February is always a bleak time of year, but we are almost half way through University term already, and spring is on the horizon. The miserable weather didn’t deter Geoff Marshall from travelling all the way out to Walton-on-the-Naze to interview me about the future of the London Underground map, details of the video will be given as soon as I have them.

Web page news
Some readers will know that, as part of my day job, I do have to teach non-map-related topics. My Intelligent Behaviour module has run for several years at the University of Essex, comparing this in humans, machines, and animals. This year I have been reformatting the slides to match my other presentations, and these now have their own web page as part of the section on university teaching. This is sort of map related, as you will see shortly.

Dates for your diary
• I will be giving my talk Underground Maps Uncharted to the London Underground Railway Society on Tuesday 10th April 2018, 18:40, Upper Room, Allsouls Clubhouse, 141 Cleveland Street, London W1T 6QG.
• I will be giving my talk Transit Maps: The Good, the Bad, and the Ugly to the International Financial Reporting Standards Foundation on Wednesday 18th April 2018, 12:00, at 30 Cannon Street, London EC4M 6XH.
• I will be giving my talk Transit Maps: The Good, the Bad, and the Ugly to the University of the Third Age Broomfield and District branch on Wednesday 9th May 2018, 14:30, at Broomfield Village Hall, Main Road, Broomfield, Chelmsford, CM1 7AH.
• Peter B. Lloyd will be discussing the joint University of Kent-University of Essex research on the effects of colour-coding on map usability at a Sign Design Society meeting on Thursday 10th May. More details once they are finalised. Over 700 copies of the preliminary report were downloaded when announced on Twitter, now is your chance to see this discussed live.

Map teaching
My University of Essex module Transit Maps: Past, Present, & Future is now up and running for the second time. Lecture slides are being posted on the course website as they are updated, and there is a lot of interesting research to squeeze in that has been published in the last eighteen months.

Map research
At least two papers on map design will be presented at Diagrams 2018 at Edinburgh in the summer: Metro Map Colour-Coding: Effect on Usability in Route Tracing with Peter B. Lloyd and Peter Rodgers, and Concentric Circles Maps: Data and Implications with Elizabeth J. Newton. I won’t be attending myself, but expect lively presentations via my able co-workers.

Map of the Month: A different kind of map
A map can help a user get from A to B, but this need not be on a physical landscape. For many years, my teaching has included classic well defined problems, and how they are solved, both as attempts to understand human problem solving, and also as a basis for the early work in Artificial Intelligence programming. These problems have a clearly defined start point and end point, as well as explicit
exhaustive rules to define what is and is not permitted. The simplest problems can be mapped using a state space diagram, which shows all the possible legal problem states, and how they are connected together. With one of these, the solution to the problem, i.e. the shortest route with the smallest number of moves, can easily be identified.

Imagine that three lions and three lambs wish to cross a river. They have a boat, but this will only hold two at a time and, unfortunately …

if the lions ever outnumber the lambs on either bank then the lambs will be eaten;
the boat cannot cross the river without occupants;
the boat must fully unload at the end of each crossing.

This is known as a river crossing puzzle and there are several variants of this at different levels of difficulty. This particular version is also called the missionaries & cannibals or the hobbits & orcs problem. Whatever the name, it has a difficult step that almost always catches people out, where two animals cross the river, and then two different animals must cross back, making it look as though the problem is not advancing in terms of completion, even though this rearrangement is essential. Technically, people seem to use a hill-climbing strategy to solve this task: at each step of the problem, of all the moves possible, take the one that seems to be the most incrementally helpful at achieving the solution. The difficult step is a local high where none of the available moves offers direct incremental advancement.

This isn’t my first attempt at mapping the state space for this problem, but I’ve never been happy with previous ones. For the first time, I have included the intermediate steps – the boat trips – on the map itself as part of the solution sequence. I have also included every illegal move, which clarifies all of the options available at each point, and this has also enabled me to create a symmetrical design for the first time. The map makes the correct solution path clear, and the lambs are safe, for now.