GRAFLEX Journal

SHARING INFORMATION ABOUT GRAFLEX AND THEIR CAMERAS

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FEATURED

TELEPHOTOGRAPHY WITH THE 5X7" REVOLVING BACK CYCLE GRAPHIC

By Thomas Evans

I recently received a 5x7” RB Cycle Graphic outfit, which included several very interesting lenses, including an f:6.8, 8¼–inch Goerz Dagor, a wide-angle 6½ x 8½” Bausch & Lomb Zeiss Protar V, with a Supplemental wide-angle bed, and an early Goerz telephotographic tube with a 3½-inch Goerz tele-negative* lens installed.

The Cycle Graphic was first introduced in 1900, with a reversible back, in five formats from 3¼ x 4¼” to 8x10”. An accessory focal plane shutter was made available for each format in 1902. The design was made sturdier in 1904 and included front shift and a double swinging back, and a dropping bed, in both 5x7” and 6½ x 8½” formats. The Revolving Back Cycle Graphic was introduced in 1907, in four formats from 4x5” to 8x10”, and was made through 1922. The 8x10” model was available with only the reversible back, and it and the 4x5” model were discontinued in 1920. The 6½ x 8½" RB Cycle Graphic was used as the basic camera in the panoramic Cirkut No. 8 outfit.

The Cycle Graphic Supplemental wide-angle bed was introduced in 1912, and, with consideration of the low serial number on the camera, 1912 or 1913 are good, educated guesses for the year of manufacture. This RB Cycle Graphic also came with a revolving back Graflex focal plane shutter, which facilitates the use of barrel lenses, such as the Protar Series V.

The 1913 Graflex catalog described the RB Cycle Graphic as being the foremost camera of its type:

“For the technical worker, the Revolving Back Cycle Graphic is particularly valuable, as its ridged construction and accurate adjustment make it indispensable for those engaged in scientific research, involving the application of photography. … the rigidity of the Graphic – due to the most careful, accurate and thorough construction ever incorporated in photographic apparatus – is still a Graphic feature which will bear particular emphasis and is one of the features which has given the Graphic its prestige with scientific and advanced photographic workers.”

“To allow the use of long focus lenses, ample bellows capacity is provided. The front runs out on telescopic framed tracks, reinforced by angle-brass guides with milled head binding screws, which lock the bed rigidly in place. The extension tracks being in the form of frames allow extra-large lens space when closed. The construction of these tracks affords a wider base for the lens support and prevents any lateral or oscillating movement, thus rendering the Cycle Graphic particularly adaptable for tele-photo and other extremely accurate work.”

Such description of the Cycle Graphic may well have influenced the photographer who originally purchased this outfit, as they were clearly interested in good optics, and wide-angle and telephoto photography.

Telephotography

I have read some about the early designs of telephoto lenses, which combined a negative lens of the photographer’s choice at the rear of the ‘tele-tube’ and used the photographer’s preferred ‘ordinary’ taking lens at the front of the tube.

This is the first time that I have actually seen one of these and have been able to experiment with it, so I will be concentrating on this telephoto. This tube came with two adapting rings that screw onto the front of the tube, to receive the positive lens. One of these rings, marked “Compound” fits the Compound shutter of the Dagor lens. The other ring is marked “Barrel” and must have been meant for a barrel lens, perhaps a faster lens, which is no longer present. I tried several barrel lenses in this ring and found a Kodak Anastigmat #31, 5½-inch lens fits, but this focal length seems to be too short to combine effectively with the 3½-inch negative lens. The rule-of-thumb appears to have been that the focal length of the negative lens should be about half, or less than half, of the focal length of the positive lens.

The idea of using a negative component at the rear of a tube to magnify the image produced by a positive component in front has long been used in telescopes, and both Galileo Galilei, in 1610, and Johannes Kepler, in 1611, developed refracting or dioptric telescopes based on this principle. In 1834 Peter Barlow designed a diverging rear lens component for telescopes which is still in wide use today. However, it was not until the end of the nineteenth century that this principle was applied to photography.

In 1891, Thomas R. Dallmeyer of England, A. Duboscq of France, and Dr. Miethe of Germany developed telephoto lenses for photography. The designs by Dallmeyer and Miethe were nearly identical, but, communicating through the British Journal of Photography, they could not establish who had primacy, and so, no patent was granted. Dallmeyer introduced an improved version, the Simple Telephoto Lens, in 1892, and was granted a patent. By 1896, the design had been improved to include a well-corrected positive lens, and a better-corrected negative lens made up of a pair of doublets. It was recognized early-on that magnifying the image also magnified the positive lens's optical aberrations. It was eventually recognized that it was very difficult to correct a negative lens for use with a wide range of different positive lenses, and by 1899 Dallmeyer had introduced the Adon Telephoto lens, which had a dedicated set of lenses, so that the aberrations could be fairly well balanced throughout the system. This lens still allowed the separation to be adjusted, and this adjustment away from an optimally corrected position introduced increasing aberrations.

