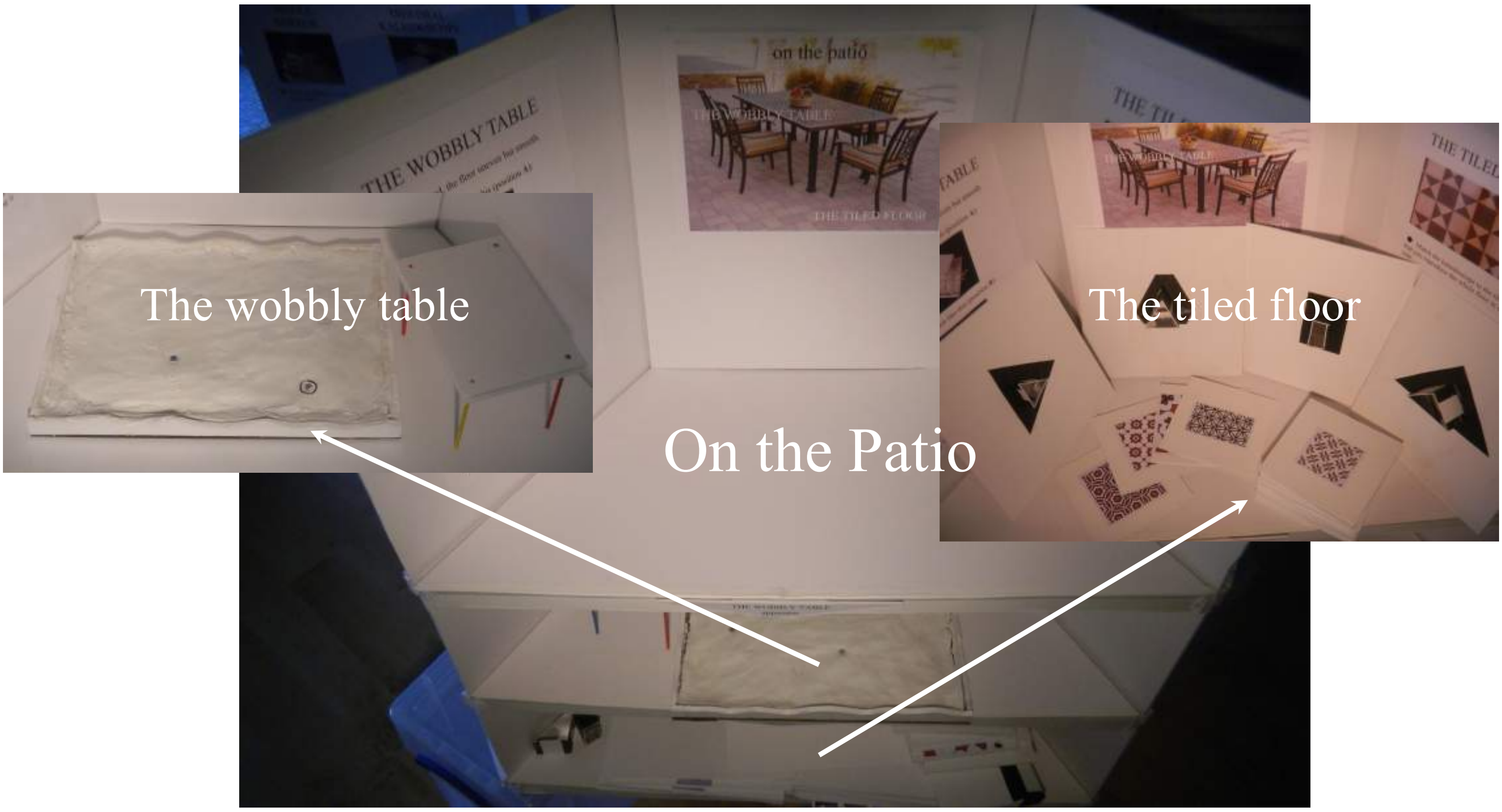
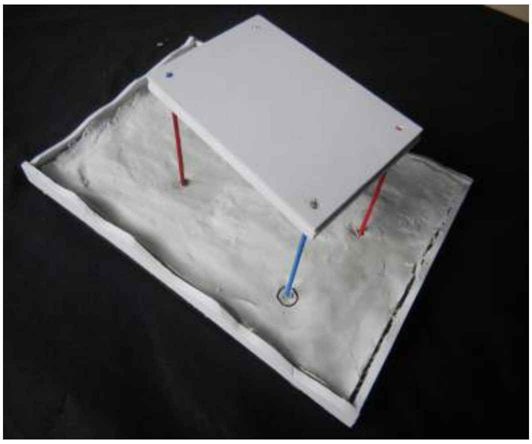

