GRAFLEX Journal

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A HYBRID WORKFLOW WITH A CROWN GRAPHIC

By Howard Sandler

Background and Motivation

I was an avid photography hobbyist in the 1980s, but I sold my SLR camera and lenses in the 1990s when they became too cumbersome to carry along with a toddler and stroller. Digital photography rekindled my interest in the 2000s, and then I became re-attracted to film in 2010. For me, film photography is largely about the joy of bringing old cameras to life, composing with the superior ground glass viewfinders, and striving to make great images with them. Although I did wet printing in my teenage years, I don't have the same interest (or available space) for a full darkroom today. So, a hybrid workflow makes sense for me. That means shooting film, developing the film myself, as that doesn't really require a full darkroom, then scanning the developed film and finishing in a photo editing program (Adobe Photoshop for me).

Although my past experience had been with only 35mm and medium format, I became interested in large-format Graphics for four reasons. First, there is Weegee and the rich history of the cameras. Second, Graphics offer tremendous performance for the cost. Third, Graphics can be used hand-held; this is a large part of my style of shooting. Finally, when scanning with affordable flatbed scanners, large format shines. A flatbed scanner can easily provide files with 50-80 megapixels of true resolution from a 4x5 negative.

My Camera, Flash and Lens

I have a Crown Graphic 45. My Crown dates from about 1956 and is a bit unusual in that it came with the Schneider-Kreuznach Xenar 135mm f/4.7 lens and has the later body details of a Crown Special, yet the lensboard is not marked Special, and the camera has the side Kalart rangefinder of earlier models. Mine also happens to be fitted with a Watson optical viewfinder from Burke and James, rather than the Graflex viewfinder.

A particular interest of mine is portraiture, and I like to use multiple off-camera flashes. I needed a way to connect the master flash to the shutter, and I also wanted a means to make the arrangement portable and removable. Mentor and long-time Graphic user, Ed Shapiro, gave me pieces of a Graflite flash handle and its quick-release mounting bracket. He had put an aluminum cap on the battery tube. I bolted a cold shoe from an umbrella stand to that. Since modern flashes generally lack PC connectors, I needed to turn that into a hot shoe. I bought an inexpensive hot shoe adapter from B&H. It provides a foot to go in the cold shoe, a hot shoe, and male and female PC connectors. A male PC - male PC cable connects that to the shutter. This arrangement, shown in Figure 1, gives me a convenient way to mount any electronic flash or radio trigger.

Figure 1.

I like the Nikon SB-800 Speedlight and own several for the professional work I do with my digital cameras. They tilt, swivel, have manually-adjustable power output from 1/1 down to 1/128, and can be used in optical slave mode, so the one flash wired to the Crown can trigger all the others to flash at the same time. There are Speedlights with similar capabilities for other brands. For typical portraits, I use the flash sitting on the flash handle as the fill light, perhaps bounced off the ceiling as shown in Figure 1, or a back wall. I use another Speedlight in slave mode bounced into a white umbrella as my key light, and a third Speedlight, its head wrapped in a tubular snoot, as an accent light above and behind the subject aimed at the subject's hair. In some cases, I might use an additional flash for the background. There is no particular limit on how many flashes can be slaved to the flash attached to the camera this way, and no cords to trip on.

Portraits generally have a more flattering perspective if the camera is at least 6 feet or more away from the subject. For head-and-shoulders portraits with a 4x5, this suggests a lens with a focal length of at least 210mm. I acquired a Rodenstock Sironar 240mm f5.6 in a Copal 3 shutter. As Figure 1 shows, this just fits on a Pacemaker Graphic lensboard. Not shown in Figure 1 is a hood I normally use to reduce any glare into the lens from out-of-frame light sources. I just use a tube fashioned from black matte paper.

My development process for 4x5 black and white is standard, so I won't elaborate here. If only developing one to three sheets, I have found the "taco style" approach in a Paterson tank to work well. Otherwise, I use a set of hard rubber Kodak open tanks with hangers and develop, stop and fix in the dark.

My only comment about film and developer specific to a hybrid workflow is that, for various technical reasons, scanning tends to emphasize the apparent grain relative to wet printing. Although grain is of less concern in large format, I don't go overboard in terms of pushing high-speed film. I like Ilford HP5 Plus and FP4 Plus, both at box speed, developed in Kodak XTOL 1:2.

Preparation for Flatbed Scanning

I use an Epson V750, which can scan an entire 4x5 in one scan. Earlier I used an inexpensive Epson V500 and was able to "stitch" two scans together using the Photoshop "photomerge" tool, because that scanner could not scan negatives wider than medium format. While flatbed scanners are well-suited to large-format work, there are a few critical details to getting the most out of a negative or transparency. It is important to recognize that the scanning optics have limited depth of field, and the manufacturing variation from unit to unit exceeds that depth of field. This means that the height of the negative over the platen of the scanner needs to be found for each particular scanner—the factory-set height of the stock film holder is usually not optimal. Placing the negative directly on the platen is also sub-optimal. One discovers the optimal height by simple experimentation using a sharp negative or scratched scrap negative and repeatedly scanning with very small adjustments to height. (I propped the holder up on two stacks of business cards until the optimal height was found.) This experiment needs to be done only once.

