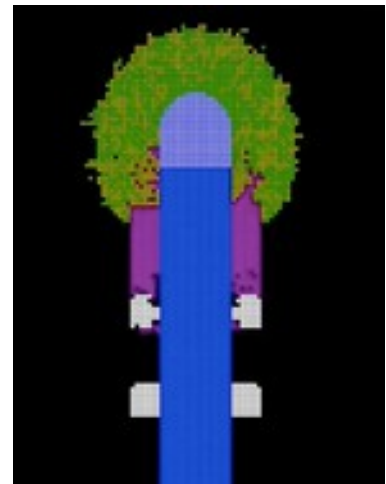


Science in the sun

A reader of these blogs kindly e-mailed to send me wishes for my good health in the time of COVID-19, and to ask what it is like for a professor and for a research group to have to work without a lab. This blog is a longer version of my reply, and is highly personal, in the sense that I do not claim in any way to be giving answers relevant to other labs.

Obviously, having to leave the lab has been disruptive to many things, but I think we as a group have been lucky in several ways, beyond my general good fortune in working with a bunch of very talented and helpful people. To begin with, there are the four members of the group who work on the pharmacology database project (now five, thanks to an application grant written and won during lockdown). They do not need access to a lab anyway. One often works from her local home, and one always works from his home in another country, so we are used to working remotely. The international coordination group for this project has met weekly by electronic conferencing for years, so again we were already used to something that has been very new to a lot of people.

Second, our connection to COVID-19 pharmacology meant that the group as a whole had a lot of warning about the gathering storm, and time to prepare for a university closure some months before it happened. To my great surprise, people in the group listened to my early warnings and prepared, perhaps because it seemed so out-of-character for me to be taking a risk more seriously than most other people, rather than taking my usual role of being the one saying 'don't worry about it' when everyone else is running about panicking over relative trivia like changes in research council policy. The senior PhD students put on a great burst of energy to get all the last data they needed while they still could (two succeeded completely and have been writing their theses since lock-down, the other one has only a little lab work left to do). Our honours project students did the same, and had rich data sets to analyse at home when the time came. The post-docs, working on longer-term projects, planned ahead for a controlled shut-down that did not ruin long-term experiments and that will allow rapid re-starting when the time comes. And we had a chance to think about what to do in any lock-down; what to take home to read, what new skills (like coding) would be ideal to learn at home, and so on. I have been impressed by the creative imagination of some of these colleagues. Two have been writing papers



a snapshot of one of our new models for kidney development (mentioned in main text).

that would never have occurred to me, applying their skills in directions for which there would not normally be time. And of course, we had time to plan how we would continue our journal clubs and lab meetings with virtual presence.

The period of lock-down has affected people in different ways, and I will only know about some of them. One of my team has been affected very directly and horribly by COVID-19, being in hospital with the disease, losing a close family member to it, and then on release from hospital being trapped in a country far from the UK, waiting for any way to fly back. Everyone's thoughts, and prayers from those people who pray, have been with this treasured colleague throughout, and continue to be. For some others, lock-down has been a welcome opportunity to step away from the bench, to think, and to become students again. For others, it has been a chance to get to grips with thesis writing undistracted by office life. For one or two, I think loneliness has been a challenge that has made focusing on work difficult, and that's fine - we are all human beings and deal with stress in different ways. For me, work has been a partial antidote to 'cabin fever', which is why I welcome being kept busy both by the group and by organization of teaching. The latter is 'interesting'; I was leading the development of a new pre-clinical medical course to begin in September, and now have the additional task of seeing it deliverable by a hybrid model of online and in-person. In a way, the fact that it is a new course is a blessing because all teaching staff were expecting to have to write brand new lectures anyway, so asking for online versions does not increase their expected work too much.

For a month or so before the beginning of social distancing, I had begun to 'practice' working at home for one day a week, to work out what I needed from the office when it was still possible to go and bring it home. The stunning weather - sunshine that has broken Scottish records - has meant that, for a lot of the time I am working and not on a conference call, I can be sitting in the garden with a laptop and cup of tea. It is amazing how much it is possible to get done on a laptop in a sunny garden surrounded by the twittering of nesting birds. Not having to commute has also been welcome - every evening has brought the chance to walk for a hour or two through fields, woods and along the beach, or to cycle along roads empty of traffic except for the odd tractor or delivery van. Out here, the population density within walking distance is so low that on most outings I do not even get within shouting distance of any other human being, so maintaining a 2-metre distance is hardly a challenge. The deer, on the other hand, are getting much more bold about being close, perhaps because of the absence of traffic. There is a sense that even the wildlife knows something has changed. The hills look beautiful, but out of legal reach just now. But they are nice to see when

looking up from a screen on which I am writing computer models of kidney development, to try out some ideas for bench experiments when they can resume.