However, the telephoto attachment for an ordinary positive taking lens remained popular among photographers, because of its great versatility. Because the separation between the positive and negative lens could be adjusted, when used on a camera with generous bellows extension, it was possible for the photographer to adjust the lens to provide the image magnification and field of coverage desired. That is, decreasing the separation between the lenses increases the focal length and magnification of the image. This also required increasing the bellows extension to bring the new image into focus. The photographer could also increase the image magnification by swapping-out the negative lens with one of a shorter focal length, thus increasing the ratio between the two lenses, and so increasing the power of the telephoto, also thereby increasing the image scale, but at a shorter bellows extension. The field of coverage can be increased by extending the bellows, and then refocusing the image by adjusting the separation between the positive and negative lenses.

In theory, if the telephoto lens allows for sufficient adjustment, and the camera allows for sufficient bellows extension, any magnification up to 'infinity' can be reached. Small changes in the separation result in large differences in the focal length of the telephoto lens, and larger differences in bellows extension. The brightness of the image diminishes by the square of the distance (extension), and so the length of exposure soon becomes inconvenient.

In practice, especially after the introduction of well-corrected anastigmatic lenses during the first decade of the 1900s, some photographers were able to produce successful images with magnifications up to 40 times the size of the image produced by using the ordinary taking lens alone. Telephotographs made of mountain peaks twelve miles away or more could show such details as rocky ridges and snow patches not visible to the naked eye at that distance.

This capacity for magnification also proved useful for studio portraiture, providing images with better perspective, and without the disproportionate size of hands and legs caused by using a normal lens close to the sitter. And the telephoto lens also proved useful for taking close-up, one-to-one or greater macro images of near objects, such as flowers, insects or birds.

The Telephotographic Attachment in Use

Early authors of telephotography how-to books clearly put a lot of thought into how to use the telephoto lens. Here are some of their helpful hints.
It is important to use a long lens hood in order to reduce internal reflections in the lens, and thus reduce flare and fogging, which can veil the image in a dull gray. This was a major source of disappointment in the early years.

When the separation between the positive and negative lenses is equal to the focal length of the positive lens, then the image produced is the same size as that produced by the positive lens alone. As the separation is decreased, the magnification is increased, in theory to infinity. The minimum 'useful' separation is found by subtracting the focal length of the negative from the focal length of the positive. That is, for a telephoto system made up of an 8¼-inch positive and 3½-inch negative, 4¾ inches is the minimum separation at which, in theory, an image can be formed. In reality, dealing with very large magnifications is impractical, due to the rapid loss of the intensity of the light.

The magnification of a set-up can be calculated by dividing the camera bellows extension by the focal length of the negative lens and adding 1 to the result. Some early authors measured the bellows extension from the ground glass to the face of the lens mounting flange, while others measured from GG to the rear surface of the negative lens, so this is at best an estimation.

When the separation between the positive and negative lens has been adjusted to produce the desired magnification, the equivalent focal length of the telephoto system can be found by multiplying the focal length of the positive lens by the magnification.

To find the effective aperture of a telephoto system, multiply the aperture (f stop) set on the positive lens by the magnification. That is, if the positive lens is set to f/11, and one is working at a magnification of 4 diameters, the effective aperture of the telephoto system is f/44.

The above recommendation about exposure can be compared to the recommendation that the telephotographic exposure can be calculated by multiplying the exposure that would be given with the positive lens alone by the square of the magnification. That is, if the positive-lens exposure called for is 1 second at f/11, and the telephoto is set to produce 4 diameters of magnification, the photographer would square the magnification of 4 (4x4 = 16) and multiply the exposure by the product: 16 x 1 second = 16 seconds. An exposure of 1 second at f/11 is a very close equivalent to 16 seconds at f/45.

The authors writing during the early part of the 20th century were using plates and films that were overly sensitive to ultra violet and blue light, and so, when using a telephoto lens on a hazy day, they cautioned against overexposure due to the inherent luminosity of the atmosphere. Yellow filters were recommended, such as the Wratten K2, K3 and G filters.

Whether a specific telephoto lens set-up will cover your film depends on the focal lengths of the positive and negative lenses, the aperture of the positive lens (because the positive lens diaphragm is in front, stopping down can cause vignetting), the magnification, and the clear diameter of the negative lens. The circle of illumination is smaller at lower magnifications and quickly increases as the magnification increases. Generally speaking, to cover a 4x5-inch film with a magnification of 3 diameters, a negative lens of 3-inches focal length would be needed, and at 4 or 5 magnifications, a negative of 2 ½-inches should work. To cover 5x7-inch format at a magnification of 3 diameters, a negative lens of 3½" inches would be needed.

Conclusion

One can see how the ambitious photographers of the 1890s and 1910s would have been intrigued by the idea that they could use their cameras to reach out into the distance and bring in fine detail not otherwise available to the eye. And one can see how the actual results might not have measured up to the expectations. The surprising versatility of a lens that could be configured to provide a lens of the local length and magnification desired, without excessive bellows extension or the large mass of a non-telephoto long lens, is attractive. The calculations needed, the careful measurements, the rigorous set-up on a stout tripod, the issues with haze, flare, and camera vibrations during long exposures, and so forth, no doubt led to many disappointments. Before the relatively well-corrected anastigmat lenses, such as the Goerz Dagor, were commonly available, the lenses used were likely to be the fairly fast Rapid Rectilinear and a Petzval type portrait lens, and the negative lenses would magnify their uncorrected aberrations as well as their images. As lens correction improved, and as the telephoto lens was simplified to the fixed-focal-length type, telephotography may have become less intriguing, but it has certainly become easier and more widely appreciated.

