An occasional column, in which Caveman and other troglodytes involved in cell science emerge to share their views on various aspects of life-science research. Messages for Mole can be left at **mole@biologists.com**.
Any correspondence may be published in forthcoming issues.

Whitewash

Friday! I love Friday! No, not for the usual reasons. A scientist's Friday isn't the same as Friday for people who have real jobs, who see this end-of-the-week day as the start of something called a 'weekend' that involves lying on couches, watching sports and eating grease or, alternatively, doing useful home projects, some retail reconnaissance and eating gigantic low-calorie fruit plates (with sides of grease). Scientists see the weekend as a chance not to have committee meetings and instead to get some real science work done (while eating grease). We have little concept of a weekend – along with hobbies, a knowledge of public affairs and healthy relationships. So how come I love Fridays?

On Fridays, I have a breakfast of fresh, warm bagels, nearly always paid for by someone else. Sometimes there's champagne, when a grant has received a fundable score or when a paper has been accepted (finally!) for publication. It isn't the food, though; it's the company. On Fridays, we have a lab meeting. My lab gathers together people who are not quite family but not quite business associates – we call them colleagues, post-docs, students, technicians or sometimes friends. And we meet.

So why is this something I love? It's because the lab meeting is the heart and soul of the lab, and Mole loves his lab. ("Who loves you, Baby?", I say. And the lab says: "You, Mole".) And you, ever-vigilant reader, ask: "So why is the lab meeting the heart of the lab – what's so important? Isn't it just administrative, more or less – a necessary evil but just the sort of thing that scientists try to steer clear of, desperate to get to some real work?" Ha! If you've thought that

you've missed something really key. The lab meeting *is* the real work.

The reason has to do with Tom Sawyer and his fence. We don't know what Tom ultimately did for a living, but it's a good bet he didn't become a scientist. But he knew the reason why lab meetings are so important. Of course you know the story, even those of you who aren't American. And all Americans know it because it was written by the only American who was actually a great writer – by that I mean the only American author I've ever actually read. The words of Samuel Clemens are as fresh today as ever – as fresh as Friday's bagels in fact.

For those of you who have deprived yourselves of the pure treat of reading Twain, here is a synopsis. Tom Sawyer is ordered by his aunt to whitewash a fence. He doesn't want to, so he pretends it is a privilege and tells friends that they *can't* do it. Whereupon they plead for the opportunity and bargain with him, offering him treasures. Fence is painted, and everyone is somehow happy. And we're left with one of the best definitions of work in the English language, and I ain't gonna tell you what it is 'cause you should read the book.

I'm not suggesting that trainees come to a lab because we make them think it's more desirable than it really is. And I'm not suggesting that lab meetings are a scam where the bosses pretend that they wish they were working at the bench. I'm thinking about something much more subtle.

For the past few decades we've recognized that ideas are viruses, or something like them. They can be transmitted, then they replicate and transmit again. They don't have to be particularly good ideas to do this. In fact, the correlation is pretty poor. Ideas that happen to sweep populations like epidemics can result in good things – such as cleaning up the environment, or bad things – such as compassionate conservatism. Pet rocks, mosh pits, flannel, paintings on velvet and swinging your hand over your head while saying "hoo-hoo-hoo". Also equal rights, basic freedoms and the idea that science is a *good* thing. Viruses.

Incidentally, some people, in an attempt to make this much more confusing, chose to call ideas 'memes' – sort of like genes but made out of the stuff of culture. You know, like ideas. (Why do we rename things while trying to explain them? As though science is composed of a secret code, and only some of us have the code book. Come to think of it; it's probably a consequence of a science meme/idea.) These ideas replicate, are selected by a process we don't entirely understand, transmit and replicate some more. Better living through evolution.

And ideas that spread can do work. Tom Sawyer dropped one of these ideas into the pond of his colleagues' collective consciousness and it resulted in a whitewashed fence at no cost (indeed, some profit) to himself.

Beliefs are a bit different, a subset of ideas. Beliefs are ideas that shape the way we act. Like ideas, they transmit and replicate and transmit again, undergoing selection along the way. A belief, or set of beliefs, can filter the ideas that bombard us, and help to sort them into those that should be incorporated into further beliefs and those that shouldn't. (A belief of this sort is: "Never trust an insectivore.") When we get enough of these to develop a complete filtering system, we attain consciousness.