Spending all my days in beautiful, sunlit countryside that feels very safe makes an even more grotesque contrast with some of the news I hear in conference calls, with people on the front line of the clinical fight against COVID-19. Colleagues in the developing world, in particular, face a disaster they are not resourced to mitigate. These calls do, though, also bring hope. Last month, in a call with senior members of CH-PHARS (the Chinese pharmacology society), came the news that clinical trials in that country were coming to an end because they were running out of patients, as the country managed to bring the spread of the disease under control. They were therefore passing the baton on to Europe, as we probably will eventually do to the Americas if we manage to bring the virus under some control too. It is good to hear of the success of others, even as our own communities struggle.

Returning to personal reflections, I have realized that one symptom of being isolated here is a great urge to repair things. It started naturally enough with my ancient vehicles and even older house, just working my way down the 'to do' lists, and feeling very frustrated that I cannot do the same for my boat in Wales. Then, the sudden failure of the radio in my office, which provides me with a dose of Radio 3 during morning e-mail reading, provoked a series of late evening electronic repairs. They began, naturally enough, with that radio, one of the most modern I possess (it dates from 1961). Inspection showed the need to replace several components, though the ultimate problem was unusual - a resistor between the anode of an audio pre-amplifier triode valve and the 200-volt HT line had risen in value tenfold and was effectively stealing all of the voltage from the valve. An urge to do the repair job properly persuaded me to do a full alignment, but the modulated signal generator to do this was itself not working. Poking around this with a 1950s oscilloscope and curve-tracer narrowed the problem down to a shorted capacitor, carrying (like all of its siblings) the date August 1942, and a War Department stamp. I replaced them all with high quality brand new units from Siemens, feeling gently amused that this old British war veteran was being saved by components from modern Germany. The 1940s signal generator then roared into life, and I used it to align the radio. Of course



I realize that a new radio would not have problems like this, but I find slivers of silicon in plastic cases completely soulless, compared to softly glowing glass bottles in polished wooden boxes, and working around lethal voltages does at least give one a reason to concentrate on what one is doing!

Following this, I finally got around to working on another signal generator from the 1950s. I was given this as scrap for components when I was 17, but I had always kept it aside for possible repair. It had two problems. The big one was a damaged valve socket, now replaced, along with its own



(This is what early 1950s electronics looks like. The top valve is from the 1930s, the lower one is war surplus).



Repaired but still with its patina of rust. The 1940s signal generator mentioned above is back-right.

ancient capacitors (as they were by now leaking). The other was a wrong connection, clearly made when it was brand new, that would have stopped it being used as an audio signal generator though it would still have worked at radio frequencies. With this newly repaired unit, I did some renovation



My sitting-room radio, given to me by Paul Garfield, a school teacher, who was having a clear out and who correctly thought I was a pupil who would like to take this home. I fixed it up and it has been a treasured radio since.

on my Columbia sitting room radio (from the very early 1950s; still running on its original capacitors, which no longer seemed wise) and have just started work on a 1938 Alba, which someone gave me almost 20 years ago and which would fit nicely in a space in the guest room. Outside, I have been improving the garden railway (a saner person would have bought a wheelbarrow); the trucks have received improvement and attention, and a few rotten sleepers in the track have been replaced.

Katie (whom I 'see' only via Skype in these times) has noted in the past that, if there is something wrong with the world that I cannot put right, for example the worsening illness of a parent, I tend to

spend a lot of my spare time repairing things that I *can* put right. So I guess that, while I do not subjectively feel very stressed by the COVID-19 lockdown situation, and certainly I would respond to any stress survey by saying I am not - I'm having a great time doing science in the sun - at some deep level maybe there is some stress and a feeling that the world really needs to be fixed.

The next month will be dominated by more writing of computer models, more COVID-19 pharmacology, some grant writing, some paper writing, much exam marking, and detailed course design. There will also be the new experience (for me) of conducting a PhD viva exam online, and with luck, the beginning of planning for a return to the laboratory in June. Writing this has been a good excuse to look back over the last two months. So far, the folk in this lab have together greatly expanded the COVID-19 pharmacology database, have won a new research grant, prepared and sent off an application for another, have written two papers from scratch and had them accepted, have a further three in preparation, have a book manuscript completed and sent to the publisher, have written two new computer models, and have performed a lot of careful analysis of banks of data we had already got from earlier experiments but had not yet had time to examine. Given the disruption, I am tempted to be amazed at what the team has done but, knowing them as I do, I should not really be surprised at all. Just grateful for their professionalism and skill.

Jamie Davies, East Lothian, May 2020

Links

COVID pharmacology database - <https://www.guidetopharmacology.org/coronavirus.jsp>