

Funny Materials

I have always reckoned that humor helps learning—at least it generally keeps an audience awake, which is a good start. While browsing YouTube the other day, I stumbled across some recordings of the annual Latke-Hamentashen debates at the Massachusetts Institute of Technology (MIT). Don Sadoway, the John F. Elliott Professor of Materials Chemistry at MIT, was both witty and erudite in his support for the latke over the hamentash (if you do not know what these are, just search for either word on YouTube or Google). He provided an excellent demonstration of how to engage and retain an audience's interest by using humor and provoked me to seek out a few more.

My first visit was to a thin volume called *How to Lie with Statistics* (W.W. Norton), by Darrell Huff, which dates back to 1954. Huff was ahead of his time

in being scathing about all those pseudo-statistics we see in newspapers, with their ill-defined terms, suppressed zeroes, and misleadingly-sized figures. After losing myself for an hour, not knowing whether to laugh or cry, I switched to a book of scientific quotations and found some words I had been looking for all year. Lord Rutherford is reported to have said, "If your experiment needs statistics, you ought to have done a better experiment." So goodbye to statistics (that's a relief).

Physicists seem to be particularly good at humor, so I reached down from my thinned-out shelves (much depleted as described in an earlier POSTERMINARIES column) a volume entitled *A Random Walk in Science*, by W.L. Weber and E. Mendoza (Institute of Physics, 1973). I recommend this to anyone who has a

spare few minutes, or who thinks that science is dry stuff. It contains well over 100 light-hearted or spoof articles by physicists, among whom are some of the greatest minds of the last couple of centuries. It includes contributions from Bethe, Maxwell, Faraday, Bragg, Casimir (and Jonathan Swift). A mock exam paper contributed by H.J. Lipkin* caught my eye and I thought we could deploy something similar to sort the materials sheep from the materialistic goats (or are goats better than sheep? I am never sure). Try these on your friends and enemies. Note that my answers may not yet have been optimized.

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*H.J. Lipkin, *J. Irreproducible Results* 7 12 (1958).

ANSWER KEY

1. Only among those who do the washing up.
2. That is more fingers and toes than I can count on. When I was a student, metallurgy was spelled mathallergy.
3. I can't.
4. Efforts to find the H_B will in the future seem so expensive that metallurgy is back in with a chance of being funded. Research on cream crackers will be a lot cheaper than work on critical cracks in reactor steels, and afterwards you can eat the fragments with cheese.
5. It is a "gobber"—watch *The History Boys* again.
6. Because it is cheaper than particle physics.
7. You need to understand *The Matrix* to be able to attempt this one. I don't.
8. Thickness: About 3,000,000 nm.
9. It is too cold, I cannot think.
10. Commercial reason: So they always feel heavy, regardless of how much champagne remains in them. This forces the pourer to attempt to fill a glass with an empty bottle and embarrasses him/her into buying another one.
11. Structure, properties – and their subtle interplay – make metallurgy. I am sure there are other better answers.
12. Answer 1: Long before either, less atoms has always been incorrect because you could count atoms conceptually long before we could count them in any microscope. Answer 2: Never – the battle to save the distinction between less and fewer was lost at about the time of the atom probe when common usage (even among otherwise intelligent and knowledgeable materials scientists) actually changed from fewer to less.
13. With the extra "u," because humour is better shared so it must be "our"s. Sorry to end on this limp pun. I will work on a better one.

Materials Mock Exam

1. To what extent does the development of Teflon contribute to John Stuart Mill's suggestion that society should seek the greatest happiness of the greatest number?
2. Is the greatest number bigger than 42?
3. Explain why copper roofs turn that particular shade of green.
4. The Higgs Boson will be the savior of metallurgy. Discuss with reference to the critical crack length in cream crackers.
5. Prove that there is a Heisenberg uncertainty relationship between truth and clarity. What is the value of the constant?
6. Why is electron microscopy?
7. The Hall-Petch relationship $s = s_0 + kd^{-1/2}$ describes grain boundary strengthening. Explain what happens when d becomes negative.
8. What is the nm-sized dimension of the iPod nano?
9. Deduce the Arrhenius relationship which would demonstrate that you get more good ideas in hot weather.
10. If we are so good at materials engineering, why are champagne bottles still so thick?
11. Write a haiku (three lines of 5, 7, and 5 syllables) including the word "metallurgy."
12. How long after the development of the electron microscope structure imaging, or the atom probe microscope, did the correct grammatical usage change from "less atoms" to "fewer atoms"?
13. How should you spell humour/humor?