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*****A 'positive' lens is any ordinary lens that will focus light that passes through it, forming a 'real image' on a plane, such as the ground glass or film. A 'negative' lens does not by itself focus an image, as it diverges or spreads the light that passes through it. When a negative lens is added behind a positive lens and has a shorter focal length than the positive, the combination still acts as a positive lens to focus the image; however, the divergent property of the negative lens acts to magnify the image that it receives from the positive lens.

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Graflex Journal subscriber Lance Blakeslee found this xl camera, owned by comedian Jerry Lewis, on eBay. It sold for £585, fitted with a Zeiss 100mm f/3.5 lens and a Polaroid® back.

GRAPHIC GRAFLEX PHOTOGRAPHY WITH INSTANT INSTAX FILM

By Howard Sandler
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Goodbye Polaroid, Hello Fujifilm

Many readers of this journal will no doubt remember Polaroid® backs that fit Graflok-backed cameras. Some types of peel-apart Polaroid film provided both an instant print as well as a printable negative. Unfortunately, such film is now gone. Polaroid later developed various flavours of integral film, which ejected from the camera dry and did not have any negative layer to peel off to reveal the print. The iconic Polaroid SX-70 used such film. The technology required the film to be exposed through the print's surface, so a mirror was required in the optical path to provide a non-reversed image.

In the late 1990s, Fujifilm took integral instant film technology further, developing their Instax films. Instax prints develop dry and, in the light, like Polaroid integral film, but are exposed through the back of the print. A mirror is not required in the optical path to get a non-reversed print. This raises the possibility of using Instax film as a medium for large -format cameras.

Instax Film Characteristics

Flying relatively low under the radar of "serious" photographers, Instax has, in fact, been the film photography success story of the 21st century. Fujifilm makes far more from their Instax line of cameras and film than from their entire digital camera business*. Instax film comes in three sizes: mini, square, and wide. They all come in 10-sheet cartridges, have the same image height of 62mm, and differ only in width. The size of interest to large format photographers is Instax wide, providing an image of 99 x 62mm (close to a 3:2 aspect ratio) plus white borders on all sides; the bottom border (where the chemical pods are) is broader than the others and writeable (at right).

Instax film is ISO 800 and daylight balanced. Color rendering is quite natural, with perhaps a slight tendency to coolness in daylight. The film is very contrasty and has even less dynamic range than transparency film, perhaps 3-4 stops. Upon ejection, the film is squeezed between rollers, breaking the chemical pods in the base border, and spreading them evenly over the surface (but under a glossy plastic coating, so the film emerges dry). Starting out white, it begins to develop visibly in about 30 seconds, the darkest tones developing to completion in about 10 minutes. It can develop over a wide temperature range, but I noticed it took longer to develop outdoors on a cold (52° F) day. Reciprocity failure kicks in rather soon, becoming noticeable even at ⅛-sec. exposure, so I have been more successful using flash rather than continuous lighting for still life work.

There is a monochrome version; however, I am personally not a fan of the monochrome. It costs more than color, so the value proposition compared to shooting black and white negative film is not as compelling, and I find it to have even less dynamic range than the color film.

Instax is likely here to stay for a long time. It has already been around for over 20 years. In my personal experience, it does not fade easily. Instax photos I made 4 years ago and displayed in the harsh kitchen environment on the refrigerator have not faded at all. The finish is high gloss (but scratches, so be careful).

Finally, at the time of writing, Instax wide is about $1 US a sheet. Kodak Ektar or Ektachrome 4x5 are both about $6 US a sheet.

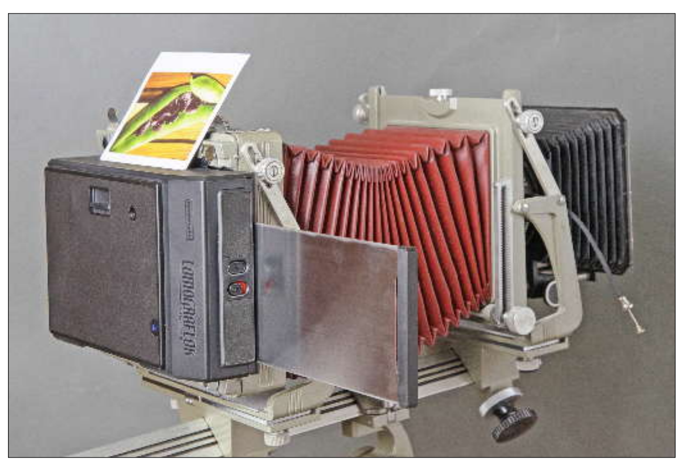
The Instax problem for large-format photographers

So we have had a credible medium for large-format instant photography for over 20 years. Why has it flown below the radar? Well, until 2016, Fujifilm made peel-apart instant film that would fit Polaroid backs. Also, the Instax cameras offered by Fujifilm are not very versatile, and Fujifilm does not seem interested in offering upscale models. They are doing fine selling basic plastic cameras with slow simple lenses, crude three-zone focus and autoexposure. They do come in wild colors, though!

Some camera enthusiasts have melded the backs of these cameras onto medium or large format cameras to make "FrankInstax" cameras, but these tend to be expensive hand-built units.

