AFTERIMAGE

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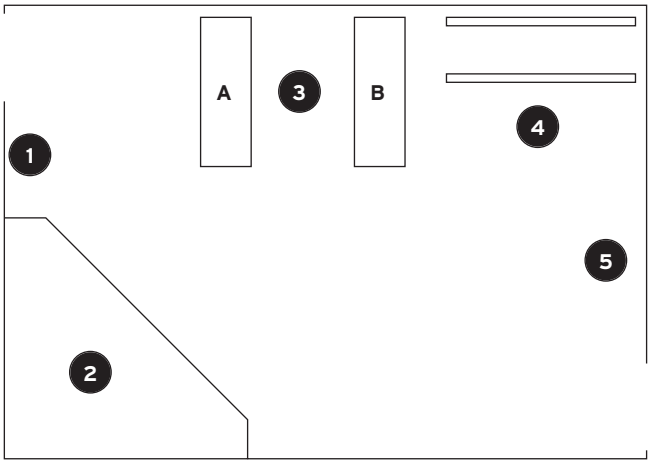
WITH JACK WELLS AND ZOE LAUGHLIN

INTRODUCTION

AfterImage provides a unique perspective on the generation of light, the phenomenon of fluorescence and our relationship with colour. Devised by three leading UK scientists, this immersive space examines the connections between the scientific and artistic explorations of light and colour, probing the thin membrane between the reality and our perception of the physical world.



1. Timeline
2. Wimshurst Machine
3. Essence of Fluorescence
4. White Shadows
5. White Light

1 TIMELINE

Ever since the first bright spark discovered fire, the recipe for light has been one of culture's most alluring quests. The discovery of static electricity, the electric light bulb and fluorescence have all contributed to lighting our world at the flick of a switch.

2 THE WIMSHURST MACHINE

The Wimshurst Machine was first developed in 1882 by British physicist James Wimshurst and is regarded as the most efficient (manpowered) static generator. Originally made of two glass discs turning in opposite directions, the discs have small sections of tin plate mounted on them. Metallic brushes are used to pick up static charge from the discs, which is then transported to the aluminium balls at the top. An electric charge builds up, then – literally in a flash – millions of particles (electrons) jump across the balls creating an enormous amount of heat, which causes the brilliant spark. When the flash appears the air around the spark becomes extremely hot. So hot that it causes the air to expand so rapidly that it explodes creating a distinctive 'crack' sound; and is why we get thunder with lightning.

This same principle applies to fluorescent lights. The moment you flick the switch electrons move across the tube colliding with mercury gas, which emits ultraviolet light. This hits the tube's fluorescent coating, which emits its characteristic visible light.

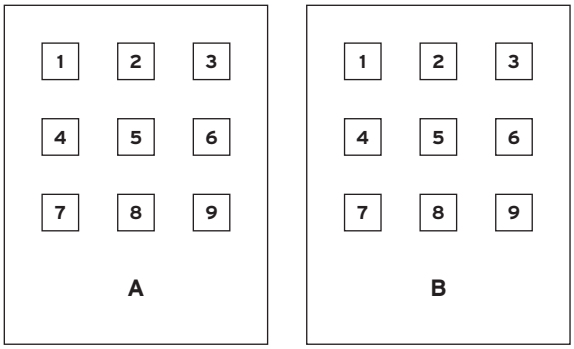
See also **www.mlythgoe.com/19Afterimage.htm**

3 THE ESSENCE OF FLUORESCENCE CABINETS

The pigments that coat the inside of fluorescent tubes convert ultraviolet light into visible light. This fluorescence could be created by crushed uranium, scorpions, diamonds, or cheese. However, modern tubes use synthetic pigments, called phosphors, which allow the light to be tuned using europium and terbium to create specific colours.

Some fluorescent materials do not give out visible light immediately and thus act as light stores. This is phosphorescence, and it allows us to create the Milky Way on bedroom ceilings and similar temporary night-time miracles. A more permanent effect involves the elements radium, tritium, and promethium. These elements luminesce, and can be found on watches and the instrument dials of WW II airplanes and in the tragic histories of the Radium Girls, painters at an American radium factory who were killed by this radioactive material.

Biology has evolved a different solution, bioluminescence, where cells harness the light produced by chemical reactions. These will-'o-the-wisp lights used to be seen only in the deep oceans and in the provocative behaviour of the glow worm, but now are invading biology laboratories. In addition the discovery of the fluorescence protein, GFP, has turned fluorescence into a vital biological tool: the cells of plants and animals are now genetically engineered to fluoresce to help us in our fight with mortality and deformity. It seems it is literally in our genes to play with fire.



A

1. **Nile Red** (The same Nile Red molecule is dissolved in five different solvents)
2. **Uranium Glass Fruit Bowl** (c.1950, Australia)
3. **Envelope** (With a fluorescent stamp and markings)
4. **Tonic Water** (100 ml)
5. **Currency** (£20 sterling)
6. **Live Edge Perspex** (propelling pencils)
7. **Phosphorescent Paint** (coating the inside of a 250ml jar)
8. **Colour Swatch** (Samples of fluorescent and non-fluorescent paints)
9. **Sunscreen** (UVA and UVB barrier, SPF 25, sprayed onto a white sheet of paper)

B

1. **Soap** (Containing peppermint, lavender and tea tree oils with alkanet extract)
2. **Penellus Glowing Fungi** (Cultured on agar)
3. **Amber** (Fossilised resin)
4. **Minerals** (Adamite (from Mexico); Franklinite and Willemite (from New Jersey); Manganocalcite (from Peru))
5. **Palamnaersus Scorpion** (from New Mexico)
6. **Teeth** (From the mouth of Zoe Laughlin, lost/extracted between the ages of 6 and 12)
7. **Watch Faces and Radium** (WW II – Dials painted with Radium and Tritium)
8. **Diamonds** (Flawed; 2.5 carats)
9. **Zebrafish and GFP** (Green Fluorescent Protein is expressed in every cell of this fish, though it is only visible under a microscope)

For more information on these samples, please visit **www.materialslibrary.org.uk**

4 5 WHITE SHADOWS & WHITE LIGHT

Perhaps surprisingly, the colour we see is not always 'true' since colour is profoundly affected by its surroundings. **White Shadows** (4) and **White Light** (5) directly demonstrate the powerful effects of context on colour perception, and thus encourage the viewer to consider not only the fact that 'context matters', but why context shapes what we see.

White Shadows shows that the relationship between the external world of light and our internal world of colour is far from straightforward. Here twelve squares are lit by a **white** spotlight, and by one of four **coloured** spotlights. Each square, therefore, casts two shadows onto the canvas behind. One shadow of each pair is lit only by chromatic light and so takes on the colour of its light (for instance, it appears blue when the blue spotlight is on). The other shadow of each pair is lit only by white spotlight. However, these 'white shadows' appear not white, but orange, blue, green or purple. Where does this colour come from if not from the world itself? Why does the brain construct an alternative reality to the one before it? The beginnings of the answer to this question reside in our evolution, ecology and experience.

Context is everything. Red looks richer when surrounded by green, blue more saturated when side-by-side with yellow. This fact of perception is fundamental to understanding the works of Dan Flavin, who exploits spectral relationships in space and time.

Notice, for instance, that the colour of the two corridors outside the AfterImage space, though physically separated, interact perceptually, so that the white corridor appears either pinkish or bluish depending on whether one views it from the side of the green tubes or yellow tubes, respectively. Also notice that if you stare at the green or yellow tubes for about 10 seconds, and then look at the white corridor, you see an afterimage, or colour negative of the coloured installations.

See also **www.lottolab.org**