Figure 2 shows how I hold my negatives, and I credit Ari Tapiero, who sold me my scanner, with coming up with this arrangement. I don't use the standard Epson 4x5 negative holder. I tape the edges of my negative to a plate of anti-Newton ring (ANR) glass, emulsion side toward the hazy side of the plate, stretching gently so the negative stays quite flat and won't sag when the plate is turned over. There are felt stand-offs in the corners of the

glass plate. These were carefully sized so that the plate, when turned over and placed on the scanner's platen, suspends the negative at the optimal height found for my particular scanner to get maximal resolution.
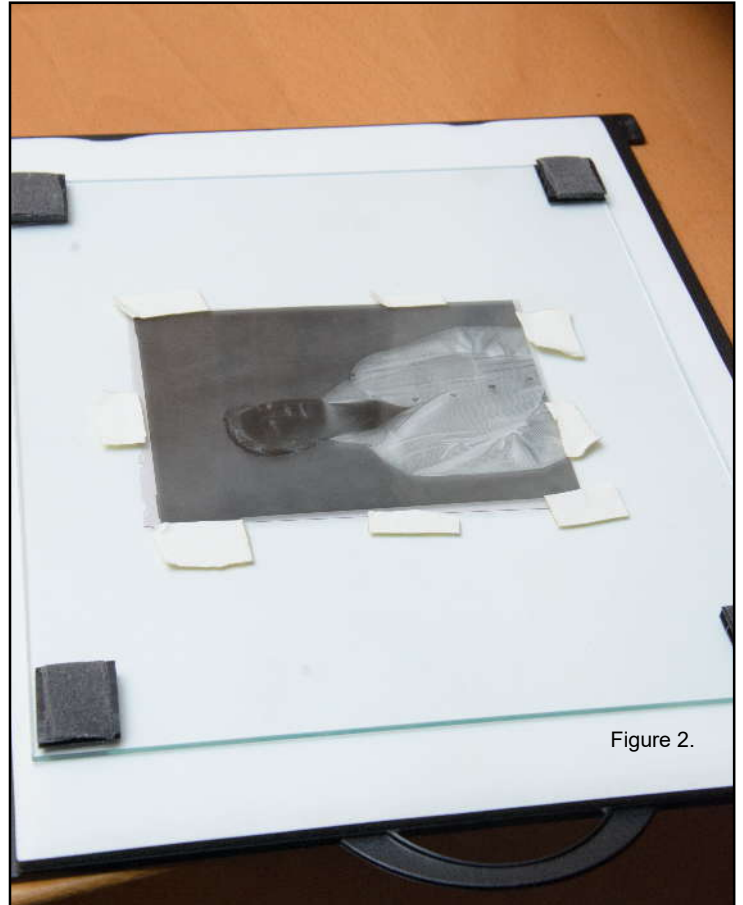

Figure 2.

Figure 3 shows the plate in position on the scanner bed. I put a 4x5-inch black plastic window mask over the plate to reduce any glare effects near the edges of the negative.
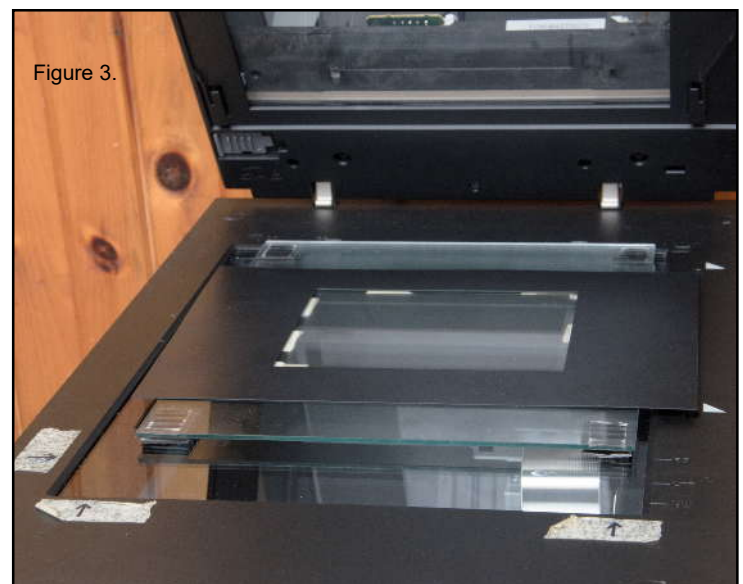

Figure 3.

With this arrangement, there is a gap of a few millimeters between the platen and the negative, and the negative is in contact with the rough side of the ANR glass plate, so there is no problem of Newton's rings or interference moire patterns developing from contact between two smooth surfaces.

Scanning Settings

I generally scan negatives and transparencies at 2400 pixels per inch. I just use the simple Epson Scan software which came with the scanner. Importantly, I select "Film (with film holder)" as the document type, as this forces the scanner to use its higher-resolution optical path wherein it expects film suspended above the platen, rather than something in contact with the platen. Although the V750 scanner supports much higher resolution settings than I use, the optical resolution is not really sufficient to get much more out of the scanner, so the higher ppi settings merely result in needlessly larger files and longer scan times. I turn off all in-scanner adjustments, sharpening and dust removal. I scan black and white in 16-bit mode and save as a .tif file to avoid any banding or compression artifacts. I scan with a linear tone curve and set the black and white points so that highlights and shadows are preserved. This tends to result in a rather dark and flat scan, such as Figure 4, which is a representation of a scan straight from the scanner. Here, I set the white point so that the bright highlight on my subject's hair was not blown out; therefore, the rest of the image is fairly dark.

Figure 4.

Post Processing

I happen to use Photoshop, but many photo editing programs have the required capabilities for the standard manipulations required to turn a flat scan into a finished file ready to print. Although the standard advice in photo editing is to sharpen last, I generally sharpen my scans first, as flatbed scanning is not particularly sharp, even when done optimally as previously described. With the Epson scanners and my settings, I have found that sharpening scans aggressively with the "unsharp mask" tool set to radius 1.4, amount 250 and threshold 0 is a good starting point.