A few enthusiasts, myself included, have put Instax wide film through their 4x5 cameras by removing one sheet at a time from an Instax cartridge in the dark, taping or otherwise attaching the film to a 4x5 film holder for insertion into the camera, then, again in the dark, putting the exposed sheet back into an empty Instax cartridge to be squeezed through the rollers of an Instax wide camera for development. In brief, it is not fun. The "instant" aspect is largely lost, the whole process is very fiddly, and you need access to a darkroom or changing bag as well as an Instax camera. These do not make for easy and fun use in the field.

Enter the Lomograflok

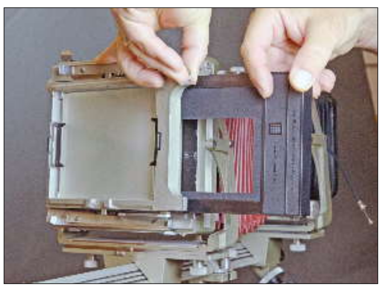


The Lomograflok, introduced in 2021, is a game changer. As of the time of writing, it retails for $175 US. It holds a standard cartridge of Instax wide film and fits any 4x5 Graflok-backed camera. Here it is shown on my Graphic View II (above).

The Lomograflok attaches to the camera using the diagonally sliding tabs. It needs four AA batteries to drive the motorized ejector and simply has an on/off switch, a blue "on" light, a counter to indicate how many sheets have been exposed in the pack, an eject button, and a dark slide. Except for the metal dark slide, everything is plastic. On ejection, the print emerges from a slot on the top. The unit needs only to be on to eject a print or to insert or remove the dark slide. I wish they had placed the eject button further from the on/off switch, as I have accidentally pushed it on occasion when intending to simply turn the unit on or off.

I had a problem with the first unit I bought. Although the first film pack worked fine, when I inserted the second film pack, the unit failed to eject the thin plastic dark slide of the film pack. I read online of others who had the same problem. Although I discovered a workaround of opening the film compartment in the dark while ejecting the plastic dark slide of the film pack, Lomography promptly shipped me a second unit which has been fine.

Use on a Graphic View II



The Instax wide image is smaller than 4x5, and the Lomograflok does not center the image in the 4x5 frame. Also, the film plane of the Lomograflok is 19mm behind the film plane of a normal film holder. To aid composition and focus, the Lomograflok is supplied with a plastic mask/spacer that you place between the camera and ground glass for composition and focusing (above). The spacer moves the ground glass backwards by 19mm, so you focus on the correct plane. It works, but I wish the spacer was metal instead of plastic. The Graflok springs put a lot of pressure on it during insertion and removal, and I worry about long term wear.

The extra 19mm extension also has implications for the use of short focal length lenses. I'm not able to achieve distant focus on my Graphic View II with my 90mm Fujinon SW lens using the Lomograflok, as there is too much bellows compression to get the standards close enough together.

Although Lomography recommends inserting the dark slide and removing the unit from the back of the camera prior to ejecting the print, I found this unnecessary on the Graphic View II. As long as there is no dark cloth hanging from the back, there is nothing to interfere with the print as it emerges from the slot on top.

I'm having a blast with this unit for still life photos with the Graphic View II. I used to be very sparing in my use of color 4x5 sheet film due to cost. With Instax film I can afford to try more lighting and composition options. Here's a simple macro still life of some scarlet runner beans from our garden (above).

Use on a Crown Graphic

A Graphic with a rangefinder is where instant really shines. I noticed that in recent years famous New York instant portrait photographer Louis Mendes has switched to using Instax wide in his Speed Graphic.

The rangefinder need not be re-calibrated. Since the set-back is always 19mm, the infinity stops merely need to be moved back by that amount, and the camera is ready to use hand-held in the field (above). I suggest making a mask for the viewfinder or masking the wire-frame sports finder to the Instax wide framing and proportions with masking tape.

I love shooting informal portraits with my Crown Graphic and being able to show the subject a print on the spot (below, models Rhiannon and Sophie, left and right). For these I used the standard Xenar 135mm f4.7 lens and lit with a classic Heiland flash handle and M3B flash bulbs.

Scanning Instax Prints is a Breeze

An empty Instax wide cartridge is a convenient holder for scanning on a flatbed, such as the Epson V750. The holder keeps the print surface about 1mm above the scanner platen and avoids the Newton's rings interference pattern that can otherwise develop when a glossy surface meets glass. I rest some AAA batteries on the springy back of the cartridge as weights to keep the print nice and flat against the outer frame. I rather like the black borders the cartridge provides and often leave them in the final image (prior page). The bordered image crops perfectly to a 3:2 aspect ratio.

On the Epson V750, I find that scanning in reflective mode at 1200 ppi is fast and more than sufficient. Instax film itself resolves only about 12 lp/mm, so finer scanning would be useless overkill. I sharpen aggressively with unsharp mask at radius 2.4, amount 280, spot out any dust or scratches, then reduce the resolution to 960 ppi. The resulting image is 4000 pixels on the long side, which is sufficient for most purposes. I usually don't have to do much to put the scans in final form. I pull in the white and black points for deeper blacks and whiter whites. The shadows seem to have a slight reddish cast that goes away by pulling in the black point of the red channel a bit more than the other colors. I sometimes warm the highlight color a bit.

