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A modern power system on your tabletop?

By Walt Patterson

As I write about innovative electricity, I keep asking myself 'Who is going to make all this new technology?' For electricity, what's still taught in most electrical engineering courses is traditional centralized engineering, entailing vast projects, in which any individual role is partial and limited. I'm increasingly convinced that we need an entirely new approach. As with computers we need a change of direction, potentially even from kids in a garage - small scale, something they can do themselves, to get them fired up about the possibilities.

When I was a kid I read *Science Magic* and other books by Kenneth Swezey, followed his instructions and tried things out, and they worked, most of the time at any rate. I devoured *Popular Science* magazine and *Popular Mechanics* magazine - note the 'popular'. I collected chemistry sets from friends who were finished with them. Science and technology were fun. You could play with science and technology, for sheer enjoyment. That's what we need, to get the brightest youngsters to pick up the innovative energy ideas and make them happen, not because they see a good career path but because they get a kick out of doing it.

In mid-July, at Chatham House in London, we held a public meeting to launch my new book *Keeping The Lights On: Towards Sustainable Electricity*. More than 100 people attended, many of whom I knew. One I did not was a young man named Gavin Harper. He introduced himself diffidently, saying he was a 'big fan' of my writing, always an effective way to get my attention. But I gradually realized that he was no ordinary 'fan'. Still only 20 years old, he has already published four books; and his publisher is McGraw-Hill, as hard-nosed as they come. Gavin's latest title is *Solar Energy Projects for the Evil Genius* - exactly the sort of pitch to appeal to bright, stropy teenagers.

What they do not want is anything that calls itself a 'textbook'. But *Solar Energy Projects for the Evil Genius* would be exactly that, if our science and technology educators were not so hidebound by stultifying tradition. In the days when I was earning a meagre crust as a private tutor of physics, I was made as miserable as my students by the prescribed textbooks, notably the omnipresent Nelkon - confused and confusing, inaccurate and dull, dull, dull. Gavin, however, has already realized an essential truth about teaching. The overriding responsibility of a good teacher is not to impart information. It is to make the subject interesting, and indeed if possible to make it fun. That Gavin does. In his enthusiasm, to be sure, he overdoes the exclamation mark. But that is a minor blemish on what is in other respects an exemplary piece of didactic exposition - a phrase that would make him cringe.

He also achieves a subtle and difficult discipline, more important for science and technology, perhaps, than for other subjects. He explains, clearly and simply, every new concept and term before using it. He starts with the easiest and most familiar ideas, such as a sundial, and builds carefully out from them, eventually arriving, by comfortable stages, at some seriously unfamiliar terrain. Would you know, offhand, how to make a tabletop photovoltaic cell, or fuel cell? With Gavin as your guide you'll find out how. He also avoids conventional specialist terminology if it's not necessary. His discourse on 'angle of incidence' of solar radiation, for instance, is direct and lucid - but he never calls it that.

His writing style is conversational, 'you' and 'we' and active verbs, not the flat, dead third person passive of traditional academia. Almost every page is sprinkled with striking specific examples, photos and diagrams. He is also scrupulous about the history of the concepts and technologies, their

originators - several of whom I had not heard of - their evolution, and indeed their shortcomings and drawbacks, economic and environmental. I am still shaking my head at the sheer abundance of the information packed into 198 pages. It also includes references, online information, and sources for kit and parts in Europe and the US.

He writes with wit and brio. Do you want to fry eggs on your driveway? or make a solar death ray? Here's how, based on good sound science and technology. He makes me itch to try out these ideas myself. He touches on almost every conceivable application of solar energy, eventually covering an impressive assortment of electrical devices, complete with wiring diagrams and assembly instructions.

Gavin Harper is already hard at work on his next book for McGraw-Hill. I understand it will be called *Fuel Cell Projects for the Evil Genius*. What would you say to a modern power system on your tabletop? I can hardly wait.

Walt Patterson's new book, Keeping The Lights On: Towards Sustainable Electricity, (Chatham House/Earthscan), is now available from Earthscan, <http://tinyurl.com/22y7z4> or (in North America) Brookings, <http://tinyurl.com/2xrujs>, and all good bookshops.

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