Sharpening also helps reveal the dust spots. My next step is to go over the scan displayed at 100% size. (One pixel of the image is one pixel on the screen.) and spot out the dust using the "spot healing brush" tool. This can be tedious, and this is where good hygiene in rinsing and handling negatives and cleaning the scanner platen and ANR glass plate with an anti-static cloth reduce frustration.
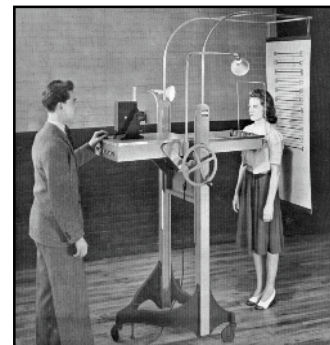
At this point, I generally crop to my desired final aspect ratio, set white and black points and apply a global "curve" to get the desired overall tonality. This is analogous to determining exposure time and selecting paper grade or multicontrast filter in wet printing. Finally, I do local adjustments to brightness and contrast, sometimes on another layer if I want to make them reversible, such as dodging and burning, retouching of skin using the "clone" tool for blemishes or stray hairs and perhaps applying a vignette. Figure 5 shows a finished portrait shot at f11 on FP4 Plus film, using my workflow.

Figure 5.

In 1940.

THE GRAFLEX MODEL A AERO CAMERAS

By Ken Metcalf

The purpose of this article is to share things I have learned about the World War I developed Graflex model A aerial cameras. Information came from sample cameras, patents, and several comprehensive books and manuscripts, from which I will relentlessly quote.

Readiness

World War I lasted from July 28, 1914, to November 11, 1918, while the United States did not declare war until late...on April 6, 1917.

"At the outbreak of the war, the United States had absolutely no facilities or knowledge for this work [aerial reconnaissance]. All the highly developed methods abroad had been kept from this country as a neutral, and there was on hand in military circles here little but the knowledge of the existence of this science. Commercial companies who had endeavored to get some inkling of it had also failed. Moreover, aerial photography was a late step in America's development, which could not be taken until the immense preparatory work of building fields, training planes, and the like had been completed."[1] "At this time [1915], the United States had not yet entered the war. They too suffered from a lack of interest in the use of photography. They had only a small unit under the control of the Army Signal Corps [and noted below, the U.S. Navy] and had to make do with converted, mainly press type, cameras."[2]

In 1918, when U.S. commander General Pershing compiled a long list of equipment he wanted sent to France, only "1 Camera, F&S, Aviation Model, 4x5" was listed, while he requested "20 Cameras R.B Cycle Graphics, and 14 Graflex Cameras, 4x5 with B & L lenses."[3] Too many on hand, or too little interest?

Contemporary writing indicates that the U.S. was developing cameras on their own prior to entering the war.

"In August 1915, the Naval Observatory signed a contract with the Eastman Kodak Company to develop an aerial camera with a high-speed lens, suitable for photography at altitudes between 1,000 and 2,000 feet. The camera, according to Navy Observatory specifications, should have a film capacity of at least 10 exposures; a glass plate (negative) size of 3x4", and be constructed so that wind pressure wouldn't affect its performance. Additionally, the camera's controls would have to be arranged so that after each exposure, a single movement of an appropriate mechanism would make the camera ready for another exposure. Richardson [station photographer for the Navy's first Naval Aeronautics Station and Flying School at Pensacola, Florida] had been urging the development of such a camera since deploying to Mexico a year earlier."[4]

"Back in 1915, the first Eastman Aero Camera of the hand-held type was developed. At that time, little information was available regarding the special requirements of aerial photography, and considering what obstacles they had to overcome, the designers of this first camera, the F & S Aero Camera Model A, as it was called, turned out a very creditable instrument. This camera was quickly followed by improved models of the same type."[5]

Learning curve

"Meanwhile, the American photographic service in France associated itself with the French service adopting its methods and apparatus and using French planes whose designs were not being followed in American construction. The task of harmonizing the photographic practice as taught in America, following English lines, with French practice as followed in the theater of war, and of adapting planes built on English design so that they could carry French apparatus, was a formidable one, not likely to be forgotten by any who had a part in it."[6]

"The first cameras to be used for aerial photography were hand-held ones of ordinary commercial types. Indeed, the idea is still prevalent that to obtain aerial photographs, the aviator merely leans over the side with the folding pocket camera of the department store show window and presses the button. But the Great War had not lasted long before the ordinary bellows focusing hand camera was replaced by the rigid-body fixed-focus form, equipped with handles or pistol grip for better holding in the high wind made by the plane's progress through the air. Even this phase of aerial photography was comparatively short-lived. The need for cameras of great focal length and the need for apparatus demanding the minimum of the pilot's or observer's attention, both tended to relegate hand-held cameras to second place, so that they were comparatively little used in the later periods of the war."

"By the end of the war, many millions of photographs were taken, and millions of prints made. Commanders increasingly relied on them. With the exception of the United States, in 1918 all the combatants had cameras that took excellent photographs from as high as eighteen thousand feet. The best American camera couldn't be used above twelve thousand feet."[7]

Although the foregoing does not speak well for the aerial camera efforts of Eastman Kodak, to their credit, they rapidly provided improved camera models, and contributed the well-regarded Hawk-Eye aerial lenses, in increasingly long focal lengths.

Because the model A1 was still being manufactured for the civilian market in 1928, I believe it is worth learning more about the camera. Although not sold as civilian cameras, I believe the other "A"s are of interest in the evolution of Graflex aerial cameras.

Initial requirements

"It is essential that the apparatus for use in the air shall have high lens [fast] and shutter speed, means for rapid changing of plates, and anti-vibration suspension." "One simplification over ground cameras, however, is brought about by the fact that all exposures are made on objects beyond the practical infinity point of the lens; consequently, all cameras are fixed focus." "Experience has shown, too, that we must avoid all mechanisms depending primarily on springs and on the action of gravity." "Because of the cold of the upper air, all knobs, levers and catches must be made extra-large and easy to handle with heavy gloves." "Loose parts are to be shunned, as they are invariably lost in service."[6]

Requirements modified by experience

"But the aircraft, flying at twice the speed of the dirigible, meant the photographer would have to work much more quickly. It soon became obvious that the hand-held camera was inadequate, and this lead to the development of fixed mounts for the vertical cameras."[7]

"In certain of the aerial cameras developed early in the war, all of these elements were built together in a common enclosure. Later it was generally recognized that a unit system of interchangeable parts is preferable."[6]

"Thus, a six-inch focus lens on a 4x5-inch plate would be as good from the standpoint of angular field as a 12-inch on an 8x10-inch plate. This is apt to be the condition with respect to most peace-time aerial photography, which may be expected to free itself quickly from the huge plates and cameras of war origin."

