

Heraeus: interview with contemporary witness Gerhard Steiner (*1937).

Material can be used for journalistic purposes.

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Translated Interview Transcript

Heraeus | Gerhard Steiner (*1937)

Gerhard Steiner worked from 1964-1998 in the Heraeus Fused Silica Smelting Facility in Hanau, Germany, and was responsible for quality control of the triple prisms for the Apollo 11 project.

Note: the most interesting parts are highlighted

00:00min – 00:17min

Question: How did a company in Hanau, Germany, end up working with NASA?

GS: The beam path in a triple prism travels in three dimensions, and Heraeus Quarzglas was the only company that could produce that prism.

00:18min – 00:49min

Question: What is so special about Heraeus fused silica?

GS: At the time, we received an inquiry from Heraeus Amersil, in the USA: We need a piece of fused silica that is radiation-resistant and three-dimensional, without layers or distortions. At the time, our Suprasil was really the only option.

00:50min – 01:09min

Question: Was the project initially a job like any other, or was it clear from the start that the order had a historic dimension?

GS: We didn't yet know exactly what would actually come of it. The request gave us an inkling – the requirements were stringent. And Heraeus was in a position to meet stringent requirements.

01:10min – 01:33min

Question: When the inquiry arrived, did you already know what was to be produced, or for whom?

GS: We needed cubes in a specific size, with an edge length of 41 mm; nothing more was known, at least not to me. Then, with adjustments in production, we were able to achieve these values.

01:34min – 01:47min

Question: What was the nature of the stringent demands you faced?

GS: A key requirement was radiation resistance, which is, in fact, an extreme requirement.

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01:48min – 02:12min

Question: What were you doing on the day of the moon landing?

GS: It was the next day. I was with friends, on our way to take a hike. And in the afternoon, the moon landing was on television. We were really excited. But I wasn't aware that our prisms were on board. We only found that out later.

02:13min – 02:40min

Question: When you think back on the moon landing – how does it feel to have been part of one of mankind's greatest technological achievements?

GS: Well, we were very proud. And – "Oh, you once held every piece of that in your hand." That was really interesting. But it was actually quite a while before we knew for sure that Heraeus prisms were involved.

02:41min – 03:08min

Question: What makes Heraeus so special?

GS: The Heraeus technology group has always been known for having special characteristics that others could not match. And with quartz glass, it was basically the same: We were essentially the world leader, with the highest quality.

03:09min – 03:27min

Question: What other revolutionary projects have involved quartz glass from Heraeus?

GS: Well, in one case the goal was to produce large-diameter quartz glass plates, specifically for telescopes.

03:28min – 03:45min

Question: What did the rest of the employees say about the project?

GS: At first, we were shocked at these stringent requirements. But then, soon enough, we were able to say "we have to do it," or "we can do it."

03:46min – 04:05min

Question: What was the makeup of the Heraeus Quarzglas team at the time?

GS: There were actually only a few people who were capable of turning out this level of quality on the production machines.

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04:06min – 04:20min

Question: How did you ensure quality?

GS: We began testing even in the preliminary stages to see whether we could manage to end up with these qualities.

04:21min – 04:45min

Question: Why was quality assurance so important?

GS: The requirements were extremely high in terms of angle accuracy, and also dependent on the refractive index, because the beam has to travel high above the Earth and only fractions of photons were reflected, which had to be captured here on Earth.

04:45min – 05:14min

Question: How precise was the result?

GS: At the time, I believe, we could measure the distance to exactly 10 cm – from the reflector to the telescope where the laser stood. And most recently, I believe, the precision is up to 2.5 cm. So, it was possible to measure the time more precisely.

05:15min – 05:42min

Question: What difficulties did you have to deal with at the time? Or did everything always function smoothly?

GS: Of course, this was back in the days when computers were still in their infancy – the moon landing is one example. Basically, its computer was similar to a Commodore 64, a few kilobytes or so.

05:42min – 05:59min

Question: How did your family and friends react to your work on this project?

GS: My sons say, "Papa, you once held everything right in your hands that is now up there on the moon." That makes me feel a little proud.

05:59min – 06:24min

Question: What does Heraeus, the company, mean to you?

GS: You always stay connected to the company, even though now – I've been retired for 23 years now. But you still feel devoted to the company. You're always delighted when you see your former colleagues, and you can still share so many old memories.

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06:24min – 06:43min

Question: What was it like working with your team back then?

GS: Teamwork was extremely important back then. You never had any – how should I put it – secret agendas. We were a family, and everyone helped everyone else.

06:44min – 07:00min

Question: Did you think at the time that the reflector would still be functioning and in use after so long?

GS: That's how we built it back then, and its radiation resistance is so high that it is still working after 50 years. These are insights that we gained through space travel.

07:00min – 07:38min

Question: When you think back on that time, is there an anecdote or a funny episode you'd like to share with us?

GS: Well, you have to temper the fused silica after it is manufactured, and one day an oven fell open, and in theory, it shouldn't have been any good at all. And then we tested those prisms, and they were actually better than the other ones. And we repeated the process, and in fact: At a temperature that under normal conditions should actually have had no influence at all, in terms of their homogeneity the prisms turned out better.

07:38min – 07:53min

Question: How would you describe the spirit of Heraeus?

GS: We were Heraeus. And we were proud whenever something somehow worked out. And we led the way.

07:53min – 08:23min

Question: For what inventions was the lunar reflector decisive or fundamental?

GS: Nowadays, every department store or hardware store sells hand-held electronic devices that you can use to measure distances. Basically, this is a very weak version of the lunar reflector. A beam is sent out and reflected back, and the device measures how long it takes.

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08:24min – 08:39min

Question: What do you say to critics or people who doubt that the moon landing occurred?

GS: The lunar reflector that it is still working today is actually the single best proof that the astronauts were up there and put it [the reflector] on the moon.