

PART NUMBER 40552

An irregularly shaped piece of transparent plastic, cataloged as TIGHAR Artifact 2-3-V-2, is an object found on Nikumaroro to which a standard Lockheed Model 10 part number can be assigned. Here's a review of the investigative process by which that determination was made.

← $22^{+0}_{-1}/16$

DISCOVERY

On the afternoon of the fourth day of the NIKU III Preliminary Expedition, team member Veryl Fenlason (#0053CE) noticed an object lying on the jungle floor in the “old village” and thought it might be a piece of Plexiglas.

ON-SITE CONSIDERATION

Veryl brought the artifact to the attention of the expedition leader and other team members in the area and it was discussed as a candidate for collection. It was clear that this was part of a larger object made of fairly sophisticated 20th century material from which pieces had been crudely cut and broken. Its surface exhibited a slight but uniform curvature. No source of such material had been encountered elsewhere in the village and the location was too far inland for it to have washed in from the sea. Other debris in the same location exhibited similar evidence of having been cut apart, suggesting that whoever lived here was something of a craftsman or tinkerer. A further search of the spot turned up another smaller shard of the same material which fit a break in the first piece. Because known aircraft parts had been found in the vicinity it seemed reasonable to speculate that this might indeed be plexiglas and to have come from an aircraft. The expedition leader made the decision to collect the two pieces for testing and cleared their recovery with the Kiribati government representative as Artifact 2-3-V-2 (see photo p. 10).

INITIAL TESTING

Upon our return to the United States the first step was to conclusively identify the material. This was accomplished by contracting with a reputable conservation laboratory for a compositional analysis. A series of tests confirmed that the material is polymethyl methacrylate (PMMA), also known by the trade name Plexiglas. So far so good, but that didn't make it an airplane component, much less part of the Electra.

We next contacted Rohm & Haas, the company which produced Plexiglas in the U.S., and got some history on the product. Polymethyl methacrylate was first produced in Germany by the Rohm company in 1927. In 1936, Rohm & Haas began producing it in the U.S. under the name “Plexiglas.” DuPont also made PMMA and called it “Lucite,” while in Britain, ICI Ltd offered the same product under the name “Perspex.” The new material was considered superior to earlier cellulose-based products (Pyral and Platicelle) used in airplanes where a curved transparent surface was needed, and by 1937 aviation maintenance manuals included instruction on how to work with plexiglas. Because it was relatively expensive, the use of PMMA was limited to aviation applications and the manufacture of jukeboxes. During and immediately after the war it was almost exclusively an aviation product and didn't come into common civilian use until the early 1950s. Because the “old village” on Nikumaroro was abandoned in 1949 and (as far as we know) had no jukeboxes, we concluded that the artifact had probably come from an airplane. But what airplane?

MATCHING THE WINDOWS

All of the airplane parts found on Nikumaroro seem to fall into two categories, B-24 and Lockheed Electra. Since both aircraft could have had Plexiglas windows, the next step was to look at the artifact's curvature and thickness. Plexiglas, to be formed, must be heated to a minimum of 90°C—a far higher temperature than could be reached just lying on the ground (even on Nikumaroro), so the curvature of the artifact is almost certainly originally from an airplane. To see if it is the same curvature as a Lockheed Electra window we asked our friends at the New England Air Museum in Windsor Locks, Connecticut to send us a piece from their under-restoration Electra c/n 1052 (Earhart's plane was c/n 1055). The exterior surface curve of the airplane and the window appeared to be identical. The glass on the 1052, however, was tinted and twice as thick as the artifact (1/4 inch versus 1/8 inch). Early photos of 1052 show

