

The Materials Gateway

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POSTERMINARIES

Biobabble

Engineers typically don't worry about it, but those who consider themselves "fundamental scientists" occasionally have the hubris to see themselves as interpreters of the mind of God: I recently read (and unfortunately lost) a quote from a high-energy physicist who described his most recent experiment as a case of "looking right up God's nostrils."

Now the God of Abraham is notoriously averse to probes of his or her thinking, from any direction, and is reputed to react quite creatively when subjected to scientific testing. The book of Genesis gives us the story of the Tower of Babel, in which the Babylonians attempted to prove the existence of God by building a tower tall enough to peer into heaven and see for themselves. God reacted with an archetypal biblical punishment—the confusion of languages, ultimately forcing us to communicate with each other at Materials Research Society meetings using pictures and mathematics—or when all else fails, broken English.

I am growing suspicious that God may have been at work creating a new confusion of languages in response to the various attempts to understand his or her thinking, on the part of physicists and biologists. This scheme is coming to fruition at a bad time for us: materials researchers are now beginning to incorporate biological principles into what was once an endeavor in applied physics and chemistry, and we are finding that there is a daunting language barrier. We are often lucky enough to be the enablers of technologies created by new discoveries in basic science, but now we are also the victims of the sins of the basic scientists: biologists and physicists have relatively little to do with each other, but we are compelled to work with both, and simple communication is becoming a difficult business.

God has evidently learned from the Babylonian experiment, too. In the first version, humans all wound up speaking words that were completely unfamiliar to each other, and that is certainly a feature of biological terminology to my physically attuned ears. It sounds like science, but I have no idea what it means. More insidiously, though, this new language barrier includes words that *are* familiar, but have completely new meanings. Just when you think you understand, you realize that you are trapped in a sort of looking-glass world, like Lewis Carroll's Alice talking to an improbably anthropomorphic egg: "When I use a word," Humpty Dumpty said, in rather a scornful tone, "it means just what I choose it to mean—neither more nor less."

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Sometimes we use the same words for different things....Don't expect good results if you tell a phlebotomist collaborator to get the *plasma* going in the sputtering system; and *CVDs* can be much less desirable to have when you understand that they are cardiovascular diseases to many more people than understand them to be chemical vapor deposition systems. (Maybe we can all agree on "Congressional Visit Days," though.) Any physical scientist who has tried to predict the path of a mosquito has a hard time understanding it to be a *vector*, but I suppose that a pathologist would have an equally hard time with a Burgers vector—that would probably be understood to be a fast-food restaurant chain. We are all used to being cautious about words

like *strain*—after all, it can be elastic or plastic, engineering or true, but when you converse with a biologist, it is more likely to be genetic. And, when we talk of *grains* and *twins*, you can be sure that we confuse our biological colleagues, too. *Nuclear* research, in both physics and cell biology, is likely to be of concern in the lay community, though it refers to different things.

Sometimes we use different words for the same thing....Biologists share with materials scientists their fascination about the linkages between structure and behavior, after all, but they study *ultrastructure* with their electron microscopes while we are busy elsewhere on campus, studying *microstructure*.

And sometimes the words sound almost as though you might be able to figure them out, but are still misleading. A *fibroblast* is *not* an advancement in plastic explosives using composite material technology.

Only a few decades ago, it was normal for doctoral students in the sciences to be required to gain a measure of proficiency in a foreign language. This has faded away from U.S. university curricula as the rest of the world has come to terms with the hegemony of the American version of English. Perhaps it is time to require another type of linguistic training, so we can talk with the people in the next building just as well as we communicate with our disciplinary colleagues in the next continent. Alternatively, I suppose, we could leave it all to trained interpreters and operate our meetings with simultaneous translation, *à la* U.N.

Whatever the solution, may all of your ideas be more communicable than your diseases.

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