Instax is not a substitute for high resolution color negative or transparency scans, but it has its own aesthetic and vibe which you might like. If you want to have some 21st century fun with your Graphic or Graphic View, give it a try!

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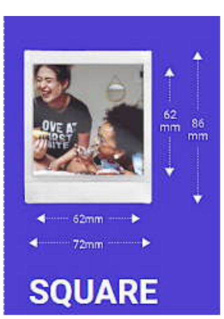
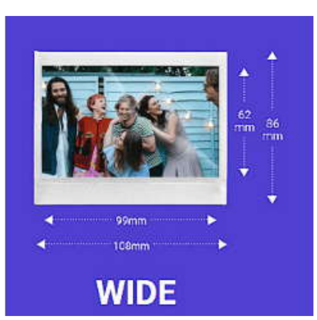
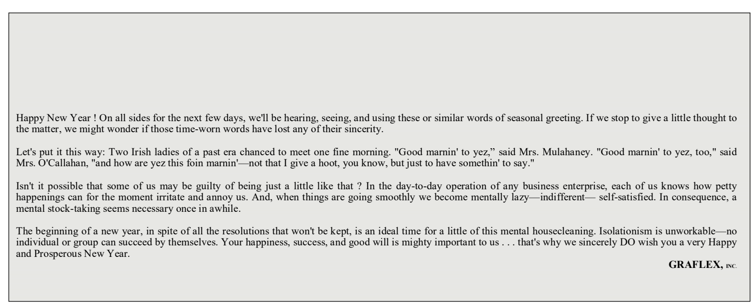
*Fstoppers May 1, 2021: https://fstoppers.com/gear/if-fujis-instax-cash-cow-should-it-produce-digital-cameras-559719

LOMOGRAFLOK 4×5 Instant Back

instax FUJIFILM







Happy New Year ! On all sides for the next few days, we'll be hearing, seeing, and using these or similar words of seasonal greeting. If we stop to give a little thought to the matter, we might wonder if those time-worn words have lost any of their sincerity.

Let's put it this way: Two Irish ladies of a past era chanced to meet one fine morning. "Good marnin' to yez," said Mrs. Mulahaney. "Good marnin' to yez, too," said Mrs. O'Callahan, "and how are yez this foin marnin'—not that I give a hoot, you know, but just to have somethin' to say."

Isn't it possible that some of us may be guilty of being just a little like that ? In the day-to-day operation of any business enterprise, each of us knows how petty happenings can for the moment irritate and annoy us. And, when things are going smoothly we become mentally lazy—indifferent— self-satisfied. In consequence, a mental stock-taking seems necessary once in awhile.

The beginning of a new year, in spite of all the resolutions that won't be kept, is an ideal time for a little of this mental housecleaning. Isolationism is unworkable—no individual or group can succeed by themselves. Your happiness, success, and good will is mighty important to us . . . that's why we sincerely DO wish you a very Happy and Prosperous New Year.

GRAFLEX, INC.

4x7" four page “Happy New Year” booklet with a tipped in sepia toned picture “SMOOTH SAILING” by Gustav Anders. A 1948 Graflex Photo Contest winner. It is unknown who received this booklet, but by current standards, the joke would be considered by some as offensive.

UP, UP, AND AWAY

By Ken Metcalf

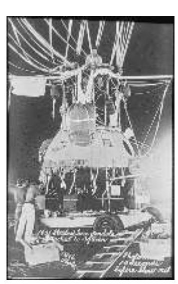
1934 was a good year for Graflex……until the explosion! This article will present information about Graflex cameras used in the 1935 National Geographic-U.S Army Air Corps (the "ps" is silent) flight of their balloon Explorer II.

To explain the explosive first sentence, the 1934 flight ended with an explosion of the balloon, mainly due to a tear in the fabric caused by adhesion between fabrics and a subsequent explosion of the hydrogen-air balloon. Fortunately, no lives were lost, as the explosion occurred near the end of the flight, and the Graflex camera's data was mostly recovered. In the 1935 flight, design changes and the use of helium gas caused the flight to go well.[1] Therefore, the article will avoid the "oops" of the 1934 flight.

The Flight

"Many scientists came to believe that cosmic rays (also called cosmic radiation) held the key to unlocking the secrets of the atom. Balloons offered the best platform for the study of cosmic rays. At the time, balloons could fly higher and remain aloft longer than airplanes. They could also carry entire laboratories into the sky. During the 1920s and 30s, teams of scientists and adventurers mounted several expeditions into the stratosphere. See last page of Journal for a definition of stratosphere.

During 1933, United States Army Air Corps Captain Albert W. Stevens began pressing his superiors to mount a stratosphere expedition using a balloon. While the Army eventually endorsed the notion, the service could not provide any funding. Army support would be limited to the use of personnel and facilities. He turned to the one organization he felt would have both the willingness and means to support such an undertaking - the National Geographic Society. Stevens presented the flight as an opportunity to loft a fully equipped scientific laboratory for the study of high-altitude photography techniques, properties of the upper atmosphere and cosmic radiation. It would also establish a new altitude record, perhaps as high as 75,000 feet. …a spot in the Black Hills of South Dakota, about 12 miles southwest of Rapid City [was found]. The launch site was a grassy meadow 600 feet square in a natural depression surrounded by steep cliffs. It subsequently became known as the Stratobowl. Launching a balloon the size



Glass plate courtesy participant Bartol Research Foundation.

