While the test tube is hardly the most imposing item of glassware on a scientist’s workbench, its symbolic power is second to none.

The test tube is possibly the most unobtrusive piece of equipment in the lab: its workaday function and sheer ubiquity render it more or less invisible. Scratch beneath the surface, though, and you’ll find... well, not a whole lot.

It has little in the way of an arresting origin story – indeed, the inception of the test tube is as opaque and colourless as many of the solutions it holds. The materials that go into manufacturing test tubes are generally unexceptional (mostly plastic, or glass, though Pyrex is mildly diverting), and otherwise there is little to differentiate one test tube from another, apart from the size, which, roughly speaking, varies from 10 to 20mm wide, 50 to 200mm in diameter, and 100 to 150mm long. We could talk about test tube racks and brushes, but they’re not about to set the imagination on fire, are they?

Yet despite this lack of any real defining character or compelling backstory, if one piece of lab equipment has come to symbolise chemistry, and in some ways the whole of modern science, it is the test tube. How on earth did that happen?

Historic origin

Of all the many basic shapes and sizes of equipment that populate the average chemistry lab, the test tube appears to be a relatively new addition: no mention of it, or anything like it, while the test tube has this metaphorical meaning that has gone far beyond its physical form
It’s one of the fundamental, iconic bits of equipment that nobody escapes using

borosilicate glass is undoubtedly Pyrex, which was developed by Eugene Sullivan in the US in 1908 after he had encountered borosilicate glass as a student in Germany. In one form or another, Pyrex soon found its way into countless labs and kitchens, where its fracture-proof powers have prevented many a scorching casserole dish from shattering upon impact with cold water. Even today, most of the glassware to be found within the reach of a chemist – including test tubes, flasks, jugs, bottles and beakers – will have been manufactured from borosilicate glass under one brand name or another.

Symbolic power

Never mind the history or physical properties of the test tube, what truly matters is that it has come to signify something much bigger. As Andrea Sella, Professor of Chemistry at University College London, says: “The
test tube has this metaphorical meaning that has gone far beyond its physical form. It is the incubator of ideas, the thing to which you turn to carry out experiments. It is extraordinary how that resonance has built up, and I think that comes from the fact that most people encounter test tubes in school. It’s one of the fundamental, iconic bits of equipment that nobody escapes using.”

This is a telling point. Children encounter the test tube early on in their school careers, usually long before they have the chance to lose interest in science, and at some point will have picked up a test tube, perhaps poured something inside it, held it over the flame of a Bunsen burner, and observed what happened. And even if they never handle another piece of lab equipment, they will always have that experience of using a test tube. For Andrea this “summarises the idea of ‘doing science’. And it is part of what has made the test tube a universal symbol for science”.

He also argues that the test tube established its strong presence in the lab towards the end of the 19th century, when chemical analysis became a big business: “This is one of the reasons why so many chemists were trained up in serried ranks, and the point when the layout of the lab itself became codified, with rows of benches, the raised sections where the reagents go, the fume hoods in the middle, and the test tube becomes part of that scene.”

Now add the chemists’ fevered work to that scene, and the full image comes into focus. “We have all sorts of qualitative testing going on,” says Andrea, “to identify whether sugar or flour is contaminated with salt or even arsenic, and we have simple precipitation tests where the chemists add a reagent and do an immediate observation. The test tube really lent itself to that sort of work. From that point on, we find that the term ‘test tube’ slips into common parlance”.

Future role

Today, the idea of the test tube as a symbol for science is possibly best encapsulated by the term “test-tube baby”. Since the birth in 1978 of Louis Brown, the world’s first baby conceived using in vitro fertilisation (IVF), this has become the universal term for any and all children who have been born as a result of IVF. Anybody with a passing knowledge of the process will know that the IVF is more likely to happen in a petri dish than an actual test tube, but “petri-dish baby” has neither the alliterative ring or the simple symbolic power of “test-tube baby” – while the average citizen might struggle to point out a petri dish in a glassware line-up, they’d have no such trouble with the test tube.

For the same reason, most chemical and corrosive substance warnings depict a liquid dripping on to a hand from a test tube and not from another piece of lab equipment. Confronted with such a warning, nobody needs to dwell a moment longer on deciphering its meaning.

But despite its prominent position in the public imagination, could the age of the test tube be coming to an end? Advances in all fields of science mean that traditional equipment is increasingly taking a backseat to more advanced technology. “My work doesn’t often call for test tubes,” says Andrea Sella, “and in some ways there isn’t that much call for test tubes. The spot tests that were universal during the 19th and 20th centuries have largely disappeared. Spectroscopy has taken over so much, though there are areas where the test tube persists, such as chromatography.”

Whether this new technology can wield the same power in the popular imagination remains to be seen, so while we wait for that, the self-effacing test tube will just have to continue its duties as the symbol for science that nobody could mistake.