"The Folmer variable tension shutter is used on the United States Air Service hand-held and hand-operated plate cameras and on some of the film cameras. It consists of a fixed aperture curtain wound on a curtain roller in which the spring can be set to various tensions, numbered 1 to 10. The range of speeds attainable is at best about three to one, or from 1/100 to 1/300 second, considerably shorter than the range indicated as desirable. Its uniformity of travel is variable with the tension…" This testing may have been more extensive than that of Folmer. "Lacking any self-capping feature, the shutter is provided either with an auxiliary curtain, or in the hand-held camera with flaps in front of the lens, opening by the exposing lever before the curtain is released. The shutter is made a removable unit in the 18x24 centimeter hand-operated camera but is built into the hand-held and film cameras."

"In all of these [bag] magazines, the laminated wood slide pull-out and in at each operation, and while satisfactory if made and operated in one climate, experience indicates that if made in America and sent abroad, swelling of the wood may be expected to prevent their successful operation."

"Except for the early English C and E type cameras which called for 10-inch lenses and 4x5-inch plates, the general practice at the close of the war by agreement between the French, English and American Air Services, was for the use of 18x24-centimeter plates and for lenses with focal lengths of approximately 25, 50, and 120 centimeters."[6]

Enough already, here are the cameras.

The Graflex Aero A, A1, AII and A-3

Graflex called their cameras "Aero." According to Graflex collector and airplane hobbyist Jim Chasse, airplanes used to be called "aeroplanes," from which Graflex chose to use part of the word for their cameras. This is borne out by this quote from 1917: "Squier [head of the Aviation section of the US Army Signal Corps] also helped develop nomenclature for the emerging aircraft industry. For example, he urged the adoption of the word 'airplane' to replace the previous term 'aeroplane.' "[8]

Although sometimes referred to as taking vertical pictures, for practical purposes, it was a hand-held camera that took oblique aerial pictures.

How many were made, and when were they made?

There are few definitive answers to these questions. Below is a chart made from entries to the company's job order book (usually called the serial number book). Entries to this book started around 1915, so there may have been earlier job orders. A couple of observations: 1. The entries lack adequate details, and 2. Some models continued to be made after newer models were introduced.

The "Dating Game." Entries in the left column are from the job order book, and those in the right column are from book notations and reasonable assumptions.

Date	Description	Quantity	Beg. Ser. No.	End Ser. No.	Notes and Quotes
	Areonantic [sic]	4	53624	53621,53622, 53625	Ca.1915-16
	Aeroplane P. H.	12	56909	56920	"Model A"
	Model A Aero	25	77163	77187	77,169, George Eastman Museum, ca.1915
	Model B Aero	25	78194	78218	In the style of the model A
	Aeroplane	12	78996	79007	
	Canadian Aero	150	80377	80526	
	Canadian Aero	17	80775	80791	
	Canadian Aero	8	80793	80800	
	Special Aero	12	85574	85585	"4x5"
	F&S Model A-2 Aero	50	86040	86089	"4x5"
	Model A-1 Navy Aero	100	87558	87657	Just before 100 K-1 cameras were ordered.
	A1 Aero, Revised	1		89486	
	A-1 Aero, Revised	1		89487	"F&S"
	A-2, Revised Model, Gun?, short	1		89489	"For Showroom"
	B Model Gun Type Aero	1		89491	"For Showroom"
	A3 Model	1		89743	"F&S Handheld", not made due to armistice signed Nov. 1918.

Date	Description	Quantity	Beg. Ser. No.	End Ser. No.	Notes and Quotes
	A-1 Aero Camera	1		92072	
	Model A1, Navy Model	15	92079	92093	"OD finish"
	Model A1 Aero	25	100377	100401	
	Model A1 Aero	36	111279	111314	111,298, black, George Eastman Museum, F&S Div., lens number 0320
Est. 1921	Model A1 Hand- Held Pat.	6	115900	115905	
1926	Model A1 Aero	8	152160	152167	152,163, Folmer Graflex Corp.
11/29/1928	Model A1 Aero	20	159455	159474	
8/20/1928	Model A1 Aero	20	162619	162638	162,633, square finder, green/OD

These cameras were produced from about 1914 through 1928 and sold by the F&S Division, F&S Department, Folmer Graflex Corp, and even the Eastman Kodak Company. So far, no military labeling or designation has been located.

A (and B) *

The Folmer & Schwing Division of Eastman Kodak made at least three versions of this camera. Two and three were described in patents 1,236,419 (applied for and dated in 1917) and 1,304,673 (applied for in 1918 and dated in 1919). The body of all versions was made of mahogany and used 4x5 plates or 5"-wide roll film.

Very little is known of the first version of the Graflex aerial camera, as I have found only a few pictures. It was probably 4x5". "As to the method of holding the camera, a favorite at first among military men was the pistol grip, with a trigger shutter release. Because of the size and weight of the camera, the pistol grip alone was an inadequate means of support..."[6] From pictures and samples, it appears to have been made in various forms, sometimes with the front shutter, sometimes with a Graphic-style back, and sometimes not.
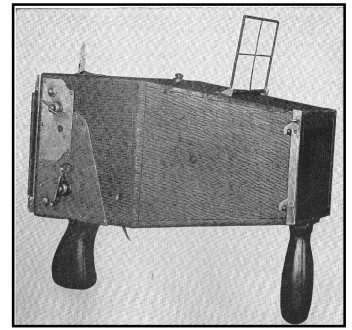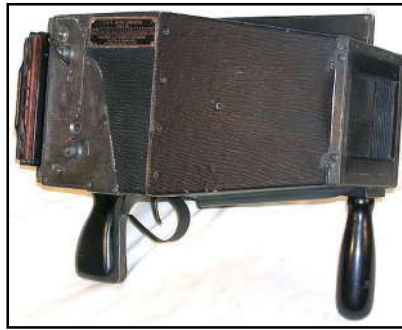
An odd variation of this camera has survived. It has a 4x5 spring back, no front handle, an inadequate aerial finder, a Cooke Anastigmat lens with a diaphragm, and a speed plate from the Folmer & Schwing Division, naming it a "Model A." The intended use is unknown.