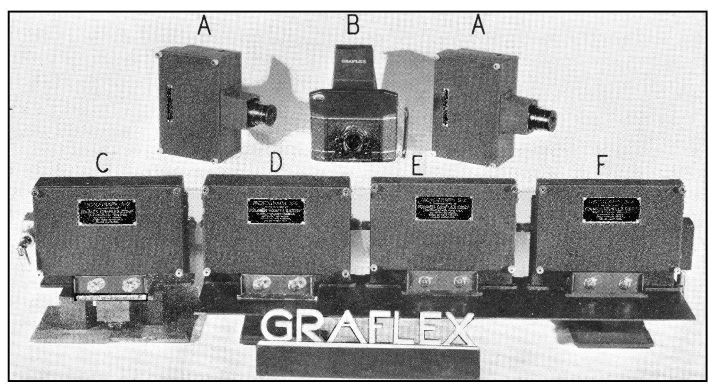
of the Explorer required a sheltered site, because such a balloon could easily whip around like a sail if caught by the wind. Several hundred feet deep, the Stratobowl offered the needed protection from surface winds. Prevailing winds would carry the balloon over the mid-western plains for a landing in relatively flat, clear terrain. Historical data indicated they would likely have three or four opportunities for ideal weather from mid-June to mid-July.

National Museum of the U.S. Air Force.

By spring 1935, the second Army Air Corps/National Geographic Society Explorer flight was ready. The Strato-camp attracted numerous visitors. These included the wife of the Governor of South Dakota and residents from the nearby Sioux reservation who toured the site while wearing traditional Native American garb. Mrs. Berry, the governor's wife, 'christened' the gondola by pouring liquid oxygen over it.

A little past 2 p.m., the Explorer II aeronauts talked directly to the Pan American Airways 'China Clipper,' which was flying over the Pacific Ocean en route from San Diego to San Francisco. 'Hello! Calling stratospheric balloon!' came the call from NBC and Pan American's chief pilot, who were aboard the airliner. Then they talked with a radio announcer in London. These transmissions were broadcast live over the NBC system.

Their flight had lasted 8 hours, 13 minutes, and they landed near White Lake, South Dakota, about 225 miles east of the Stratobowl." [2] "Explorer II carried two 'aeronauts' 72,395 feet – nearly 14 miles- into the stratosphere. It was the highest men would go for another 21 years" [3]



National Geographic Society Contributed Technical Papers, Stratosphere Series Number 2, 1936.

The Cameras

Describing these cameras is challenging, as none of them has so far been located, and the pictures and written materials are sparce.

From a DESCRIPTION OF EQUIPMENT USED from the files of the National Geographic Society, there was one oblique F-4 Aerial camera made by Eastman Kodak, one vertical K-3B aerial camera made by Fairchild, and….drum-roll, a bunch made by the Folmer Graflex Corporation.

The Graflex cameras (shown above) were….

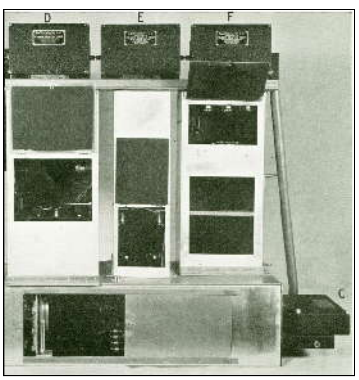
3 National Graflex Series II cameras 2¼x2½”, 120 size (10 exposure), 1 with Dufaycolor & 2 with EKC film.

One of the National cameras used Dufaycolor 120 film to take pictures of the sky.[4] The other two were loaded with Eastman Kodak film to shoot pictures in the gondola.

4 Factograph No. 10 cameras EKC film, all driven as a unit & driven by one motor *

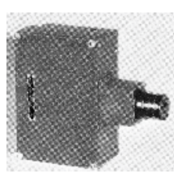
- C 100’ 35mm film, 72mm f/4.5 lens, flap type focal plane shutter
- D 100’ 35mm film, 50mm lens, flap type focal plane shutter
- E 100’ 16mm film, 16mm lens, no shutter, timed by time lights on
- F 100’ 16mm film, 48mm lens, timed by time lights on.

* “Each camera carried a separate demountable magazine with the film feeding device within the magazine. These magazines could be removed from the camera and loaded in the darkroom and placed upon the camera proper, which had projecting shafts that fit into the opening in the magazine for driving the film feed and the take-up spools. The intermittent movement for the film in all of these cameras was obtained through the use of a standard toothed sprocket, which, in turn, was driven by an interrupted gear.”



Picture shows position of Factograph cameras in the gondola to photograph “various instruments.”

2 Factograph “special cameras” built for the Bartol Research Foundation for recording cosmic ray data 35mm, 800 exposures, matched f/2.3 B&L lenses “for their apparatus.” Operated by a cable connected foot treadle that made an exposure and advanced the film.



