Panagor Macro Converter

CLOSE-UP REVIEW

BY KIM SAUNDERS

CLOSE-UP work causes a number of problems even to the professional who is well versed in this particular field. If you have ever toyed with this aspect of photography using a hand held meter, colour slide film and a strict ration of one shot per subject, you probably don't find it very enjoyable to wait, fingers crossed for your results from the processor.

Most of the problems seem to stem from the use of optical devices which are totally inappropriate, or at least complicated, for the work in hand. All lenses are designed for optimum performance at a given subject distance; deviations from this optimum inevitably result in a degraded image due to the lack of optical correction. With unfamiliar subject detail seen on many high magnification prints, we tend to be more critical of the sharpness and resolving capabilities of the lens and close-up aids, on which we heavily rely. This results in a fairly broad gap between the acceptable and unacceptable prints. We will discuss the pros and cons of the different types of hardware available shortly, but to get some idea of the type of work involved I think a short definition is in order.

The term *macro* is frequently applied to all close up work, but by definition it only applies to magnifications of 1:1 (life size) or greater when a single lens is used between the film and subject. In theory the maximum magnification has no limit, but in practical terms it rarely exceeds 1:20 due to the gradual decrease in resolution or practical picture sharpness. For higher magnification, a microscope would usually be used which has two optics, and the term photomicroscopy is used to describe the procedure.

CLOSE-UP ATTACHMENTS

Quite a daunting number of lenses and attachments are available for close-up work, each having different optical characteristics, and inevitably varying degrees of convenience, results and cost. Some of these are: bellow units, extension rings, macro lenses, flat field lenses, enlarger lenses, close-up lenses (positive supplementary lenses) and macro converters.

Bellows provide an infinately variable means of adjusting the separation between camera body and lens so that the rays of light from close subjects can be brought into focus. Ideally bellows should be used in conjunction with a macro, close-focusing or close-up lens for high magnifications, since a standard lens produces very poor edge definition when used at subject distances shorter than about 0.5.m

When you consider that to obtain a 1:1 magnification with a 50mm lens, the distance from lens to subject is about 10cm, the limitations are immediately apparent.

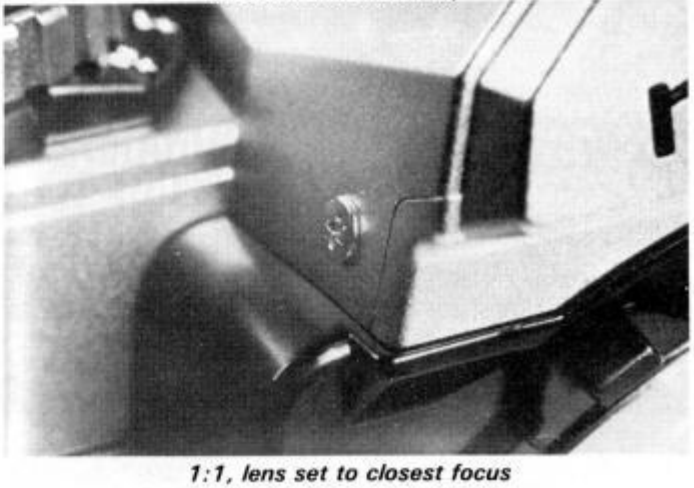
Similar restriction apply when using extension rings between camera and lens, but they are a little more portable. Their main drawback seems to be lack of flexibility, and continually changing rings to obtain different magnifications can be a nuisance.

Marco lenses are probably the most ideal solution for close-up photography as they are to produce best definition at short subject distances, and most have a fairly flat field (produce a sharp image across the entire film frame when photographing a flat subject). Flat field lenses are even more suitable for flat copy of a modest magnification, and if you have the necessary thread conversion adaptor, an enlarger lens mounted in reverse on the camera can be used as a good substitute.

The Panagor Auto Macro converter is fitted between a standard lens and the camera. By virtue of the internal sliding lens components, a magnification ratio range from 1:25 to 1:1 is obtainable (the magnification produced by an unaided standard lens set on its closest focus is about 1:9). The lens components also serve to

This series of prints shows a range of magnifications attainable with the Panagor Auto Macro Converter when used in conjunction with a standard 50mm camera lens. The first five were made with the camera lens focused at the infinity setting so that the negative magnification corresponded with that indicated by the scale (1:5, 1:3, 1:2, 1:1). The sixth print was made with the camera lens racked out at its minimum focusing distance which produced a slightly higher magnification of about 1:0.66. The final two prints were made under the same circumstances using a 135mm and 35mm lens respectively for comparison.

