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Solargraphy
Solarigrafia

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Abstract: Pinhole photography is lensless photography. A tiny hole replaces the lens and the light passes through it forming an image in the camera. Solargraphy is a specialised form of pinhole photography. It consists of applying long exposure times, from one or more days up to months or even years, thereby recording sun trails and other objects. Hence, the light strikes the photosensitive material placed inside the camera, both directly from the sun or by reflection from other elements.

Keywords: Photography, pinhole, pinhole photography, solargraphy.

Resum: La fotografia estenopeica és fotografia sense lents. Un petit forat substitueix la lent i la llum hi passa a través i produeix una imatge a la càmera. La solarigrafia és una forma especialitzada de fotografia estenopeica que consisteix en l'aplicació de temps d'exposició llargs, a partir d'un o més dies fins a mesos o fins i tot anys, i enregistra les traces del sol i altres objectes. Així, la llum incideix sobre el material fotosensible col·locat dins de la càmera de manera directa pel sol o per la reflexió d'altres elements.

Paraules clau: Fotografia, estenop, fotografia estenopeica, solarigrafia.

Introduction

In 2007, during the International Year of Science I received a number of emails from FECYT about workshops in Spain and one of them included a "Do It Yourself" pinhole camera cut-out model. [1] I did not get around to building one at that point, but the idea stayed firmly in my brain and two years later I discovered the Worldwide Pinhole Photography Day. The activities included a couple of workshops to be held in a community centre in Barcelona. The pinhole workshop was fully booked, so I ended up in a solargraphy workshop in which I discovered a different way of taking long exposure pinhole shots. I became hooked!

Pinhole photography and solargraphy

The workshop consisted of two parts: the first dealt with the basic principles of pinhole photography; the second addressed solargraphy in particular. In the first part, the main differences between pinhole and lens photography were clearly explained. This was a major discovery for me. The usual concepts of framing, composition, exposure time, depth of field, etc., expanded their limits and made me realise how to play with all of them together in perfect synchronization to achieve the best results. It might seem ridiculous but something similar happened to me when, as a college student, I suddenly discovered the abstractions hidden in the mathematics theorems and their meaning. You may compare it with a spotlight in the precise instant when it focuses on the artist of a show or with the magnificent explosion of fireworks. In summary, it changed my way of looking at and thinking of photography.

Regarding solargraphy, one of the main things I learned was the fact that, when exposed for a very long time using a pinhole camera (for instance, when recording solargraphs) photosensitive black & white paper was able to produce a colour image without the need for the developing process (figure 1).

The main characteristic of a pinhole camera (figure 2), also known as *camera obscura*, is its lack of any lens. It works based on the fact that light travels in straight lines producing

Figure 1. **Picos de Europa. Solargraph recorded at El Pinu (Piloña, Asturias) from 4 August 2013 to 8 February 2014.**

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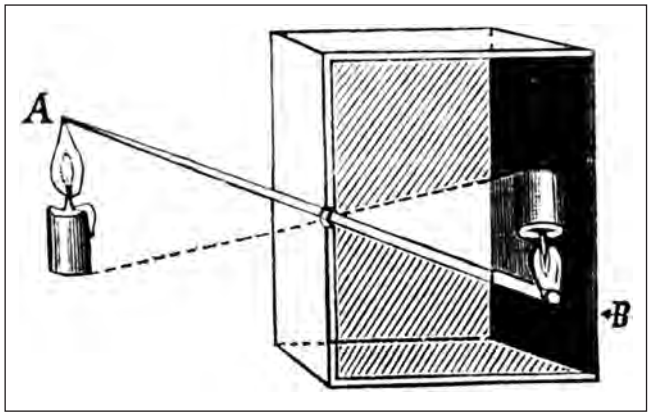

Figure 2. Basic design of a pinhole camera.

an image that appears upside down and laterally inverted inside the camera. When the shutter is opened, light shines through to imprint an image on photographic paper or film placed at the back of the camera.

Pinhole photography makes you think before making a picture. It is also important to study the peculiarities of each camera in order to get used to it. That is the most rewarding way of making photographs.

Usually you know the characteristics of a pinhole camera, like the *f*-number and the format of the light sensitive material being either paper or film. However, pinhole cameras do not have a built-in photometre to automatically measure light conditions or a viewfinder to help you when framing your photographs. This means that you need to make some calculations for the exposure time and carefully point your camera to frame what you are willing to get in your photograph. Also, the shutter is a bit different from those found usually in lens cameras. Thus, with a pinhole camera you need to get used to it, learn about its specific features like geometry, angle of vision, distortion (if any), etc., and take into account that the framing has a high chance of failing. Once you are "familiar" with your camera, you can guess beforehand how your photograph will be, and even then sometimes you may be pleasantly surprised with the outcome (figures 3 and 4).

Solargraphy is a specialised form of long exposure pinhole photography and it was established in November 2000 when Paweł Kula, Sławomir Decyk and Diego López Calvín launched the Solaris Project "involving the participation of artists, photographers and all other individuals interested in the photography, pinhole cameras and the movement of astral bodies.