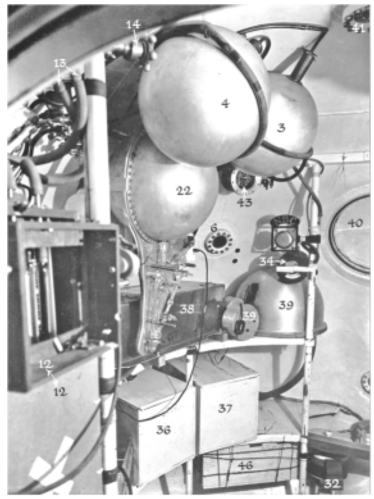
These two Factograph cameras, made for Bartol, were used to photograph cosmic ray data.

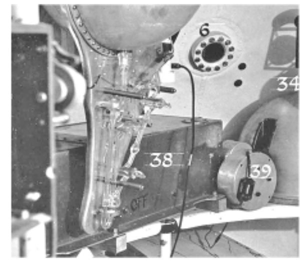
2 Factograph cameras “designed and built” by Graflex to photograph spectrograph readings, operated as a unit.

1 in the inside spectrograph, motor driven, and detachable magazine.

1 in the outside spectrograph “One attached to spectrograph made of 15-second exposures followed by 15-minute exposure, and a third of 15 seconds. (Repeated throughout the flight.)” No details on the second camera, but probably doing a similar routine.

No specific pictures of these cameras were published.





One clue about the camera comes from a labeled photograph of the gondola. No. 38 is labeled as “horizontal spectrograph.”

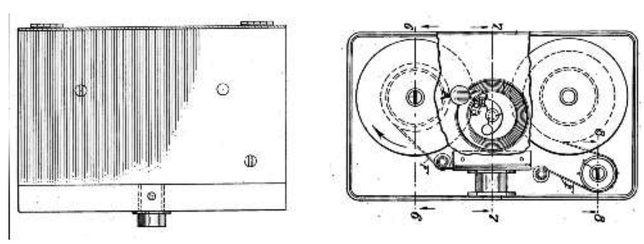
According to all Graflex and Explorer literature, the cameras (except for the Nationals) were Factographs, and probably S-2’s, if I retouched it correctly from the picture on the previous page.

The cameras for the flight involved challenging new technology for Graflex. In addition, Graflex introduced their National Graflex Series I in 1933 and their series II in 1934. Also, the Photorecord camera was patented in 1934 and introduced as a copy camera unit in 1936.[5]

There were several patents submitted in 1933 and approved in 1934, but 1,977,569 may be the most relevant. In this patent (which is for a magazine), a sprocket drive is shown, which may be the first for the company. “Simply put” in the final claim by Mr. Hineline:

film placed therein in an unexposed condition and adapted, while wholly contained within said magazine, to be mechanically fed past an exposure opening of the said magazine, said magazine containing therein a light tube past the inner end of which the film is fed, whereby the film is at all times wholly contained within the magazine, said magazine comprising holder and cover sections together constituting a receptacle, said receptacle containing film supporting, feeding and take-up means, and film guiding means to guide the film in a substantially straight path past the inner part of the light tube, one or more faces of said magazine having one or more openings therein for the reception of film operating means carried by the camera, and means for securing said holder and cover sections in closed position.

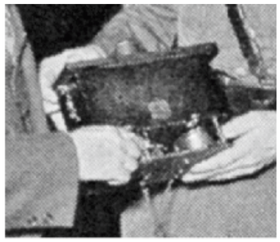
EDSON S. HINELINE.



In my opinion, Graflex was in the process of updating their products, when the opportunity to showcase them with the stratosphere flight landed in their laps!

In my second, and less reliable opinion, Graflex did a good job of using these ideas in both the Factograph and Photorecord lines.

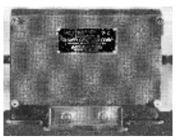
If you thought the forgoing conclusions were the end of the article, you would be wrong. Here are several items that show similarities between the cameras.

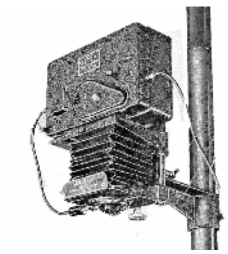


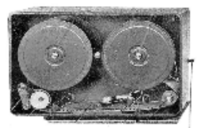
Above scans of pictures from the July 1934 issue of Camera Craft magazine, showing Captain Stevens, Graflex VP C.H. Harper and Chief Engineer E.S. Hineline ogling one of the Factograph cameras.

Although, in a letter from Captain Stevens, "No. 10" cameras were noted, there is no reference in production records.

From photographs and descriptions, the cameras used film, with sprockets, and sometimes included lenses.

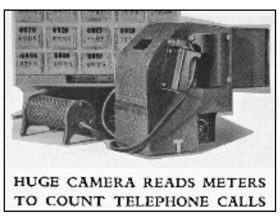






Left to right, Factograph, Photorecord camera, and magazine.

T-5



Factograph in 1937.

It was a good year for Graflex and the United States.

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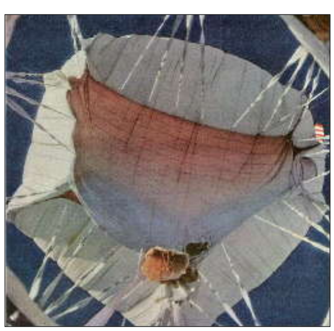
[1] National Geographic Society Contributed Technical Papers, Stratosphere Series Number 2, Washington, 1936.

