

## Lessons from English Museums, 1970

Alan J. Friedman

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In 1970 my wife and I made a vacation trip to England, the first time we had traveled outside the United States. In a few weeks, a series of museum experiences I had there completely changed my views of what museums could do and how they might play a part in my own life.

As we planned our trip, I knew in advance some of the things I wanted to see. Among my interests were astronomy, ships and great explorers like Captain James Cook, and clocks. So we planned to visit the Old Royal Observatory at Greenwich, the *Cutty Sark* clipper ship, and the National Maritime Museum in Greenwich, which I'd heard had many ship models and old clocks. I had noticed that in fact these three attractions were within walking distance of each other, but I hadn't wondered why an observatory might be close to a maritime museum.

At the time of our trip I had finished my work on a Ph.D. in physics and thought I had a good general understanding of how science (at least the science I knew best, astronomy and physics) fit in with the rest of culture. I knew, for example, that there was a connection between astronomy and sailing (something to do with navigation), but it wasn't a particularly important connection for science, I thought.

In one day, visiting the clocks, telescopes, and ship models at the National Maritime Museum and the Old Royal Observatory, I discovered a whole world of connections I had not known existed. Astronomy was indeed part of navigation, but astronomy alone told sailors only half of what they needed to know to survive. It could give them latitude, but not longitude. Clocks turned out to be the missing key that, combined with astronomy, revealed longitude and thus let sailors navigate the world's oceans. A system of navigation was a life or death matter for sailors, but it was also what spurred the funding of both astronomy and precision timekeeping. The justification for having a Royal Observatory in the first place was not a royal family's love of fundamental science; it was the Royal Navy's and the merchant marine's need for a complete system of navigation.

Somehow, in all my courses, readings, and television watching, I had never realized this vital connection among astronomy, sailing, and clocks, subjects that individually but independently fascinated me. Perhaps I would never have learned of this connection until Dava Sobel's 1995 best-selling book, *Longitude*. But I didn't have to wait a quarter century, because the story was told independently in those two museums, the Old Royal Observatory and the National Maritime Museum. The telescopes I saw in the observatory were built to create astronomical tables for navigation. The chronometers ticking away in the National Maritime Museum were invented by John Harrison to prove the concept of navigation by star and clock. Captain James Cook's clocks and telescopes were there as well, because he conducted key sea trials of Harrison's

chronometers, and he also used telescopes and clocks to observe a transit of Venus in an attempt to calibrate the size of the solar system.

*Lesson 1: Museums not only have simple data to impart, such as the age and appearance of rare and historic artifacts. Museums can also put artifacts in a context, making exciting connections with other parts of a visitor's own world. Simply the juxtaposition of objects can tell important stories and make sense out of apparently disparate facts.*

We also visited the Science Museum in London. There were two remarkable lessons for me in the few hours we spent there.

I saw an exhibit in the Science Museum that was delightful in concept and totally unprecedented (to me, at least) in execution. On a mezzanine overlooking the exhibit floor was an exhibit on astronomy. One unit was not a historic instrument but a fairly crude contemporary device made of two large disks, mounted parallel to each other and about a meter apart on a common axle. You could actually touch these disks and turn them around the axle. Mounted in the disks were lenses. So you could “dial a telescope,” choosing a pair of lenses. Then you looked through the pair you had selected and saw an image of whatever was across the museum.

Perhaps I had seen “hands-on” exhibits before. There must have been a few in the American Museum of Natural History in New York, when I was growing up in Brooklyn. But, as far as I can recall, that device in London was the first hands-on exhibit I’d ever used. It instantly clarified some of the characteristics of the historic instruments nearby in glass cases: what factors are important for magnification, and why the lens at the far end from your eye is bigger in diameter than the one nearer to your eye. And it completely changed for me the relationships among the visitor, the object, and the museum. Until then, I had believed that it was up to the object and a label to communicate meaning to the visitor. The museum’s job, I thought, was make the object and label visible, and then to protect them from the visitor.