1:2, lens set to infinity



1:1, lens set to closest focus

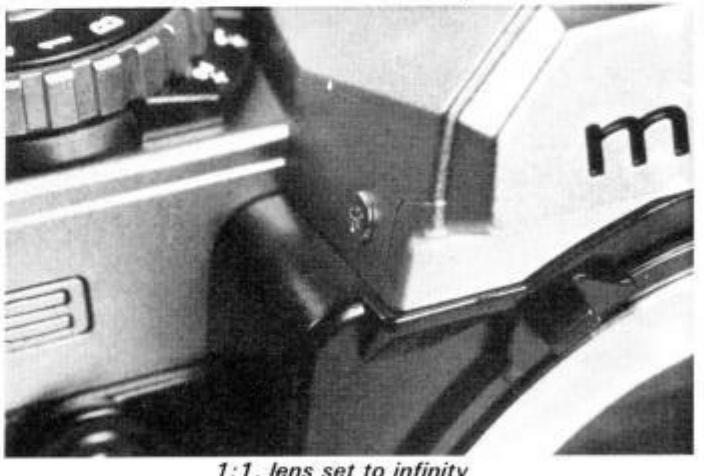
Movement of the lens elements inside the Panagor converter with the twist ring enable a range of subject distances to be covered, to produce a magnification range from 1:25 to 1:1 with a 50mm lens.

The subject distance control ring on the Panagor converter twists through 90deg to control the image magnification. Exposure factors are also engraved on the ring.

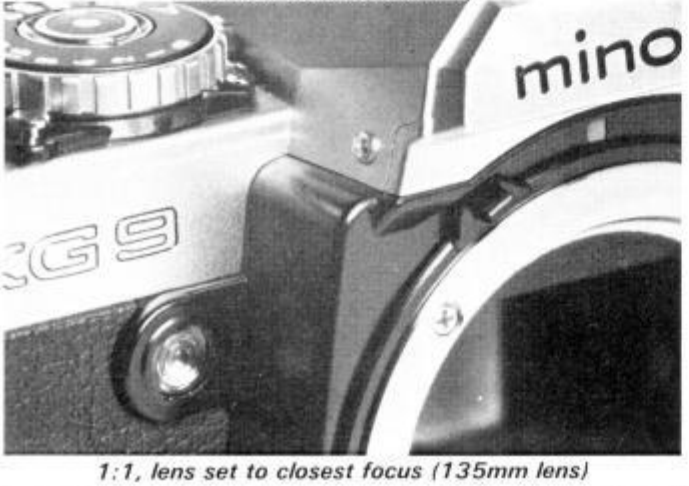
1:5, lens set to infinity

1:3, lens set to infinity

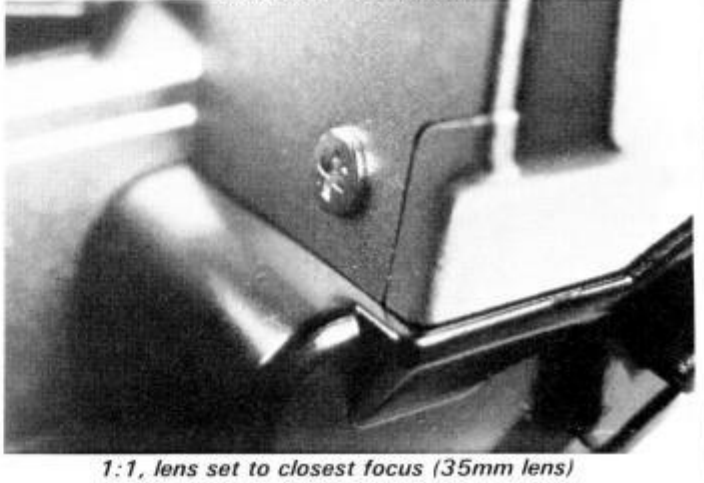
1:1.5, lens set to infinity



1:1, lens set to infinity



1:1, lens set to closest focus (135mm lens)



1:1, lens set to closest focus (35mm lens)

correct the optical aberration deficiencies caused by working at these distance.

CONSTRUCTION

The Panagor Auto Macro Converter measures about 60mm long and has the same diameter. The general design is very clean cut in a black, scratch resistant satin finish, with a 90deg smooth action knurled twist grip for adjusting the magnification ratio. White numerals indicate the magnification, while exposure factors are given by adjacent numerals engraved in blue. The coupling faces are finished in polished steel, and despite reasonably extensive use during testing there were no signs of any marking or wear — which doesn't necessarily go without saying.

The manufacturer's instructions recommend that the standard lens should be mounted to the adaptor before the camera, although we didn't experience any difficulties regardless of which was mounted first.

