Flash Photography, From the Beginning

1888-Flash Powder

Used by Jacob Riis to illuminate slum conditions in New York. Magnesium powder was ignited in an open pan to briefly provide sufficient light for an exposure.

1930's-Flash bulbs

First press photographers, then, later, amateurs used bulbs with magnesium filaments, triggered electrically by a switch on the camera's shutter. The biggest advantage of this method was that a small explosion was contained limiting the number of injuries incurred by photographers and their subjects. Very few cameras of the time were equipped to accommodate flash bulbs. It was necessary for the photographer to disassemble the camera and engineer the flash trigger into the camera independent of the camera manufacturer. Flash bulbs were very slow (compared to shutter times) to achieve maximum brightness, so very slow shutter speeds were necessary to manage flash synchronization. A little later in the game, several manufacturers of flash bulbs began coating the bulbs with a pale blue plastic skin. This helped to balance the light from the flash with daylight making color photography with flash less of a battle. The primary purpose of the coating, however, was to minimize the glass spray that occurred whenever a bulb cracked or exploded during exposure. Flash bulbs were still in regular use as late as the 1970's. There are still a few sources for flash bulbs for those enthusiasts for doing it the old way; though most of those enthusiasts are hard-core enough that they are doing it the same way photographers did in the 1930's, they make their own bulbs.

1938-Electronic Flash

Dr. Harold Eugene (Doc) Edgerton experimented with high speed stroboscopic photography at Massachusetts Institute of Technology (and later consulted with divers on the U.S.S. Monitor off Cape Hatteras for underwater photography.) Dr. Edgerton is most renowned for the famous stroboscopic photograph of a stream of water reduced to a series of droplets by a strobe.

1950's-Portable Electronic Flash

Very heavy, very expensive (for the time) flash units became commercially available from a number of manufacturers. They typically used 510 volt batteries or rechargeable lead-acid, and later, nickel-cadmium batteries. They were noted for consistently producing the exact same amount of light with each flash.

Early 1960's-Automatic Electronic Flash

Flash units became smaller, lighter, and less expensive. Automation was achieved by placing a sensor on the front of the flash unit. It would read reflected light off the subject and trigger a "quench tube" so that flash was adjusted based on the distance to the subject. A quench tube was nothing more than a flash tube inside the flash body that was shielded so that no light escaped from it and the energy diverted from the primary flash tube was wasted harmlessly. This type of automation required that the lens be set to a pre-established aperture to get the correct exposure, but it made use of flash much more flexible than ever before. Honeywell was one of the earliest companies to use this technique and is credited by some with inventing it. They introduced their Auto Strobonar in the popular publication *Modern Photography*. Honeywell described the technology as "secret" and would not reveal how the flash so consistently, and inexplicably, got the correct exposure over a variety of distances. The editor of *Modern Photography* commissioned one of his tech men, Tony Karp, to dismantle the flash and see if he can figure it out. He did, and Honeywell was furious but the cat was out of the bag. Most of these flashes were powered by non-removable nickel-cadmium batteries.

Late 1960's-Flash Cubes

Kodak had improved their Instamatic cameras to accept flash cubes rather than flash bulbs. A flash cube was a plastic cube with one flash bulb built into each of four faces. When the shutter was fired, the front-facing bulb was triggered and when the film was advanced to the next frame the flash cube rotated 90° to bring the next bulb to the front. These were commonly used on Kodak's Instamatic cameras (126, and later 110 cartridge cameras) into the 1980's. Other camera manufacturers bought the rights from Kodak to use this technology as well.

Shortly after the introduction of the flash cube, came the Magicube. The old flash cube was an electric flash bulb with a wire filament. The Magicube was a chemical flash bulb. In the Magicube each bulb was set off by a plastic pin in the cube mount that released a cocked spring wire within the cube. This wire, in turn, struck a primer tube, at the base of the bulb, which contained a fulminating material. The fulminate ignited shredded zirconium foil in the flash and, thus, a battery was not required. Magicubes could also be fired by inserting a thin object, such as a key or paper clip, into one of the slots in the bottom of the cube.

