Chapter 4

Analogue and Digital Stereo-Photography

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ABSTRACT

The origins of stereoscopic imagery are discussed briefly, and a practical method of producing stereoscopic pairs of images with a single-lens camera is explained in this chapter. The history of stereoscopic cameras is summarised, and the models and formats listed. The various formats for 35 mm formats are discussed and the fundamental geometry reviewed. Instructions for the correct mounting of stereo pairs of images are given. Equipment for digital stereoscopic photography is discussed, with descriptions of available models and their control devices and associated software listed for each model. Specifically designed programs for stereo image processing are available.

BACKGROUND TO STEREO-PHOTOGRAPHY

Stereo-photography is almost as old as photography itself. In 1826, the French inventor Nicéphore Niépce produced the first image on a pewter plate coated with a layer of bitumen of Judea, a white substance that hardened on exposure to light. He exposed it for a whole day, then washed away the unaffected bitumen with oil of lavender to leave a positive image. This could be coated with ink and pressed onto paper to give a permanent image that he called a ‘heliograph’. He discovered that silver compounds were more amenable, and threw his lot in with Louis Daguerre, whose images, based on silver as the recording...
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medium, became known as daguerreotypes; these were also positive images. Around 1839 Henry Talbot in England produced negative images on silver chloride impregnated paper, from which any number of prints could be made; he called these images calotypes. The standard size was 85 x 170 mm. Contributions by John Herschel led to the chemical techniques still used today for (analogue) photography. Later developments included the wet collodion process, in which glass plates coated with a solution of nitrocellulose in ether were sensitised and exposed wet, being prepared and processed on location by the photographer. George Eastman in the US had not yet introduced gelatin-silver halide coated cellulose nitrate film and small cheap cameras, so large cameras constructed of wood with brass fittings producing images on glass plates were the rule, and exposure duration was regulated by removing and refitting a cap over the lens.

It was not long before stereoscopic cameras, with two lenses side by side to record simultaneous left- and right-eye images on wide plates, were introduced. Single lens cameras were also used to make stereoscopic pairs of negatives by exposing two plates, moving the camera a few inches to one side between shots. By the 1850s stereophotographic image pairs were widely available to the public. These were viewed using an optical device invented by Charles Wheatstone called a stereoscope. Stereoscopic photographs became very popular in Victorian homes, as Roger Taylor explained in Chapter 1. There is a fascinating modern study by Brian May and Elena Vidal of a set of stereo cards produced in the 1850s in a book entitled A Village Lost and Found (May & Vidal, 2010). This book includes reproductions of the complete original set of stereo card images and a specially designed viewer.

Successful stereophotography relies to a large extent on the sharpness of the images. Anything in a scene that moves during an exposure and produces a blurred image will look odd when viewed through a stereo viewing device, and any object that changes position in between two sequential shots, or is missing from one of them, will give rise to strange visual effects. To obtain overall sharpness the camera should normally be focused on a distance that will give maximum depth of field.

Stereophotography was the natural successor to the 3-D drawings of geometric shapes produced in 1838 (as side by side left and right views) by Wheatstone in a scientific paper presented to the Royal Society (Wheatstone, 1838). In his paper, Wheatstone also described stereopsis and gave details of his invention, a mirror device for viewing such drawings as a three-dimensional image. It was he who coined the term stereoscope from the Greek ‘seeing depth’. The name is now used to describe any device used for the same purpose. Production of stereograms (also known as stereographs) was then almost entirely confined to the professional photographers of the day.

David Brewster was the first to design a stereoscopic camera; he also invented an improved design of stereoscope, still in use today (Brewster, 1856). Towards the end of the 19th century smaller cameras began to be marketed, an example being the French Verascope, designed and patented in 1891 by Jules Richard (Perrin, 1997). The first model appeared in 1893, and many improved models were made and sold over the next fifty years or so. The availability of such equipment might have been expected to result in a flurry of amateur activity in stereophotography, but interest in the subject tended to fluctuate, as it does to this day. After 1900 interest in stereophotography waned, although it assumed importance as a tool in the hands of the RAF