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Defining Data Down

By John Derbyshire

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Like other complex human enterprises, science has a “front” and a “back.” The model here is a restaurant. In the front, waiters in spotless uniforms glide between tables murmuring suggestions and delivering exquisitely arranged platters. Meanwhile, the kitchen—the back—is a chaos of noise, heat, haste, breakage and rancor. Now and then a gross error in the back leaks out into the front, and a case of food poisoning shows up in the newspapers.

So it is with science. “Plastic Fantastic,” Eugenie Samuel Reich’s readable account of a fairly recent science fraud, is valuable chiefly as a close look at the “kitchen” where scientific results are assembled and validated—and whence occasionally comes forth something that should not have seen the light of day.

In late 1997, a young German postdoctoral physicist, Hendrick Schön, was hired by the famous Bell Labs of Murray Hill, N.J. Over the next four years he claimed sensational results in an arcane corner of materials science. Broadly speaking, Mr. Schön was seeking to persuade organic materials, like plastics, to exhibit behaviors useful in electronics. For such behaviors—superconductivity, bipolar transport and something called the “quantum Hall effect”—we currently rely on inorganic substances of a simpler but less robust microstructure, like silicon. Mr. Schön’s research, if it fulfilled its promise, would lead to smaller, cheaper and more reliable electronics. And Bell Labs was just the place for such work: The original transistor concept, on which modern electronics is based, emerged from there in 1947.



Mr. Schön began with modest claims, publishing in academic physics journals in 1998. Two years later he advanced to articles in *Science* and *Nature*, the big - generalist (though still peer-reviewed) magazines, and from there to coverage in newspapers and popular-science outlets. He won prizes for his work and became a well-known name in his small field.

There were skeptics from early on. In August 2000, Stanford physicist Bob Laughlin protested the questionable quality of Mr. Schön's data. Another - researcher, Ivan Schuller of the University of California at San Diego, doubted

that Mr. Schön's materials could withstand the electromagnetic fields he claimed to be applying. It was not until early 2002, though, that fraud was suspected. In May of that year a formal committee investigation began at Bell Labs. Four months later the committee found that Mr. Schön had faked lab results and fabricated data. If plastic is fantastic, he hadn't shown it. Bell Labs fired him soon after. He was stripped of his Ph.D., too, and is now employed in humble engineering work in his home country.

How did he get away with it? Why did he do it? These are the main questions that a book like "Plastic Fantastic" should answer. Ms. Samuel Reich does better with the first question than with the second. Throughout her narrative, Mr. Schön remains a shadow, his personality obscure, his motives a mystery. Simple greed can probably be ruled out. Science prizes are rarely lucrative, and the ones awarded to Mr. Schön were fairly modest. A quest for glory can be ruled out, too, since Mr. Schön must have known that his un-replicable results would be debunked soon or later. There seems to have been no vindictiveness in the scheme, no desire to make a fool of anyone. Said a colleague: "No one had it in for Hendrick. He didn't have enemies." Mr. Schön was not obsessed by any pet theory or ideology. Perhaps there is no better explanation, at last, than that he did it because he could.

As to the "how": A key factor in Mr. Schön's success seems to have been his skill at cultivating his managers, who continued to support him when his fellow researchers had become skeptical. Mr. Schön was an amiable employee, apparently, and a cheap one, delivering striking results from a minimum of resources. He was even reluctant to use the usual corporate American Express card to cover lab expenses.

Circumstances at Bell Labs magnified the effect. Lucent Technologies, which ran the labs, was hard hit by the bursting of the dot-com bubble, its share price dropping 30% on Jan. 6, 2000. In that year's "summer of insecurity" the labs were roiled by restructuring and cut-backs. It was precisely then, amid

administrative distractions, that Mr. Schön had his first great burst of publishing productivity.

What of the normal processes of authentication in science—peer review and the replication of results by other researchers? How did Mr. Schön's bogus claims survive these safeguards? The glass-half-full answer is that they didn't . . . eventually. The span from Mr. Schön's first appearances in the technical literature in late 1998 to his unfrocking in 2002 was less than four years—longer than one would wish but not disgracefully long in a newish and arcane field - concerned with hard-to-measure effects in microscopic quantities of hard-to-handle materials.

The really serious failures were in the peer-review process. There are excuses one can make here. For example, science publications seem eager to balance out the flood of papers in sexy fields like genetics and neurobiology with some good old dry-goods physics and chemistry. Still, the failures are dismaying to read about. It appears that the people charged with vetting Mr. Schön's work—whether editors or fellow scientists—did not do so carefully or thoroughly enough.

A key moment in the denouement came in April 2002 when a Bell Labs researcher noticed that two of Mr. Schön's papers from two years before, one in Science and one in Nature, had reported outputs that were identical—even down to the electrical "noise"—from two quite different devices. Two years, in two journals claiming a combined readership of nearly two million, and *nobody noticed?*

Mr. Derbyshire's "We Are Doomed: Reclaiming Conservative Pessimism" will be published in September.