible with the surface winds on Earth.

Thus this hypothesis can be tested. If S-H's Object was a cloud in the Earth's atmosphere; then the wind should have been moving toward the N, at between 6–60 kms/h. This information should be available in the meteorological office. Notice that this assumes that the surface wind is the same as the wind at the object's altitude, which might not be the case.

Additional information could be gained from a study of the image structure in the published picture. If the object was a comet the image structure should show a trailing central condensation, decaying slowly in brightness outward. This does not seem to be the case from a cursory analysis of the image. However a more detailed study is required.

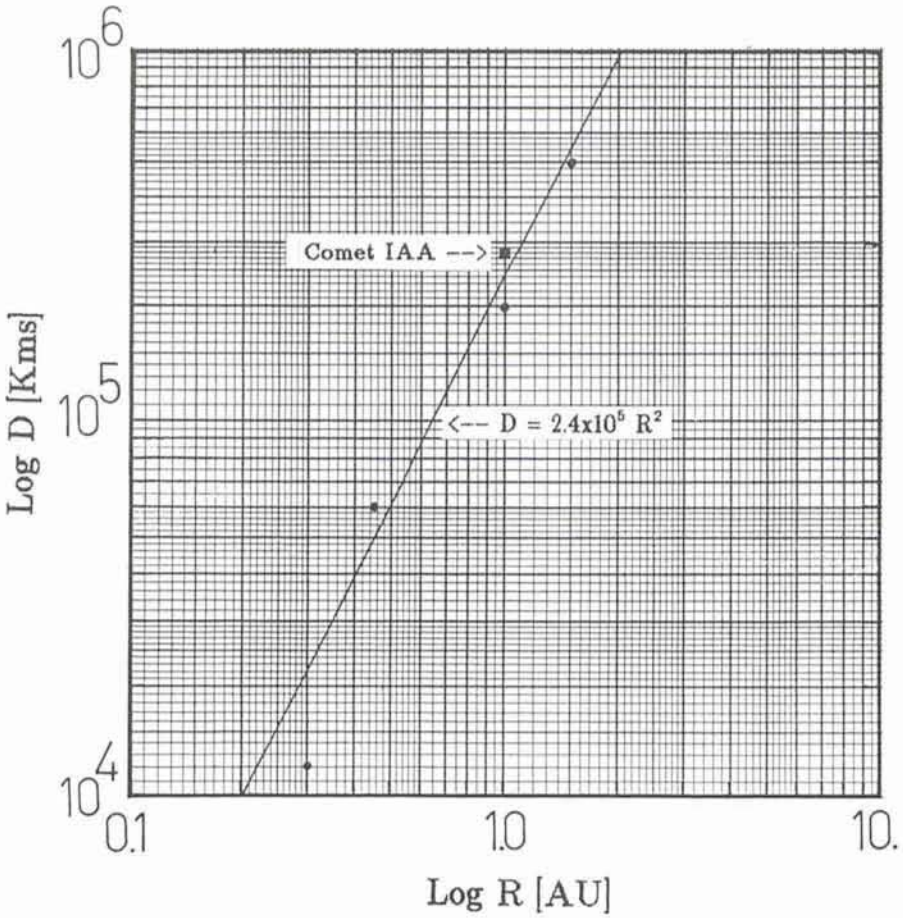

Figure 1: *Diameter of cometary coma as a function of distance to Sun (Wurm, 1939).*

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Unidentified Object Over Chile Identified

The unidentified flying object (UFO) seen from Chile between 2:15 and 2:21 UT on January 24 (*The Messenger* **67**, p. 56) was correctly assessed by author Hainaut as the upper stage of a rocket. However, it was not re-entering, but "exiting" to a higher orbit.

An hour earlier, the Commonwealth of Independent States (CIS) had launched Cosmos 2176 on a three-stage rocket from Plesetsk (2300 km northwest of Baikonur). Typically, the strap-ons and stage zero impact within CIS borders. The first stage places the payload and second stage into a transfer orbit of roughly 200 by 600 km. After separation, the first stage remains in the transfer orbit and the second stage fires while heading north-east off the west coast of South America, before completing one revolution of the Earth.

Until now there was speculation whether this type of UFO seen by Chileans was the first stage venting unburned fuel or the second stage firing. The fine photographs and description provided by La Silla astronomers indicate that, at least in this case, the latter

explanation is correct. A nominal second stage burn lasts a little under 4 minutes. Ironically, although its launch was detected visually by astronomers, the mission of Cosmos 2176 is to detect the launch of missiles towards the CIS in the infrared!

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On the "Unidentified Object Over Chile"

In a recent article (*The Messenger* **67**, p. 56–57), O. Hainaut proposes a re-entering satellite or rocket as explanation for the observations of the unidentified object over La Silla on 24.1.92 at 2.15 to 2.21 UT.

A preliminary analysis of the information on satellite launches and decays for the period 23./24.1.92 was performed by H. Köhnke, Satellite Station Stade, and myself in order to confirm or disprove this hypothesis.

Satellite decays*: according to information published in *Spacewarn Bulletin*, the following satellites decayed on 23./24.1.92:

Object	Description	Decay
1986-19-CX	Part of Ariane Launcher	23.1.92
1991-51-A	Microsat 1	23.1.92
1991-51-B	Microsat 2	23.1.92
1991-51-D	Microsat 4	23.1.92
1991-51-G	Microsat 7	23.1.92
1991-51-C	Microsat 3	24.1.92
1991-51-E	Microsat 5	24.1.92
1992-1-B	Rocket Cosmos 2175	24.1.92

Orbit calculations of the Microsats and of Rocket Cosmos 2175 show that none of these objects can be considered a potential candidate to explain the observations of the unidentified object over Chile. For the Ariane launcher part, no orbital elements were available for our calculations.