APPLICATIONS

Although recommended for use with a standard 50mm lens, Panagor indicate in their instruction leaflet that lenses of 55 and 58mm can be used, but the normal lens must be focused on a near distance to obtain a 1:1 magnification ratio (the magnification indices given in this article are based on the camera lens focus being set to infinity.

To stretch the capabilities of the converter, we also made some tests with a 35 and 135mmlens, and surprisingly enough the results were excellent. The only problem is that in doing so, the exposure and magnification scales change, and TTL metering becomes essential. Therefore, if you want to use a non-recommended lens with electronic flash, it would be advisable to bracket exposures, since the calculations normally used to evaluate exposure for a given magnification with a normal lens aren't capable of accounting for the light loss in the additional optics of the converter.

The focusing range and, of course, magnification, also change when using different focal length lenses, and for convenience this information has been tabulated, according to our findings. The shorter the focal length of the basic camera lens, the higher the degree of magnification possible, and the closer the camera is to the subject.

Camera lens focal length	Focusing range	Magnification ratio range
35mm	50-560mm	1:0.66-1:7
50mm	130-1200mm	1:1-1:25
135mm	900-10,000mm	1:2.5-1:33

EXPOSURE

Having previously drawn attention to the calculation of exposure, a short review of the procedure may be useful in case you are using some of the attachments without exposure scales for the first time with a non-TTL metering camera.

The difference between the exposure read by the meter and the actual exposure required is normally expressed as a factor (F), which can be calculated from — $F = (1 + M)^2$ — where M is the camera magnification. So if you are using bellows to give a 1X magnification and the metered exposure is 1/15sec at f/11, the exposure factor is $(1 + 1)^2 = 4$. This results in a final exposure of 1/4sec at f/11.

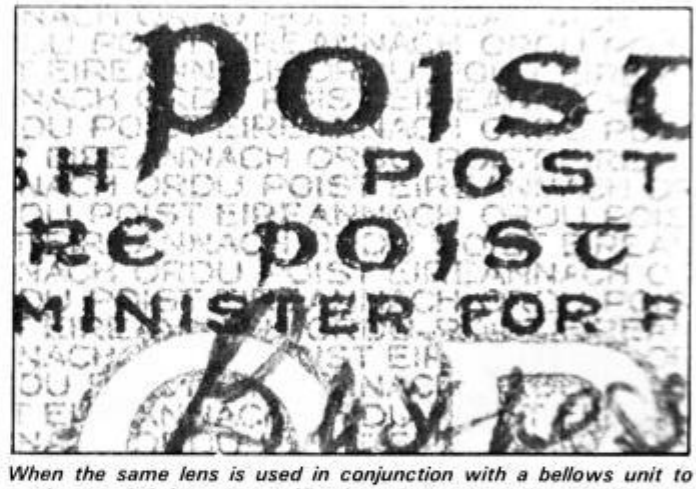
With the Panagor converter the exposure factor is slightly higher (appoximately 6 at 1:1 magnification), but the scale is given in numerals indicating the number of exposure stop (f/stop) increases required and is very simple to use.

In a similar manner to automatic (not manual) extension rings and bellows, the Panagor attachment maintains fully automatic full aperture metering, so if your camera has TTL metering all exposures can be made directly without any application of factors or formulae. This also means that you can focus at full aperture and allow the camera to stop down the lens iris aperture, unlike manual bellows and extension rings with which the lens iris must be stopped down manually to the desired aperture.

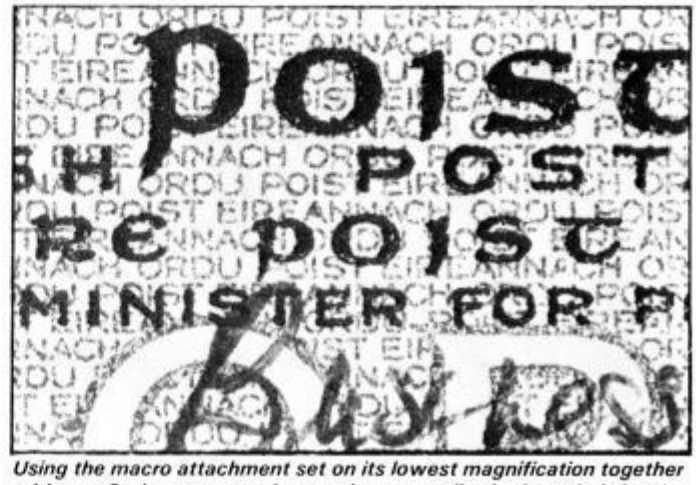
Lighting can also be a problem with close up photography due to the proximity of the camera to the subject. The Panagor converter does partially alieviate the problem, since the camera to subject distance is substantially greater for any given magnification with the attachment than with a standard lens and bellows unit.