Figure 3. Strong winds. Solargraph recorded at Sagrada Família (Barcelona) from 17 February 2013 to 21 June 2013.

The project was conceived as to allow the participation of anyone interested no matter how far he/she was from the original creators of the project". [2]

Solargraphy records the sun trails as a consequence of its apparent movement in relation to the earth (known as the "ecliptic"). The image is created using home-made pinhole cameras (usually tin cans, 35 mm film canisters, PVC pipe,

Figure 4. Library windows. Solargraph recorded inside Can Manyer Library (Vilassar de Dalt) from 14 June 2014 to 25 November 2014.

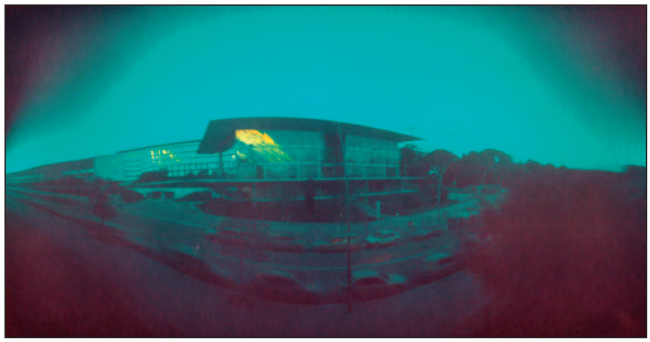

Figure 5. *Touched by the sun!* Solargraph recorded at Nexus II building (Barcelona) from 4 November 2014 to 21 December 2014.

etc.) loaded with photosensitive paper and secured to a specific point for a period of time.

It consists of applying long exposure times, from one or more days up to months or even years. During these extremely long exposures, the photosensitive material placed inside the camera records changes in the tonality of the emulsion as the light strikes it, both directly from the sun or by its reflection on other elements (figure 5).

Initially white or yellowish, depending on the paper used, it gradually becomes an observable image without the need for any chemical treatment whatsoever (development and/or fixing). The image looks like a geometrically inverted negative (i.e., upside down and reversed from left to right), presenting different colour tonalities only visible in red or faint light to prevent blurring.

You can use any kind of photographic paper, both colour or black & white paper. I only use black & white and these types are my favourites: Ilford MGIV RC DELUXE Pearl [MG4RC44M], Ilford Ilfospeed RC DELUXE 3 [ISRC344M] and

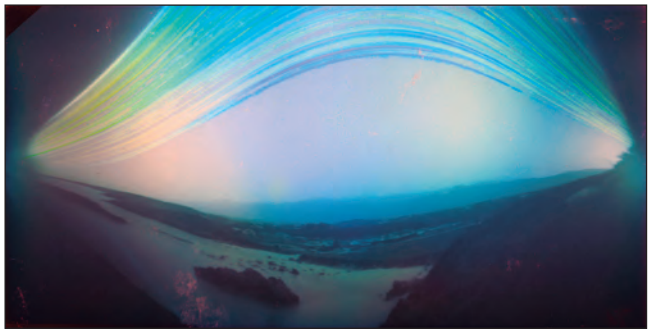

Figure 6. Borizu beach (Asturias). Solargraph recorded from 6 April 2014 to 10 October 2014 (with the help of Delfín Heredia).

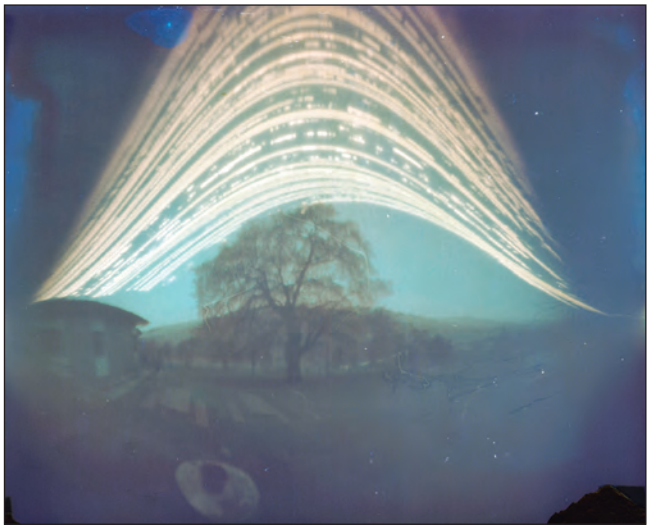

Figure 7. Centennial oak tree in Ayardes (Asturias). Solargraph recorded from 20 January 2016 to 9 July 2016.

Foma FOMATONE MG Classic warm tone. The differences in the paper are illustrated by different colouring, contrast or tone. These variations are an interesting topic open to investigation by the photographer. Other variables that can affect the final results are weather conditions, humidity, temperature, etc. (figures 6, 7 and 8).

Figure 8. Carrer de Milans (Barcelona). Solargraph recorded from 19 August 2015 to 22 June 2016.