The wobbly table
On the Patio
The tiled floor
on the patio
THE WOBBLY TABLE

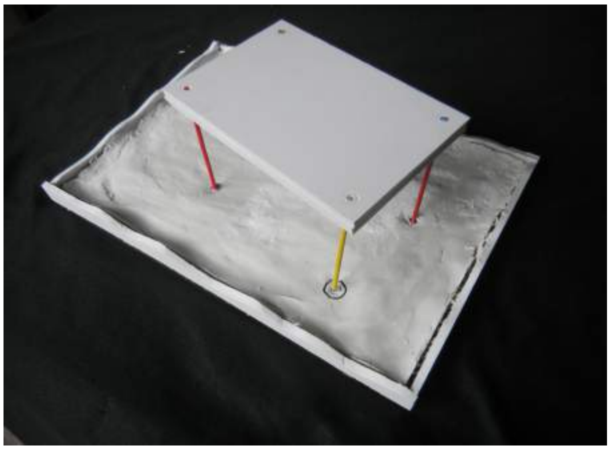
THE WOBBLY TABLE

The table is good, the floor uneven but smooth.

Set the table down like this (position A):



Set it down again like this (position **B**):



Now imagine starting the table in position A and, keeping 3 legs on the ground, turning it till it arrives at position B. Make the experiment.

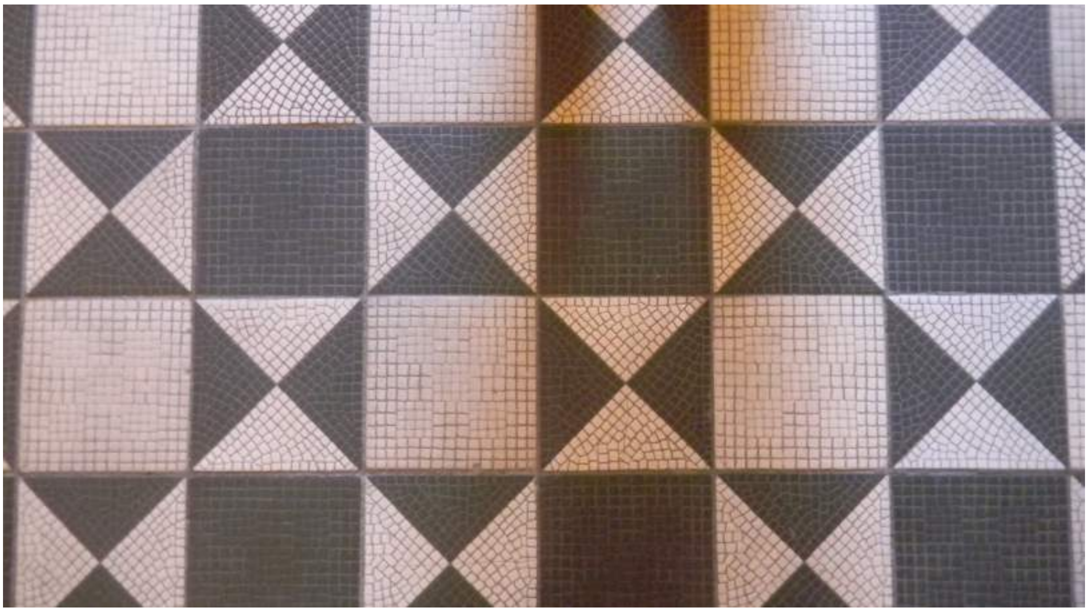
Notes

Though part of mathematical folklore long before, the problem became known through Martin Gardner's column in 1975. Gardner's intuitive proof makes no use of the intermediate value theorem but later writers cite the problem as a nice exemplar. In terms of our apparatus, Gardner's argument goes like this:

At some point as we turn the table, the yellow leg leaves the ground. Since there are always at least 3 legs on the ground, the blue leg must be one of them. At some point as we turn the table, the blue leg touches the ground. Since there are always at least 3 legs on the ground, the yellow leg must be one of them. Since no 2 legs are in the air at once, there must be a point where both the blue leg and the yellow leg, and therefore all 4, are on the ground. (You can imagine the yellow leg saying to the blue leg, "Oh, I was just leaving".)

For an explanation using the intermediate value theorem, visit David Eubanks' IVT and Wobbly Table - You Tube (www.youtube.com/watch?v=CD3URqfVyQY)

THE TILED FLOOR



Match the kaleidoscope to the tiling so that you reproduce the whole floor in each case.

Notes

If the symmetries of a tiling can be accounted for solely in terms of reflections, it can be recreated by the appropriate polygonal prism lined with mirrors.

The *locus classicus* is 'Tilings and patterns' by B. Grünbaum & G. C. Shephard. For an alternative characterisation of the symmetry groups concerned, see part 1 of 'The symmetries of things' by J. H. Conway, H. Burgiel & C. Goodman-Strauss. As part of the Atractor project, M. A. Chaves has developed the program Simetria, in which the tilings are printed by rolling deformable 'stamps' on the plane.