Was this an A? "In December [1915] the long awaited 'Kodak Aero Camera' was finally ready. Richardson has tested a number of aerial cameras since 1915, but none had proven entirely satisfactory. The Kodak camera, however, proved to be an unqualified success and from that time on, the number of aerial photographic assignments increased rapidly.

Less than a month later on January 10, 1917, the Navy placed its first production order for aerial photographic equipment – 20 Kodak Aero Cameras and accessories. The Aero, Richardson discovered, was actually an improved model of a camera he had tested a month earlier.

During this period, Richardson also shot and laid the Navy's first oblique photo mosaic. Because his glass plate cameras weren't suitable for such tasks, Richardson purchased a Kodak 2-C [possibly the Kodak C-2] roll film camera for the job."[4]


From 1919 Photographic Review. Camera held on its side, next to fixed mounted camera.
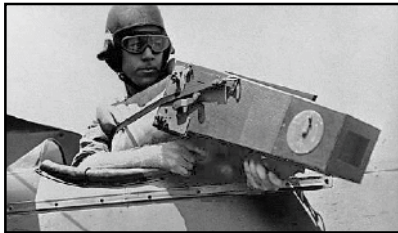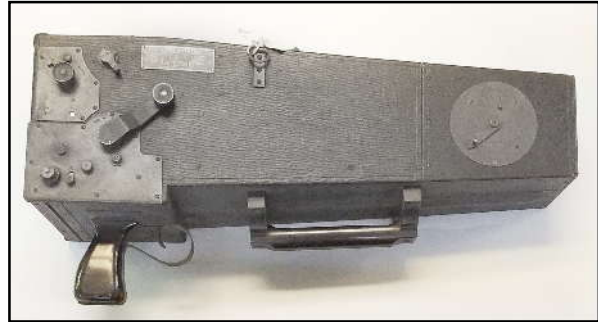

F&S-done?

As is shown with a cut film holder, the second version would accept any 4x5 accessory made for Graflex-style backs. According to the patent, the lens had an adjustable diaphragm, which was not present in the patent for the next version.

Serial number 77,169, ca.1915.
Courtesy George Eastman Museum,
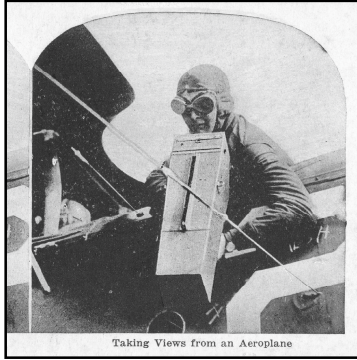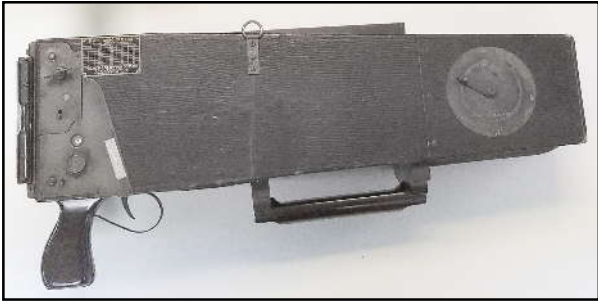
Stereo view of model B.

Top to bottom, second and third version of model patented cameras. Courtesy George Eastman Museum.

Model B.

The third version (Model B) is more interesting. As operating instructions for this and all other aerial cameras have not yet been found, it is fortunate the Technology Collection at George Eastman Museum has an example of the roll film version, along with what is believed to be a prototype for the camera. These and all other museum pictures were provided by their Technology curator, Todd Gustavson.

If classification is done by appearance, the third version of this camera should also be an "A," but the museum example is labeled as a "B" and is more like the A1 than the B-1 shown in the 1919 retail catalog. Several job orders for this model are shown in the chart above.
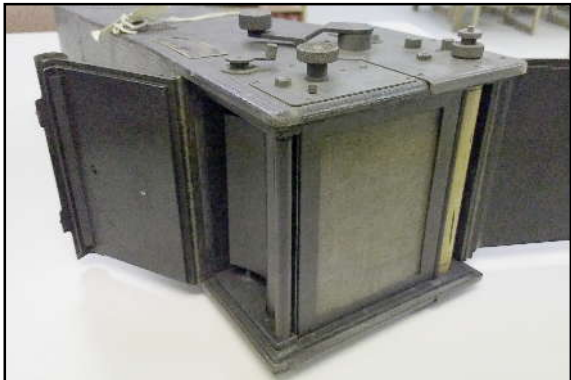
Left to right, model B prototype, prototype open, and actual production camera. It appears that film loading was simplified by removing the corner post.

A1

Of all the model A cameras, only the A1 was sold after the war to the civilian market, and it was little changed from its wartime form. Due to post-war sales brochures and sample cameras, we know more about this camera.

Details:

4x5"
Graflex-style back.
Fixed aperture 254mm (10") f/4.5 Eastman Hawk Eye Aerial lens. The standard aerial mount had a running thread and set screw, permitting accurate adjustment at infinity focus. This was one of the first photographic lenses made by Eastman Kodak.