By allowing visitors to manipulate an object, vastly more information about the object could be communicated and would be remembered. Each time I learned something from my choice of lenses it was my personal discovery. I had a much better understanding of the many historic telescopes in the glass cases.

*Lesson 2: A museum can sometimes create objects expressly for visitors to touch and manipulate, and meaning can be transmitted through such visitor/object interaction.*

There was an even more startling experience in store for me at the Science Museum that afternoon. A sign had announced a “giant spark” demonstration at an appointed hour. Since I did static electricity demonstrations as part of the freshman physics class I taught, I had to see how they did it in London. We arrived at the demonstration area in plenty of time, and I set up my camera and tripod so I could document this exercise in physics pedagogy.

Soon quite a large crowd had assembled to see the event. I remember struggling to get the camera high enough to look over the people between me and the Van de Graaff generator. Then the demonstrator arrived, a young man in a suit and tie, I think. He began setting up. Then he

looked around the room, spotted me, and immediately began to make his way across the room, straight toward me.

I remember the sinking feeling in my stomach. Oh, no, there must be some rule about not taking pictures or not using tripods. I hadn't seen a sign, but then I hadn't been looking either. I was about to be embarrassed before a hundred other visitors—and my wife. I started to take down the camera as he approached.

“Excuse me,” he said, “but were you planning to take a picture of the spark?”

“Well yes, but I didn't . . .”

He stopped me before I got into my apology. “OK, the spark is really bright, but it is also very fast, so you'll have to open the shutter just before it goes. Do you have a ‘time’ or ‘bulb’ setting on your camera?”

“Oh. Yes I do.”

“That's great. Then here's what I'll do. Just before I press the button to start the spark, I'll wave to you like this. Then you'll know to open the shutter, and the spark will go off about one second later. You should get a good picture. OK?”

Of course it was OK! In fact, I was stunned. He hadn't come to berate me for breaking the rules. He had come all the way through the crowd to try to help me take my picture. He actually cared that I would have a good time and get what I wanted out of the experience. I had never imagined that museum staff saw their job as helping visitors enjoy themselves rather than protecting the museum from those visitors.

*Lesson 3: Working in a museum is not just about objects and scholarship. It can also be about the visitors' experience and sharing your enthusiasms with them.*

There were other experiences on that trip to England that I now see also revised my image of museums. In the British Museum there was Isaac Newton's glass prism and William Wordsworth's walking stick, immensely evocative because of who owned them, even though purely as objects they were absolutely undistinguished. There was Stonehenge, impressive not because of the size of the stones (even a small house is much larger), but because of a lifetime of familiarity, the lovely, lonely setting, and the deeply respectful treatment of the site that induced a sense of awe and wonder. This was the *real thing*.

I also learned the power of follow-up materials. Gift shops at the museums and historic sites had excellent pamphlets, books, posters, maps, and kits. With my interest sparked, I began reading more about clocks, Captain Cook, clipper ships, and archaeoastronomy.

I didn't immediately set out to change my career plans. I continued to teach college physics, although the next year I created a course called “Stars, Clocks, and Men” to share my new knowledge from the London museums. Three years later the occasion arose to do some

temporary work at the Lawrence Hall of Science in Berkeley, California. Armed with my new enthusiasm for what museums could do and my new perception of the role of staff in these institutions, I took the opportunity. Soon I was working on my first exhibition. It was called *Star Games* and was about how telescopes worked. The inspiration for that entire exhibition was the dial-a-telescope device in London. Half a dozen other sciences centers around the world later made replications of *Star Games*.

I've now been working in museums for almost 30 years. I've visited hundreds of museums, science centers, planetariums, and historic sites around the world, and I learn from each one something new about what we can do, and what we can do better. But I've little doubt that those few days of visits to museums and historic sites in England, 31 years ago, made the major change in my perception of the field.