8 Plumbing, not Popper; or, the Problem with STEP

by Pastor Manul Laphroaig

Gather round, neighbors. We are going to a magical place. One that we hardly ever notice in our busy lives, but which has a way of taking over your entire day when you are forced to visit it. We are going on a trip to the plumbing closet![26]

Look at the miracle that is the clump of pipes, looking right back at you. Its message is clear: *do not approach without skill*, unless you *like* wet, gigantic messes. This message is universal: it speaks to a politician, a professor, an NYT columnist, a movie actor, and a hedge fund manager alike. It transcends languages and beliefs.

Even though these worthies and civic leaders might agree the country could use more plumbers, it has not yet occurred to them to approach the problem by putting a big P into some popular slogan like "STEP" (Science, Technology, Engineering, Plumbing), by setting up a federal Department of Plumbing, or by lionizing a professional coveralls-wearer TV personality who goes by "A Plumbing Guy," despite never having fixed a pipe in his life.

They somehow know that these things will do diddly squat to address the shortage of plumbers. They know deep down that to learn plumbing—and even to not sound ridiculous about it—one needs to study with a plumber, attach oneself to a plumber, and do what a plumber does for a while. This, neighbors, is how deep the plumbing magic goes.

Science, alas, has not been so lucky.

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It is fashionable to talk about how we need more scientists, and how we can direct and improve science, quoting grand theories that explain science, while similarly educated people nod approvingly. After all, they all know what science is, as befits all forward-thinking people these days. No one feels awkward; everyone feels good.

Perhaps this happens because our social betters all experienced helplessness at the sight of broken plumbing, but would not recognize broken science, much less a hopelessly broken science textbook. You see, science lab equipment is OK with a patronizing, self-satisfied gaze, whereas plumbing has a way of glaring back contemptuously, daring you to use your general theoretical understanding.

With plumbing, it's either practical skill or a huge mess in your basement. Messing with how plumbers learn and teach this skill guarantees messes in thousands of basements. If you value your plumbing, it's wise to leave plumbers alone even if you believe every word of every newspaper column you've ever read on plumbing economy.

It may be a surprise to the readers of Karl Popper and Imre Lakatos[27] that actual scientists are helped by philosophy of science in exactly the same way as plumbers are helped by the Zen of Plumbing. Although these very same people are likely to believe they understand plumbing too, they usually have the sense to leave the plumbing profession well alone, and not apply their philosophical understandings to it—being empirically familiar with the fact that when you need plumbing done, philosophy is useless; only the skill stands between the water in your pipes and your expensive library.

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[26] For those of you fortunate to own a house, it's probably in the corner of your basement, an equally magical place, whence all science and innovation springs forth—but let us not digress.

[27] Lakatos the philosopher is considered to be a great intellectual authority. For what it's worth, you might also want to read about how he applied his philosophy in real life: `unzip pocorgtfo13 freudenthal.pdf`

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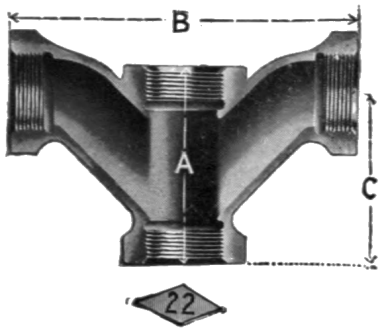

By far the worst hit to a profession is delivered when a part of the professionals actually welcomes philosophers lauding it, politicians bearing gifts and grants, and governments setting up departments to promote it. Forms to fill, ever-growing grant application paperwork, pervasive "performance metrics," and having to explain basic fallacies to the well-meaning but fundamentally ignorant and hugely powerful committees come later—and accumulate. In the context of metrics, charlatans always win, because they don't get distracted by trying for actual results.

Not to mention that the money that goes to charlatans is not net-neutral for actual plumbing (or science); it is net-negative, because charlatans have a way of making the lives of professionals hard where it hurts the most. When Tim "the Tool Man" Taylor waves power tools around with a swagger, the results are immediate and obvious. When learned committees do the professional equivalent thereof to math textbooks and call it nice names like "Discovery Math," "Common Core," or "Critical Thinking" it takes a generation to notice, and then we wonder—how on earth did school math become unteachable and unlearnable?[28]

Plumbers have wisely avoided it, perhaps due to some secret wisdom passed from master to apprentice through the ages. Scientists, I am sorry to say, walked right into it around the middle of the twentieth century.

Sure enough, national agencies got us to the moon—but it seems that all the good science schoolbooks have been put on the rockets going there, never to return. Have you met many scientists who are happy with what schools do to their sciences after half a century of being improved by various government offices?

Funny how it worked out for scientists. Now hear them complain about "publish or perish," the rapidly rising age at which one finally succeeds in getting one's first grant, and the relentless race to rebrand and follow the current big-ticket grant programs.[29]

But don't blame them, neighbors; it was their advisors or their advisors' advisors who fell for it. Better to buy them a drink, and remember their lesson.

Better yet, find some plumbers, and buy them drinks. Perhaps they'll share with you some of their secrets of how to keep the philosophers and their educated and benevolent readers interested in the result, but at a safe distance from the actual plumbing.

[28] We sort of know the answer, neighbors: a roller coaster of reforms and unintelligible standards created a generation of math teachers for whom math did not have to make sense. `unzip pocorgtfo13.pdf wu-preparing-teachers.pdf` and read it. It may apply to whatever else you hold dear.

[29] According to Ronald J. Daniels, President of Baltimore's Johns Hopkins University, no less than the whole generation is at risk: "A generation at risk: Young investigators and the future of the biomedical workforce." (`unzip pocorgtfo13.pdf atrisk.pdf`.) For more of this, read "Science in the Age of Selfies" by Donald Geman, Stuart Geman. (`selfies.pdf`.) It's hard to make these things up, neighbors.