Also indirectly related to exposure is depth of field; this is the distance between the nearest and furthest parts of the subject which appear acceptably sharp. At high degrees of magnification, the depth of field is always small, and for any given magnification and f/N. is

A standard 50mm lens set to its closest focusing distance was used for this print. The subject distance was approximately 0.5m, and there is no apparent fall off in definition towards the edge of the field.



When the same lens is used in conjunction with a bellows unit to produce a 1:1 image magnification, the subject distance is about 50mm. With the lens operating outside its normal focusing range, there is a drastic tail-off in image quality towards the edge of the frame. Distortion also becomes evident (see horizontal black line at bottom of frame) due to the excessively short subject distance.



Using the macro attachment set on its lowest magnification together with a +3 close up attachment, image quality is degraded, but by comparison with the results obtained using the close-up lenses alone, we can see a marked improvement.

This is a manual bellows focusing unit fitted with the camera's standard lens. The lens would be used in the manual mode — turning the aperture ring to fully open for viewing and focusing, then manually stopping down to the f/stop required for the picture before the shutter is released.

virtually the same regardless of the focal length of the lens used.

The main way of control is by choosing a small aperture which will probably require a long exposure time (shutter speed) and hence a sturdy tripod. If depth of field is essential and unobtainable by completely stopping down the aperture, the only solution will be to reduce the camera magnification and increase the degree of enlargement proportionally. This inevitably lowers the print quality, but you must balance your priorities to achieve the best compromise.

Below: To test the definition across the field for a number of close-up devices, we photographed a small section of a postal order at a magnification of 1:1. The only exception were the close-up lenses which only permitted a magnification of between 1:3 and 1:4, and for comparison purposes this has been taken in to account during enlargement. In all cases an aperture of f/8 was used.

RESULTS

The contrast and definition throughout the magnification range was excellent. This was also uniform across the frame without a hint of exposure fall off with the Panagor converter.

We also made a series of tests on flat copy (which is quite a stringent test for any macro lens) at a magnification of 1:1, and the print produced with the Panagor Auto Macro Converter was virtually indistinguishable from that produced with a true macro lens. The print made with a 55mm Nikon lens and bellows unit emphasises the loss of definition at the edge of the field caused by lack of field curvature correction, which will occur with any standard lens used in this way.

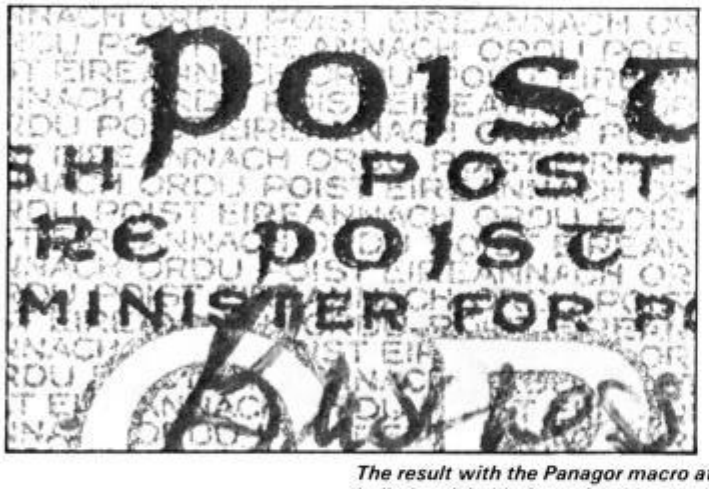
The prints made with close-up lenses attachments (positive supplementary lenses) were totally unacceptable; normally these kind of attachments would be used at subject distances between 0.5 and 1.5m. Combining a +1 and +3 close-up attachment enabled us to obtain a 1:1 magnification, but the image quality was poor in terms of both contrast and overall definition. In fact the enlargement made from the lower power negative made with just the +3 attachment was of better quality, since its operating distance was closer to (but still a long way from) the distance it was designed for.

