As loyal foot soldiers of the Empire, Star Wars stormtroopers became one of the saga's most seminal characters. Variations on the original stormtroopers appear in every film, though none are more beloved than the original. The stormtrooper costume was another brainchild of Lucas and Ralph McQuarrie. “They were sort of robot-like,” McQuarrie said. “Totally obedient; the ultimate soldier, without any feelings at all. If they were given an order, they did it. So they were better off being these people without expression.”

McQuarrie experimented with the stormtrooper’s armored shell in preliminary pencil studies, and laid down a rendering in his production painting of a stormtrooper with a lightsaber. He conceived that like most military forces, the stormtroopers would have different ranks, distinguishable by their helmets. “I had the officer’s helmets a somewhat different shape than the standard trooper. The trooper’s helmet had a metal-colored top, and a more symmetrical look to it. The officer’s helmet was formed more like a skull,” he said. He envisioned the officers as having a removable breathing unit, with a heat sync mounted on the front that would cool the air they breathed. Practical concerns meant that McQuarrie’s concept of varying helmets would never be realized. In the film, all stormtroopers wear essentially the same helmets and the same uniforms.

Much like C-3PO, the all-encompassing body armor of the stormtroopers was initially modeled in clay. “We got in a model of suitable size and did a plaster cast of his body. The sculptor in the studio then modeled the armor in clay over the figure. Everybody used to go in and say, ‘Well, take some clay off here, take some off there.’ This went on for several weeks,” said Mollo.

Sculpting duties for the stormtrooper were split between Brian Muir and Liz Moore, with the former handling the body armor and the latter tackling the helmet. The helmet was actually Muir’s first job when he started on the film in early January 1976. “The only thing that wasn’t done from Ralph’s original concepts was the back of the costume, because there was no concept art to show it. I just had a single sketch to go by,” Muir says. “Each component was sculpted on its own, with a gap between each one, because it had to fit anyone from 5’10” to 6’3”. The only way to make that work was to have a gap between components, and if someone was bigger, the gap would increase; if they were smaller, it would close up.”

The helmet was actually sculpted outside of the studio. Liz Moore left the film at the end of January 1976 to spend time in Holland with her boyfriend. John Barry and Liz were friends, and I’m sure that John gave her the helmet as something to do while she was in Holland, for the money. Because she was a single mother at the time,” Muir says. Moore set up a makeshift workshop in Holland and began crafting what would become the quintessential villainous soldier helmet. Once the physical version of McQuarrie’s helmet design was locked in, Moore drove the completed sculpture back to the U.K. and delivered it to Barry at Elstree.

The clay sculpts for both the body armor and the helmet were molded by the studio plasterers, and sharpened by the same process applied to the Darth Vader and C-3PO costumes. The cleaned-up patterns were then used as templates for vacuum-forming the final armor components. Vacuum-forming is a process where a thin sheet of plastic is heated, pressed over a pattern, and vacuum suction is applied to mold the plastic snugly to the original form. A few sets of costume pieces were vacuum-formed in-house at the studio, before a temperamental machine combined with a growing workload forced production to employ an outside vendor for the rest of the suits. “We had a vacuum-forming press in the studio, but they needed it for various things for the set. So we had to find somebody outside to make the stormtroopers,” Muir says.

The helmets were especially difficult to manufacture due to the undercuts, or areas of negative incline, which cause the plastic to fold back on itself and become lodged in the pattern during forming. A majority of the helmets were therefore produced in a khaki-colored polyurethane. The only helmets that were truly hand-made were the “hero” stormtrooper helmets created to a higher standard than their standard counterparts. Hamill and Ford wore these “hero” helmets for their stormtrooper disguises.
As George Lucas discusses the next shot with his well-equipped sandtroopers stroll in the Tunisian desert, circa March 1976.

This sandtrooper helmet was derived from the stormtrooper helmet Harrison Ford and Mark Hamill wore across set on location in Tunisia, circa March 1976.


TOP Harrison Ford and Mark Hamill were assigned stormtrooper outfits similar to these.

UPRIGHT Imperial stormtroopers get some air between takes on Stage 9 at Elstree, July 1976.

Polyethylene plastic that was more malleable than the available white-cotton plastic. The helmets were then painted with thick lexicon house paint to produce the desired white finish. The body armor was more manageable, and was produced in white ABS plastic. A limited number of "hats" helmets designed for close-up work were also produced in white ABS plastic; the helmets Harrison Ford and Mark Hamill wear in the film are examples of the ABS "hats" helmets.