1970's-Automatic Thyristor Flash

Where earlier automatic flashes wasted unneeded power in a quench tube, newer circuitry recycled unused power through a "thyristor" so that the flash unit could provide repeated flashes at near distances without waiting for the capacitor to recharge. This greatly reduced the cycle time of a flash enabling several shots in quick succession. It also served to help batteries last considerably longer in flash units. Just as with a quench tube, this type of automation required that the lens be set to a pre-established aperture to get the correct exposure. This technology is used today in modern flashes. It has been refined somewhat, but is still the same technology that revolutionized flash photography some thirty years ago.

Early 1980's-Dedicated Flash Units

Additional circuits were added to flash units to make them more efficient. Flashes were able to set the shutter speed in electronically controlled cameras to the flash synch speed, minimizing the problem of out-of-synch shots. A flash-ready light was added to the viewfinders of many cameras eliminating the need to remove your eye from the viewfinder to see when the flash has cycled. These extra functions were proprietary to the camera model or brand to which the individual flash unit was dedicated.

Early 1980's-Tilt, Swivel and Zoom Flash Heads

Tilt heads to allow bounce flash became available, followed later by swivel heads that allowed bounce flash when the camera was held in a vertical position. Zoom heads made it possible to match the flash's area of coverage more closely with the lens in use.

Late 1980's-Bounce cards

In the early 1980's photographers taped or otherwise attached index cards to their flash units to be able to create a more diffuse flash and/or to increase the angle of coverage. Later, flash and camera manufacturers began to offer plastic versions of these same innovations. Some flash units came with a tiny pull-out card built into the heads which could prove useful. These were quite frustrating to photographers because they were not easy to access and were only useable when shooting with the camera in the horizontal position. It wasn't until late 2008 that Sony introduced the HVL58AM flash, which allows bounce and a built-in bounce card from both the vertical and horizontal positions.

Late 1980's-TTL flash Metering

Full communication between flash and camera has finally been established. The flash limits the shutter speed to the flash synch speed, but allows for use of slower shutter speeds. The flash sets its output based on the aperture setting of the lens rather than requiring that the lens be kept at a specific setting; and the photographer still has a flash-ready light in the viewfinder. TTL flash metering is achieved by use of a very slight, usually invisible pre-flash from which the flash metering system takes a reading. Many cameras even had a light to tell the photographer that the flash is not turned on, but should be, when a low-light situation is encountered that will prompt the automation to select a shutter speed too slow to hand-hold.

Early 1990's-Autofocus and Zoom Flash

With the sudden emergence of auto focus cameras at the end of the 1980's, the dedicated TTL flash was equipped with a red panel on the front, which contains the auto focus illuminator. It sends out a pattern on which the camera can focus making auto focus possible in very low light. Simply expanding on the TTL circuitry already in the flash unit, an auto-zoom function was added. With equipped cameras, the focal length of the lens was sent to the flash, which would then zoom the flash head to match the focal length of the lens. This was particularly useful with zoom lenses; and is handy for creating studio-like special effects.

The Twenty-First Century-Digital Flash

The more things change, the more they stay the same. The newer, more sophisticated digital cameras of today have certain requirements to make of the flash units they use. The most important is the voltage that the flash sends into the camera when they communicate. Digital cameras are very sensitive to this and require a dramatically lower voltage than older cameras, due to the use of logic circuits and other sensitive aspects of a digital camera. It is wise to avoid using pre-digital flash units with digital cameras without a buffering device of some sort like the *Wein Safe Synch* to protect the camera. The TTL Metering technology has gone from reading reflected light off the film to a meter in the prism or other part of the light path of the camera. But thyristors, flash ready lights, zoom heads, auto focus illuminators, pre-flashes, aperture controls, and flash synch are all still the same.

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