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Möbius

You've probably heard of Möbius strips: Take a one-foot length of *cash-register* tape, give it a half *twist*, and then *glue* the ends together, forming a circle. Next, draw a line down the middle of the strip, without lifting your pen, until you close the line. You'll find, to your surprise (if you didn't already know) that the line is not on just one side. Rather, there is no blank side. When you made that half twist, you created a closed loop of paper with no inside or outside. And, when you look at it, you don't quite believe it.

So, who was the *namesake* of this strange thing? August Ferdinand Möbius was born in 1790, in what is, today, central Germany. He showed an early talent in math, and he finished a doctorate at Leipzig when he was 24. The rest of his life he taught math and astronomy at Leipzig, and he died there at 78.

No grand theories are named after Möbius. In fact, he's famous for two ideas that weren't *uniquely* his. Yet he was a fine mathematician in a time when Germany *excelled* in math. Working near him, were Gauss, Jacobi, Dirichlet, and someone you older engineers remember, Bessel of the infamous Bessel functions.

When he was fifty, Möbius gave a lecture in which he *posed* an odd problem: You're the king, and you must divide your kingdom among your five sons. You want each region to touch all other regions. That's easy enough to arrange with four regions. But just try to do it with five.

A somewhat similar problem is proving that you can colour any map using only four colours. You can do the colouring easily enough, but don't try to prove that its possible! It finally took the computer to convince people that they'd never find a map arrangement that needed more than four colours. The map problem is not really the same as the kingdom problem, but Möbius gets wide credit for inventing that four-colour problem.

So what about the Möbius strip? In 1858, at sixty-eight, he began his work on geometric *solids*. He described his Möbius strip in a paper published when he was seventy-five. However, his note-books show that he'd formulated the idea just after he began that work. Then we find that another person, Johann Listing, discovered the Möbius strip idea two months before Möbius did.

Well, that could hardly *lessen* one's *regard* for this remarkable person. For he did everything: He did his intuition-*boggling* geometry

and he did *celestial* mechanics. He wrote the mathematics of musical intervals as well as of psychology.

Möbius' grandson Paul became a neurologist and he eventually dug up Möbius skull. He wanted to explain his grandfather's geometrical ability by studying the shape of that skull. Well that bit of topology failed, of course. But Möbius' strip has been the mental driver for more valuable applied mathematics than I could ever describe in my *allotment* here. ■



<i>allotment</i>	Zuteilung, Anteil
<i>boggling</i>	verblüffend, irre
<i>cash-register</i>	Registrierkasse
<i>celestial</i>	Himmels-, himmlisch
<i>excel, to</i>	hervorragend sein
<i>glue, to</i>	kleben
<i>lessen, to</i>	abschwächen
<i>namesake</i>	Namensvetter
<i>pose, to</i>	aufwerfen, darstellen
<i>regard</i>	Achtung
<i>solid</i>	(Fest-) Körper
<i>twist</i>	Verdrehung
<i>uniquely</i>	einzigartig

Das Möbiusband ist wohl eine der bekanntesten mathematischen Spielereien. Wer aber war August Ferdinand Möbius?

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