Satellite launches: according to the RAE tables of Earth Satellites the only launch of interest for the UFO observations is that of Cosmos 2176 on 24.1.92 at 1.12 UT. The orbit inclination of this launch was about 63 deg which points towards the Plesetsk Space Centre (near Archangelsk) as launch site. With this assumption an observability over Chile resulted on 24.1.92 between 2.15 to 2.20 UT for re-entering parts of the Cosmos 2176 launch. The scenario of the re-entry of a rocket launched from the Baikonur Space Centre as proposed by O. Hainaut can be ruled out for two reasons: no parts from the Cosmos 2176 launch would pass over La Silla during the first orbit revolution when launched from Baikonur and most Russian high-inclination launches (i.e. those above 60 deg) are made from Plesetsk.

In summary: The UFO observed on 24.1.92 2.15–2.21 UT over La Silla could have been a part from the Cosmos 2176 launch. However, further investigations are needed to verify this explanation (launch site of Cosmos 2176). In this context, a more detailed description of the UFO trajectory over La Silla or other places in Chile would be very helpful for a positive identification of the Cosmos 2176 launch as origin for the UFO. The decay of a space debris (like 1986-19-CX or others not given in the NORAD catalogues) cannot be ruled out as possible explanation.

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* The decay and orbit information was kindly provided by ESOC Darmstadt.

First Images with IRAC2

ESO's new infrared camera equipped with a 256×256 Rockwell NICMOS 3 array (see *The Messenger*, **67**, 21) was tested on the 2.2-m telescope for the first time during the second half of May. Although the weather was generally poor, a large number of images of a variety of objects were nevertheless obtained and are now being reduced to assess the performance achievable in the various modes. Amongst the first of these are the accompanying images of the A1689 galaxy cluster at z=0.2 and the supernova remnant RCW 103. It is planned to include a more detailed report in the next issue of the *Messenger*.

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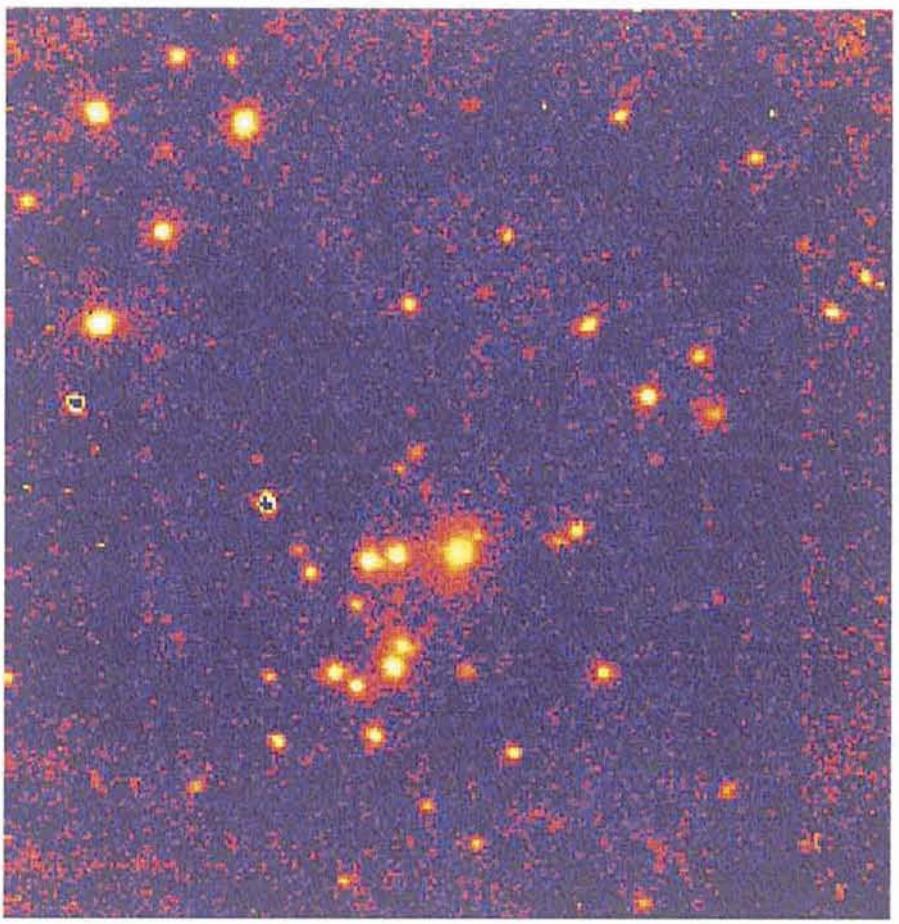

Figure 1: *K' (2.1 μm) image of the galaxy cluster A1689 (z=0.2) obtained with IRAC2 at the 2.2-m telescope on La Silla. The scale is 0.49"/pixel and the field is ~2×2' with N at the top and E to the left. This image was constructed from ten 2-minute exposures made at different positions shifted by ~15" on the sky to enable accurate sky subtraction and removal of bad pixels and has been flat fielded using measurements of the illuminated diffusing screen in the dome. The galaxies have integrated magnitudes in the range K' = 13.5–19 and the r.m.s. noise corresponds to ~21 mag (arcsec)^2. (Image processing: Reynier Peletier).*