[2] Kennedy, Gregory, StratoCat - History and presentation of the use of stratospheric balloons in science, military and aerospace.

[3] Jenkins, Mark Collins; National Geographic 125 Years; National Graphic Society, Washington, DC, p. 50.

[4] The first "natural-color" photograph taken in the stratosphere. Taken with a National Graflex through the porthole in the top of the gondola. 1934 was the first year 120 roll film Dufaycolor was available.

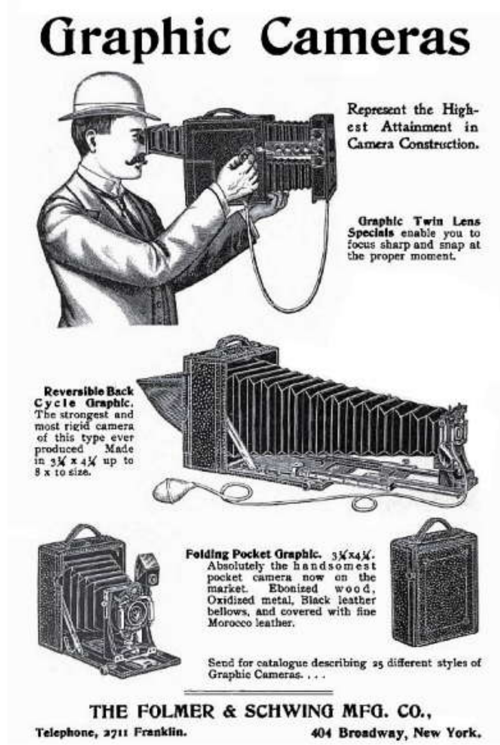


"Dufaycolor was an early British additive colour photographic film process, introduced for motion picture use in 1932 and for still photography in 1935. Dufaycolor worked on the same principles as the Autochrome process but achieved their results using a layer of tiny colour filter elements arrayed in a regular geometric pattern, unlike Autochrome's random array of coloured starch grains. The manufacture of Dufaycolor film ended in the late 1950s."

https://en.wikipedia.org/wiki/Dufaycolor.

[5] Graflex Historic Quarterly, issues 14, 2 and 18.

1919 National Geographic 125 Years
Gilbert H. Grosvenor. What is wrong with this picture?



1901 ad from The American Amateur Photographer

Graflex Journal

The Graflex Journal is dedicated to enriching the study of the Graflex company, its history, and products. It is published by and for hobbyists/users and is a not-for-profit publication. As such, we believe we qualify as a 501(c)(3) educational publication.

Masthead. Temperature test of Speed Graphic by Graflex.

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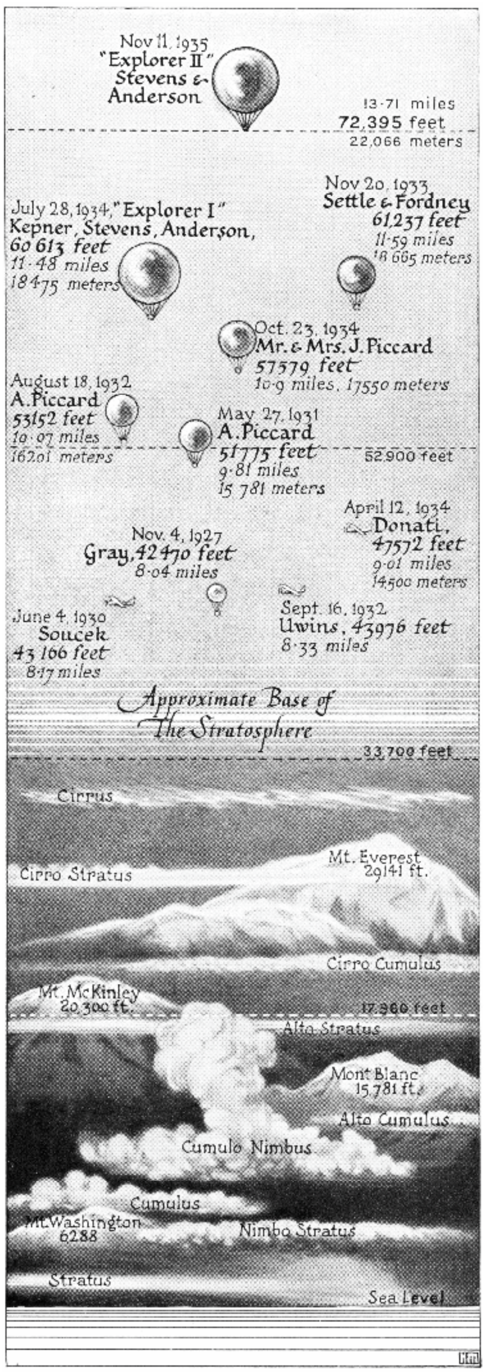

The stratosphere is an atmospheric layer composed of stratified temperature layers, with the warm layers of air high in the sky and the cool layers of air in the low sky, close to the planetary surface of the Earth. The increase of temperature with altitude is a result of the absorption of the Sun's ultraviolet radiation by the ozone layer. The temperature inversion is in contrast to the troposphere, near the Earth's surface, where temperature decreases with altitude.

https://en.wikipedia.org/wiki/stratosphere.