Once the plastic body pieces and helmets were produced and painted if necessary, they were delivered to the costume department. There, the helmets had to be adjusted to fit the performers. "When we had to get Mark and Harrison into the armor was a worry. "When we had to get Mark and Harrison into the armor on, because once they were dressed in the white outfit they could not sit down. After a while, the men tried to sit down, and of course fits and pieces started to come adrift. So after dressing them, they would be back in the workshop, putting them together again for a couple of hours. We had jam jars full of solvent we used to melt the plastic, as a glue, because I don't think we found a glue that would hold. So we used the solvent to stick the plastic onto them."

When the screenplays called for both Luke and Han to wear stormtrooper costumes against the Death Star, getting the rigid pieces to fit them was a worry. "When we had to get Mark and Harrison into stormtrooper costumes, I was concerned if they were going to fit properly," says Wilson. "Because the armor was basically one-size. But we managed to get them into it and it worked. They were quite good and didn't complain.

In addition to the standard stormtrooper costumes, Lucas requested a small number of enhanced uniforms for use as field troopers. This style of gear-laden trooper, later dubbed a sandtrooper, was illustrated by McQuarrie. "At that point, George talked about making the stormtroopers really like American soldiers in Vietnam, with things chucked on their jackets," McQuarrie said. "And they would be loaded down with all kinds of equipment. All mysterious things that you don't know what they are; little cameras, like German soldiers wore in World War II.

During the film's production, Lucas requested these field-ready stormtroopers for the location shoot in Tunisia. "George announced that he was going to take some stormtroopers on location with him, and he wanted them to be in combat order," Mollo recalled. "I said, 'Oh yes, George, what's the combat order for stormtroopers?' And he said, 'Well, they've got a lot of stuff on the back.' So I went into this toy scout shop in London and bought one of those metal pack things, and then we had these plastic seed boxes and we stuck two of those together to make a box, and we put four of those on the rack." Additional details came from similar plastic storage containers and drainpipes from hardware stores, all cobbled together to look functional.

"That's the most amazing kind of film," Mollo said. "A real 'thrown together' job." Lucas also requested something to differentiate the division of the troops. Mollo found a youth motorcycle chest protector that was available in different colors, and it was positioned on the costume as a shoulder pad. "George said, 'That's great!' so we painted one orange and one black, and that was it," Mollo said.

The armor of the stormtroopers was detailed to make the troopers seem like they had been working in the conditions for some time. Their helmets were also given a slightly different painted detailing to distinguish them from the other stormtrooper helmets.

While the stormtroopers remain one of the most enduring costumes of the saga, McQuarrie was never fully satisfied. "I think the way the helmet turned out, it suggested teeth too strongly. I wanted it to be more just part of a machine, you know," he said. "That's why I would have loved to have been there in the U.K. when they were being made, to see these things develop."

The Modelers

Nearly all the hard plastic elements for the Star Wars costumes were sculpted by Liz Moore or Brian Muir. Modelers are an essential part of any production's art department, as they can shape clay into organic three-dimensional patterns that are difficult to produce in wood, plaster, or other materials.

Liz Moore was recognized for her sculpting talents early in life, and enrolled in art school at the age of sixteen. At age twenty-one, she received wide coverage in the British press for her sculpted busts of the Beatles. She began her film career in 1952. A Space Odyssey, working with Stuart Freeborn. She worked on Kubrick's next picture as well, A Clockwork Orange, where she met production designer John Barry. After a brief stint creating figures for Barry Lyndon at Kubrick's personal request, she went to work on the production of Star Wars. Moore was tragically killed in a car accident before the film was released. She trimitted neither her massive success nor her impact on the film industry.

Brian Muir was another relatively young member of the Star Wars production team. He was only twenty-three years old when he modeled the mask and helmet of Darth Vader. Muir had attended art school as part of an apprenticeship program through the Associated British Picture Corporation, a film studio not far from Elstree Studios. During this time, Muir's mentor was a veteran industry sculptor named Arthur Holsey. Muir worked on a number of films during his four-year apprenticeship, at various studios in Borehamwood, which was known as "England's Hollywood." It was on these pictures that he became accustomed to the thin budgets and tight deadlines of the production world. When he completed his apprenticeship, Muir went to work outside the film industry for several years before receiving a job offer from Elstree.

"Out of the blue I had a phone call from the guy that I trained under. Would I like to go and do a science-fiction film at Elstree? The way he put it was that there were a lot of strange characters to do," says Muir. Since then Muir has worked on more than sixty major film productions and continues to be active in the British film industry.

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