Serial number 111,298. Courtesy George Eastman Museum.

The body was cast aluminum, and the cone was fabricated from sheet aluminum.
There were two lugs for attaching shoulder straps, if needed.
There was one 5/8" aperture and 10 speeds from 1/120 to 1/435 second.
There was a front safety shutter "in the front for fog, mist or dirt or fogging when shutter reset." It could be easily removed for replacing the lens. In 1925 they added that the shutter was also for protection from "burning the shutter cloth, if accidentally pointed directly at the sun."
Top hand-hole. A fine-threaded screw cover could be removed for access to the rear element of the lens. As aerial filters were recommended, they may have been placed over the rear element.
The camera was fitted with a direct viewing tubular finder with wire cross hairs. One late-dated camera has a rectangular finder.
It accepted plate and cut film magazines, roll holders, plate and film holders, and film pack adapters.
A thumb-release lever tripped the focal plane and front shutter at the same time.
Weight: 13¾ pounds with a loaded plate magazine. Due to the weight of the casting, it weighed as much as an 8x10 Enlarging Camera.
Dimensions are 8x8x18 inches.
Serial number. From examples, the serial number is stamped in the lower left corner of the body, as viewed from the front.
Price in 1919, US$345, and US$230 in 1925.
No specific patent has been found for this model, but there is a patent date of August 14, 1917, on the thumb release lever, which is for the second model A.

The "cone." From sample cameras from as early as 1917 and sales brochures from 1919 through 1925, it appears the "cone" was non-removable, made of sheet metal aluminum, and tapered from 5 to 4½ inches square. An A-1 in the Bruce Thomas collection, labeled as Folmer Graflex Corp. (1926 or later), has a tapered square-to-round wooden cone, which fits over the standard square aluminum cone. Also, although made post-war, it has an early 011 numbered lens and an earlier plate magazine with features needed on cameras used only during the war.


Bag magazine plate holders. As noted earlier, the Folmer & Schwing-type plate holder had shortcomings; therefore, few examples exist. Fortunately, Bruce Thomas has one. Due to the altitude, temperature and wind speed, Folmer & Schwing added a large hand grip to the dark slide and a large loop to the septum extractor. Also, it has a unique exposure counter and no ruby window.

Clip. There is a clip on the bottom of the camera that looks like clips used to hold dark slides; however, a test shows its use is impractical at best.

AII

This model, also made by Kodak's Folmer & Schwing Division, is very similar to the A1, but was made in limited quantities, and only two examples and one picture have so far been found. The most notable difference is that the AII had two apertures (5/16" and 7/16"), while the A1 had one (5/8"). With the AII, the speed range was 1/80 through 1/460, and the A1 was 1/120" through 1/435". It was fitted with the same 254mm (10") Eastman Hawk Eye f/4.5 lens as the A1. As with the A1, no patent was issued for this model.
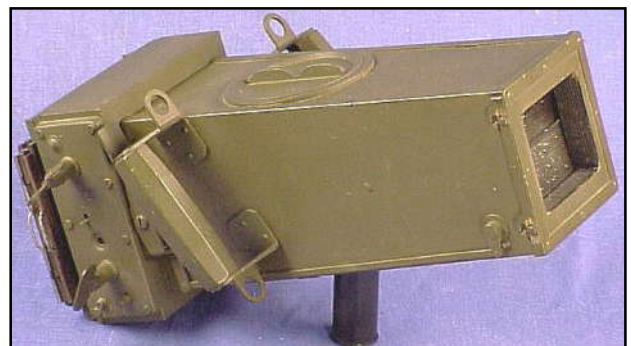
Like the A, Graflex made at least two versions of this model, as shown in the production chart… one had a shorter cone. Lacking company documentation, it is possible they were trying to create a camera more appealing to the civilian market, although the camera never appeared in any company brochures. Far less noteworthy is why was it the only camera to use Roman numerals in the name?
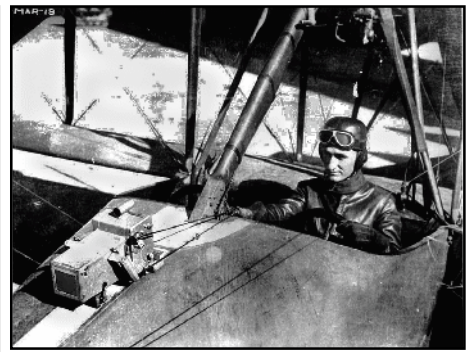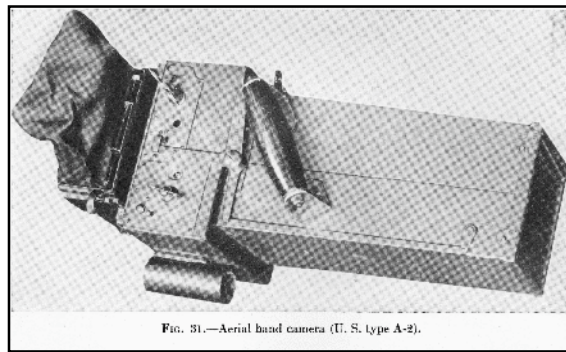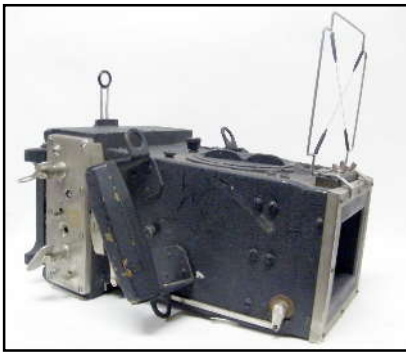
Left to right, short cone, external linkage "A-2" and mounted upside down on US Navy plane.

Type A-3

Talk about rare. "The model was subjected by the Air Service to very severe testing, all of which it passed in a remarkably credible manner." "Orders had been placed with the Eastman Kodak Company, and production was about to be started when the Armistice was signed."[9] Production records show that only one was made.