"What?" you say, "Consciousness? Come on, Mole, you've been in the mosh pit saying 'hoo-hoo-hoo' too long." But no, really. When we're born, we very quickly get our first filter (maybe we're born with it): trust this person who keeps showing up with food and comfort, and do whatever they say. (Yes, we test this, a lot, by screaming for food and comfort, to make sure that we've got this right). As other individuals appear with more ideas and potential beliefs ("color inside the lines") we stretch the limits of our belief systems, and one day, we suddenly have an inward-facing concept of 'I' that represents the filters we use to choose between different ideas.

So what does this have to do with lab meetings? Well, everything.

Science is an intellectual process that, at best, loosely approximates some sort of truth, based on a logical fallacy that happens to be the best we can do. (I don't have to do the black swan thing for you, do I? Okay, you are just about to have your high-impact paper entitled "All swans are white" (based on extensive and repeated observations) accepted, when who should walk into the editorial office but a black swan.) We sift through data sets for patterns, make predictions, sift through the new data sets for hints we might be right, submit a paper, and once it's accepted put out press releases saying that now we understand what is going on. In fact, two laboratories doing carefully controlled experiments that are reasonably well interpreted can publish papers that each show, in detail, that the other's results are impossible. And experienced scientists can sort through this morass and come up with a fairly good (and, more importantly, *useful*) picture of the universe. In fact, developing this ability is an essential part of becoming a successful scientist.

In order to move about purposefully in this fun-house of conflicting views, strange results, spurious data and impossible interpretations, we need to filter out the noise and identify the useful information. We need a belief system that lets us function as scientists. It can be very flexible on some things (I'll believe anything you tell me about the driving habits of star-nosed moles, since I don't care about that side of the family at all) but utterly immovable on others (the Atkins diet). And our belief systems have a lot to do with how effectively we can do what we do (if your beliefs result in experiments that consistently fail to give anything vaguely resembling reproducible results, you're going to waste a lot of time and money).

This system of beliefs, which represents a sort of scientific consciousness for our scientific selves, is what allows us to function as scientific individuals. And we transmit the beliefs that make up this consciousness to anyone who will accept it. Those who are just born (scientifically speaking) may tend to take on more of these beliefs than the more experienced individuals who already have established

filters. Our beliefs, in the form of this functional information filter, spread if they are favored (they are proven useful). Which is just what any replicating, mutating thing does. The fittest beliefs survive to reproduce.

At our lab meetings we gather around our breakfast, explore our shared belief system and work to make it stronger and better. Some of our ideas concern which molecules do what, and how to do a proper immunoblot. Others concern what to do with results that indicate our tribe may be wrong, and how to publish the work to the benefit of the group and the individual. As lab members grow up and leave the fold, many of them will carry our ideas with them and transmit them to others. With time, some of our ideas will integrate so well into the scientific community that they no longer need to be referenced – they are simply taken as true. That's our job, isn't it? To come up with things that we think are true.

Every Friday I bring my paint and brush to work, pull on my overalls and have such a good time painting the fence that everyone else in my little science belief-sharing group picks up brushes and gets right to work. It looks like we're really enjoying ourselves – and often others want to join in, but we don't let them unless they're really, really good at what they do. And every Friday we compare notes and see how our ideas are fairing in the big, big world, and probe our beliefs together. We make it look like fun. And the real secret of our success? It *is* fun.

And what's really great? Tomorrow is Saturday and I can get my grant finished.

Mole

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Cell Science at a Glance

Cell Science at a Glance is included as a poster in the paper copy of the journal and available in several downloadable formats in the online version, which we encourage readers to download and use as slides. Future contributions to this section will include signalling pathways, phylogenetic trees, multiprotein complexes, useful reagents . . . and much more.

The JAK/STAT signaling pathway (March 2004)

Cell adhesion receptors in *C. elegans* (April 2004)

Polarity establishment in yeast (May 2004)

nNOS signalling (June 2004)

The Rb network (July 2004)

The matrix metalloproteinase family (August 2004)

We would like to encourage readers to submit ideas for future contributions to this section.

Potential Cell Science at a Glance articles should be addressed to the Executive Editor and sent to

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