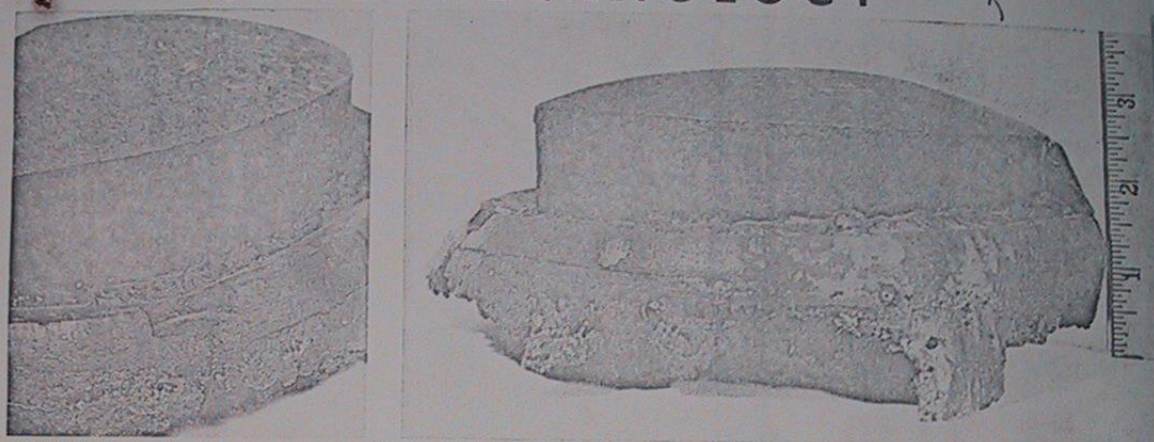


EDGE OF STEEL PLATE contains counter-bored bolt hole (left). Full view of fragment (right) indicates disk-like configuration.

Reveals Sputnik 4 Fabrication Techniques

the perimeter of the cylinder, except for a 30-deg. arc. The plate appears to have been machined to a depth of approximately ⅛ in. to accommodate the cylinder, and the interface between the two is extremely smooth. A metallurgist who examined the object at Massachusetts Institute of Technology termed the weld "very good."

Rounded top surface of the cylinder and the plate show evidence of ablation, although the cylinder has retained its sharp upper perimeter. The shoulder formed by the cylinder and plate is partially filled with resolidified steel, the appearance of which suggests that it flowed from the top surface during re-entry.

Irregular mass of ablated steel adheres to the underside of the plate and is bubbled and porous in appearance, as might be expected from the resolidification of molten steel. Composition of this part is identical to that of the unablated portion of the disk, except for a decrease in the concentration of some of the more volatile trace elements.

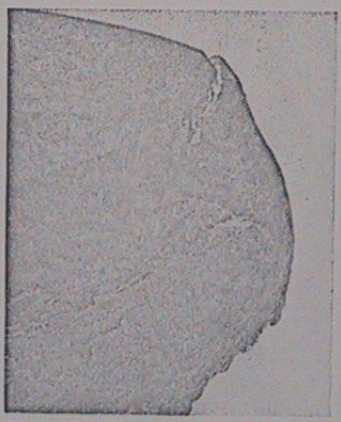
Over-all appearance of the disk lends credence to the Smithsonian supposition that it re-entered the atmosphere with the rounded cylinder foremost, but an MIT professor of aeronautics and astronautics said that in its present shape the object probably would be aerodynamically unstable, causing it to tumble during re-entry.

When the disk was sectioned for scientific analysis, a bolt was revealed embedded in the resolidified deposit on the bottom of the plate. The bolt—one end of which is threaded into a flanged nut—has metric-system dimensions, with 6-mm.-dia. and one thread per millimeter.

The bolt has not undergone analysis, as was suggested by an MIT metallurgist, nor is there any plan to search for other objects that might be concealed by the ablated steel.

As yet, no positive identification has been made of the precise function of the disk-shaped object in the satellite. Dr. Charles A. Lundquist, Smithsonian assistant director-science, said that it may have been ballast or a part of the heat sink in the re-entry shield, which would explain its unusual massiveness.

Several Soviet scientists, including Mme. Alla Massavich, head of the Russian program for monitoring satellite re-entry, have been approached for an explanation of the disk, but to date none has been offered.



BEAD OF WELD joins steel cylinder and plate. Note shape and texture of resolidified steel which ablated from top of cylinder to fill part of shoulder.

Proof that the object had been above the atmosphere for a considerable length of time and was not a hoax was obtained by means of radiological tests conducted at Los Alamos Scientific Laboratory. A radioactive isotope, Argon 37, was detected in the test sample. This isotope was formed by bombardment with galactic cosmic rays and trapped particles in the Van Allen belts.

Test for tritium, a triple-heavy hydrogen isotope, was negative, but this was attributed to the fact that the substance probably flowed away during re-entry into the atmosphere.

Smithsonian officials ascribed the successful sequence of events—visual observation of re-entry, recovery of fragments and scientific investigation—to a combination of luck and enthusiastic support by members of their Moonwatch teams, field investigation personnel and scientific staff.

Moonwatch teams, which were organized in 1958 for the purpose of monitoring satellite re-entries, were alerted throughout the world following prediction by the North American Air Defense Command's Space Detection and Tracking System (Spadats) that Sputnik 4 would re-enter the atmosphere on or about Sept. 6. Re-entry ephemeris computed by Moonwatch headquarters indicated that the satellite would pass near zenith in the Milwaukee area during its final orbit at 4:58 a.m. local time.

Three trained observers on the Milwaukee team, equipped with theodolites, were waiting for the satellite. Two were stationed at the Milwaukee Observatory on the outskirts of the city, while a third was about 20 mi. away in downtown Milwaukee.

At 4:49 the downtown observer no-