Two patents (numbers 1,400,277, 1919/1921 and 1,485,603, 1921/1924) were issued for this camera. It is possible that features in these patents were used in later aerial cameras.
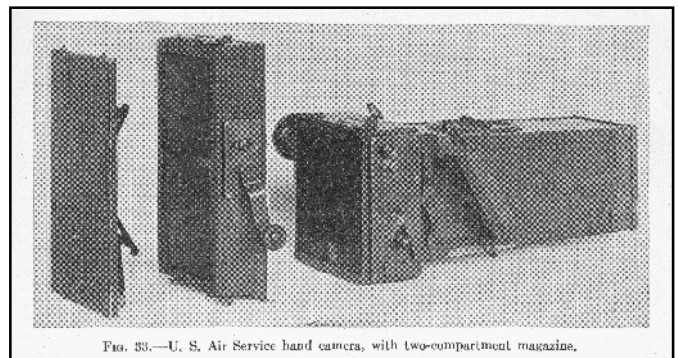

Fig. 33.—U. S. Air Service hand camera, with two-compartment magazine.

Post Armistice

Far fewer Folmer & Schwing A series cameras were made after the Armistice, as the military rapidly moved on to the Kodak F&S K series and the Bagley T-1 cameras. The A1, however, continued in use into the late 1920s.

"The aerial cameras used for the Fleet gunnery practices were the 1918-1919 Eastman Kodak F&S 4x5 hand-held aerial cameras to which was attached a glass plate magazine which held 12 sensitized 4x5 glass plates.

These old F&S hand-held aerial cameras were used throughout the Navy for oblique aerial photography until the late twenties, when the Fairchild Aerial Camera Corporation supplied the Navy with the first roll film (5x7 picture size) hand-held F-l aerial cameras."[10]

Civilian use

From the first civilian publication in the 1919 Aero Cameras: "In this little pamphlet, we give but a hurried presentation of four models [A-1, B-1, C-2, and K-1] that will, we believe, prove their value in peace." Sales brochures continued to be issued at least as late as 1925 and in the Eastman Kodak name, and a final small batch was made in 1928. In 1925 Kodak pointed out: "For the past few years, the Kodak Company has been devoting its resources to the development of aerial photography from a commercial standpoint. This handy little camera might be called an 'aerial Kodak' for it's definitely designed for making aerial snapshots."

Conclusions

Contemporary analyses did not look favorably on the A series aerial cameras. In defense of these cameras, all cameras of this type, from all countries, were quickly superseded.

A number of these cameras have survived, some essentially the same, some very much modified, and some very well restored. In sum, an interesting part of the history of aerial photography.

The story continues to this day with the development and use of military drones.

If you have made it this far, and have additional information or corrections, please let me know.

*According to British histories, they produced two versions that predated and were similar to the U.S. model A. They were designed in conjunction with and manufactured by the Thornton-Pickard Camera Company. There is no doubt that they had a substantial influence on the design of F&S cameras.
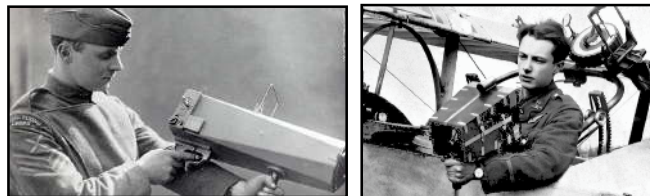
Australian aerial camera collector and historian Mick Kelly writes: "The French and Germans were the world leaders in aerial cameras. The British would grab every German camera from the wreckage and use the lenses. Britain actually called for donations of lenses, which was a disaster." Mick recommends Shooting the Front: Allied Aerial Reconnaissance and Photographic Interpretation on the Western Front -- World War I by Terrence J. Finnegan as an excellent source for World War I information.

"The German Luftfahrtruppen (aerial troops) also led the British in the development of aerial reconnaissance capability and in building a photo capacity."[11]

Footnotes

[1] Sweetser, Arthur, The American Air Service, Problems of War and Reconstruction, D. Appleton and Company, 1919.

[2] Pyner, Alf, Air Cameras 1915-1945 RAF and USAAF, self-published.

[3] "Memorandum for Organization & Personnel Division (Photographic Section)," August 16, 1918, National Archives.

[4] Giberson, Art, The Crazy Ones Shot Film, 2nd Edition, 2008, ArtGibBooks.

[5] "Kodakery, a Magazine for Amateur Photographers" Eastman Kodak Company, ca. 1919.

[6] Ives, Herbert E., Airplane Photography, J.B. Lippincott Co., 1920. ("Major, Aviation Section, Signal Officers Reserve Corps, United States Army, Lately Officer in Charge of Experimental Department, Photographic Branch, Air Service."). This 422-page book is an excellent source for the science of aerial photography for both the Allies and Germans.

[7] Heiman, Grover, Aerial Photography, Air Force Academy Series, The Macmillan Co., 1972.

[8] Raines, Rebecca, Getting the Message Through, A Branch History of the U.S. Army Signal Corps, Center of Military History, US Army, 1966.

[9] "Photographic Review," Sweet, Wallach, & Co., Eastman Kodak Company, November 1919.

[10] Carroll, George, USN (Ret.) Eyes of the Navy, A History of Naval Photography, an unpublished manuscript.

[11] Streckfuss, James, Eyes Over the Sky, Casmate Publishers, UK, available as an eBook. Although interesting, no mention of Eastman Kodak, Folmer & Schwing or specific cameras was found.


GROUND CAMERA, TYPE C-4
Made by Graflex

By Maurice Greeson

Military Speed Graphics are desirable not only by Graflex collectors but also military re-enactors. The only military model Miniature Speed Graphic was the US Army Air Force C-4. This fairly rare (Only 900 were purported to have been made.) Speed Graphic was a WWII version of the 2x3 Miniature Speed Graphic. Serial number 292568, manufactured in 1941.