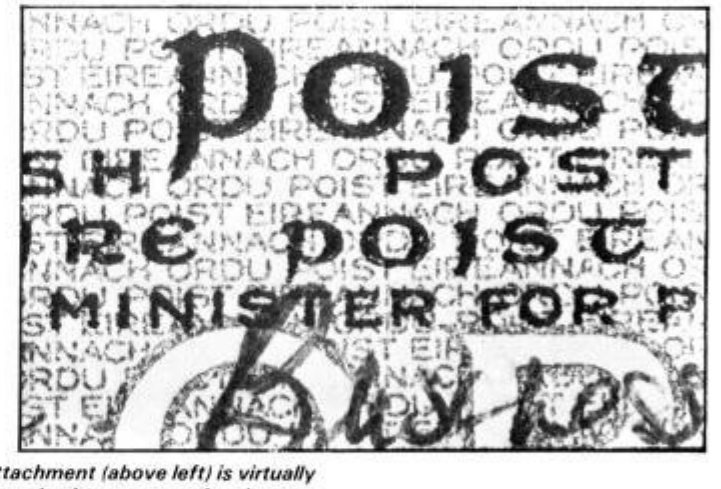
Just to complicate matters we decided to set the Panagor converter to its lowest power setting and add on a +3 close-up lens. Naturally definition was not as good as when the converter is operating on its own, but the optics in this macro converter did largely compensate for the abnormal working distance and a quite acceptable result was obtained. So if pressed, it is possible to obtain an even greater magnification by this method (although it wouldn't be recommended for very critical work).

CONCLUSIONS

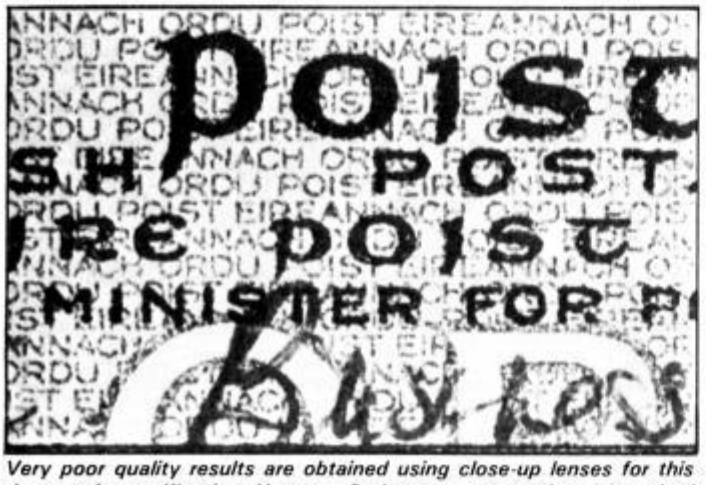
On balance, the Panagor Auto Macro Converter results left very little room for criticism, both in design and optical performance. The engraved exposure factors were very accurate and extremely easy to use, while the small movement of the magnification ring made focusing a very quick and accurate process (something which isn't always the case with other close-up devices).

Taking into account the price of the attachment (£36.07 with 42mm screw mount and £45.04 with bayonet) I think there is a very real possibility of this kind of attachment taking pride of place in the realms of 35mm close-up photography aids. Not only does the quality match that of a moderately-priced macro lens, but you are left with a perfectly good standard lens which in most cases will outclass even an expensive macro lens in the more conventional subject distance range.

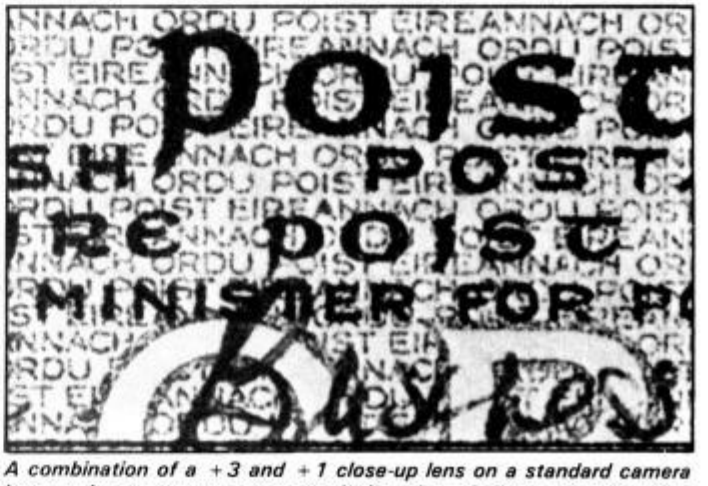




The result with the Panagor macro attachment (above left) is virtually indistinguishable from the print produced using a conventional macro lens (above right). In each case sharpness is good across the frame, while contrast and resolution are excellent.



Very poor quality results are obtained using close-up lenses for this degree of magnification. Here a +3 close-up was used on a standard lens and the negative was enlarged to give an image size equal to that obtained with the other attachments.



A combination of a +3 and +1 close-up lens on a standard camera lens produces an even poorer result than the +3 alone, even though a lower degree of enlargement was required, this is again attributed to the excessively short subject distance.