

## Putting students back in touch with principles of metalworking and manufacturing.

The following article by Michelle Bennett appeared in the July, 2011 issue of *Manufacturing Engineering* magazine. It suggests ways America could re-introduce to students the process of thinking about how things are made so that we could once again become a society of innovation and production.

## Polishing Hephaestus's Tarnished Image

Michelle Bennett, Writer, Artist, and Metalworker

Since the time of the Greek gods, manufacturing has always been the black sheep of the family. Steeped in images of smoke, soot, grime, and slag heaps—not to mention clanging noise, unbearable heat, and arduous labor—it is the less-respected sibling of the professions of law, medicine, and agriculture, even though it is of equal antiquity, and arguably produces things of just as much value.



According to the myths, the Olympian gods have given us just about everything. Knowledge, wisdom, and law are the province of Athena. Medicine, music, and the liberal arts belong to her brother Apollo. Demeter is the goddess of agriculture; Hermes the god of commerce, communication and travel; and we have Dionysus to thank for the invention of wine. Love and war are the respective realms of Aphrodite and Ares.

At the same time, Hephaestus, Greek god of metalsmithing, technology, and craft, may be better known for his crippled legs and his rocky marriage to Aphrodite. But he was

a born inventor. By age nine he had made a brooch so beautiful it attracted the attention of Hera, the highest of all Olympian goddesses. He is the father of metallurgy, of skillful workmanship, and even of robotics, creating mechanical people to assist him in his workshop. He is the god who is equated with technical ingenuity and excellence in craftsmanship.

He made some priceless gifts for his powerful siblings. He crafted a silver bow and arrows for his sister Artemis, goddess of the hunt; he fabricated the magical winged sandals worn by his brother Hermes, which “carried him about with the swiftness of wind”; and he forged weapons for his sister Athena during the Trojan War.

But his status is still comparatively low among Olympian gods. How can Hephaestus’s profession be raised to the same level as those of his more respected siblings? The answer is through education.

What if today’s students were taught in early grades the fundamentals of engineering, including applied math, physics, and chemistry? What if they were shown a direct relationship between principles and products? What if they worked out a design on paper, and were given the knowledge and tools to build it themselves? What if they were encouraged to ask questions about how everything is made, especially the things that they use every day? These changes in education could ignite a powerful interest in the technological fields across a much wider spectrum of learners.

Actually, it is within the reach of young technicians today to design and create a brooch, a shield, a sword, even a robot. But their ranks could be greatly increased by an early technological education that puts basic engineering ideas alongside reading, writing, and arithmetic. Students who previously only wanted to read a book might start asking how the book was made. Students who were only interested in drawing might start wondering if they can turn their sketches into three-dimensional realities.

With a new emphasis on the engineering sciences in education, this country could once again be a global innovator. Fresh minds could be working on the practical problems that plague the world: how to provide nutritious food for the entire population; how to create energy without polluting the planet; how to live without banishing hundreds of species to extinction.

We need engineers and scientists to find solutions to the world’s biggest problems, but also visionaries to create things that have not yet been imagined. Let us invite students to be both engineers and visionaries, to follow in the footsteps of Hephaestus: not his hobbled footsteps, but his innovative, creative footsteps.

In the spirit of the inventor Hephaestus, let us challenge the students of today, and ask them who will be the first to make the winged sandals that will take the one who wears them anywhere he or she wants to go?

## About the Author

Michelle Bennett, daughter of longtime SME member Ron Bennett, is a writer and artist living in Oakland, CA. Bennett, author of *Missouri: Celebrate the States*, has been employed as a metalworker in West Oakland for many years, building stairways and other architectural steel structures.