The C-4 outfit included a 2-cell Graflex battery case with the 5" reflector that accepted the "midget" size flashbulbs such as the No. 5, 25, and especially the short duration and short delay SM and SF.
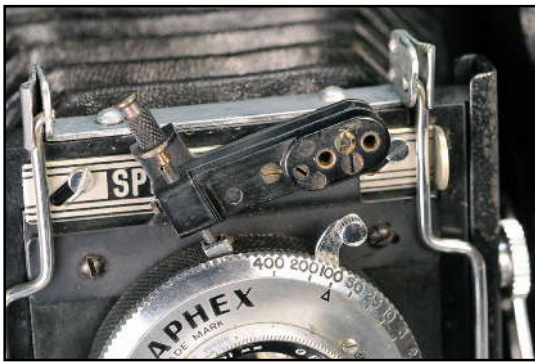
The features that differentiate it from the civilian model was the "Synchroswitch" assembly mounted on the lensboard[1], the three red centering dots (or faded red dots) on the optical viewfinder, which were used to show the center of the field when making close-up shots nearer than the range of the range finder[2], the acceptance stamp on the bottom of the bed, and the plastic USAAF plastic nomenclature plate on the door.

The Synchroswitch looks like a solenoid but actually gives a delay of about 5 milliseconds to synchronize with SM or SF type flashbulbs that have a short flash duration of about 1/200th of a second.


This synchronizer also could be fitted, with slight modifications, to the Graphic "45" Combat Camera. As set out in the Navy manual: "The Combat Camera Flash Synchronizer, engineered and built by Graflex expressly for this camera, operates from what is termed the synchroswitch, consuming no current except that actually used to fire the lamps. It makes contact with the release point of the shutter. Either SM or SF gas-filled lamps may be used at any shutter speed. It can also be used at a shutter speed of 1/25 second with any standard delay lamp or foil-or-wire filled lamp. When the exposure is made in the latter manner, the same exposure rating may be used as with an open-and-shut flash. This synchronizer consumes a minimum of current, hence the effects of low temperature, and aging or excessive use of the batteries will not affect synchronization until the current drops to the point at which ignition failure of the lamp may be expected."

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[1] From the Navy manual: "The series outlet is located at the back of the battery case. It is this outlet into which the S-17 cord is plugged, and also into the S-M switch housing. Now, the synchroswitch must be connected in this way because it cannot function if plugged into one of the parallel outlets at the front of the battery case. The parallel outlets are for use with only regular solenoid release or with extension flash."

[2] "The tubular view finder objective lens is marked with three red close-up centering dots which are used to show the center of the field when making close-up shots nearer than the range of the range finder, the focusing scale, and the parallax adjustment of the view finder, when it is inconvenient to use the ground-glass focusing screen. The distances at which they are accurate are measured from the focal plane (for all practical purposes the forward surface of the film pack adapter or film holder). When using these dots, the parallax eyepiece is set at its closest distance.
    The upper dot shows the center of the field at 36 inches from the focal plane.
    The lower dot shows the center of the field at 18 inches from the focal plane.
    The middle dot shows the center of the field at 24 inches from the focal plane."
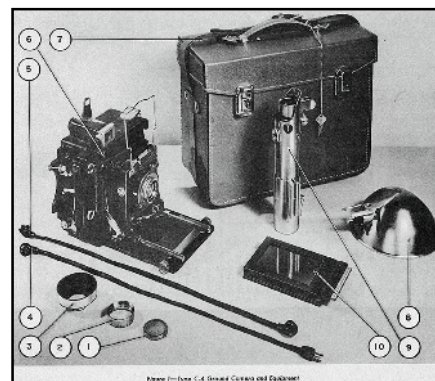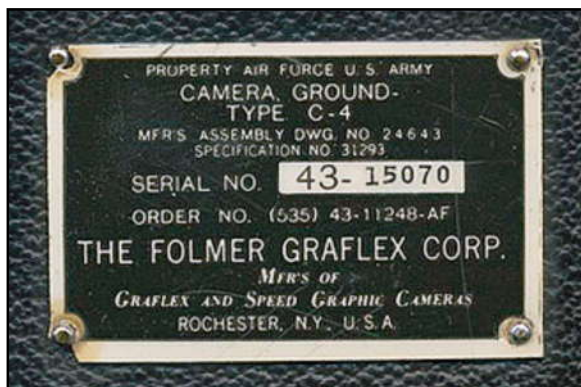
Masthead photo. Famous parents, Mr. and Mrs. Dionne 1935.........parents of the Dionne quintuplets sent in by George Dunbar.

Update To Jeff Yost's article in the last issue of the Graflex Journal.

Jeff sent this picture of his 3¼x4¼ Auto Graflex, which was refurbished by John Minnicks (johnminnicks@gmail.com). In addition to a new shutter, John added a customized speed plate with the new shutter speeds.

Photography: First World War, 1914–1918
April 28 –October 28, 2018
Art Gallery of Toronto
https://scotiabankcontactphoto.com/2018/primary-exhibition/art-gallery-of-ontario-photography-first-world-war-19141918

Airplane Photography, by Herbert Ives, 1920. ("Major, Aviation Section, Signal Officers Reserve Corps, United States Army, Lately Officer in Charge of Experimental Department, Photographic Branch, Air Service.")

Dedication: **"TO MY WIFE, A HELPFUL CRITIC, EVEN THOUGH SHE NEITHER PHOTOGRAPHS NOR FLIES"**

Is this camera a Graflex?

In the current issue of the Australian photo history publication, Back Focus, John Fleming wrote an article about John Beattie, pictured at right. Mr. Beattie is shown with a camera that has many features of a Graflex, except possibly the notch and the plate at the upper right of the body.

If you recognize this camera, please let Ken know, and your answer will be published in the next issue of the Graflex Journal.