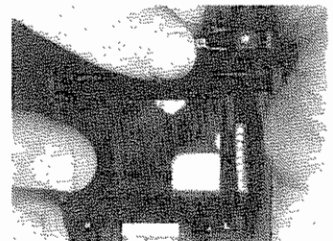


modern tests

along with our test Minolta XK in addition to the AE finder we've already mentioned. Each is finished in satin black like the camera itself and fits onto the XK in the manner previously described. All finders, including the AE, show exactly the same field of view, which is 97 percent of the image actually recorded on the film. But all differ in size, optical measurements and operation. To give you the best idea how each fits into the XK system, we'll begin with the standard AE finder.

The standard AE (auto exposure) finder (\$235) is the tallest and heaviest of the four, extending a maximum of 1 1/2 in. (38mm) from the top of the finder receptacle and weighing in at 7.5 oz. (210 g). In addition to its multiple



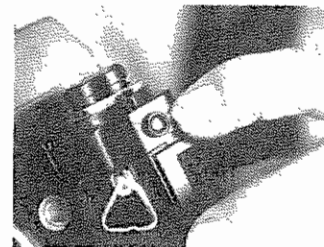
Aperture-coupling pin must be set to red dot before mounting AE finder. If not, it won't fit.

capabilities detailed before, it provides a smaller-than-life-size 0.8X viewing image with a 50mm normal lens at an apparent viewing distance of just under 4 ft. (1.25m) with a combined shutter-speed and metering scale at 3/4 ft. (1.1m) and an aperture indication above the finder at 3 ft. (9m). This means that all scales and the viewing image are pretty nearly in the same plane, and while some visual focus shift is required, eyestrain should be minimal.

For the XK users in search of a compact meterless prism, the plain finder (\$105) should do quite nicely. It extends only 1 in. (25mm) from the top of the finder receptacle, weighs in at 5 oz. (140g) and does everything the AE does except meter. For example, it reads apertures off the lens' f/stop ring and displays them above the finder image. User-selected shutter speeds are displayed in a little window to the right of the aperture window instead of down the right side as in the AE. Viewing the data in the plain finder may cause slightly more eyestrain, however, since the viewing image appears at just under 4 ft. (1.25m), while the shutter speeds appear at about 1 1/2 ft. (0.5m) and apertures are seen at about 2 ft. (0.5m). Magnification with a 50mm normal lens is 0.8X of life-size.

For low-angle views or use with scientific instruments, the waist-

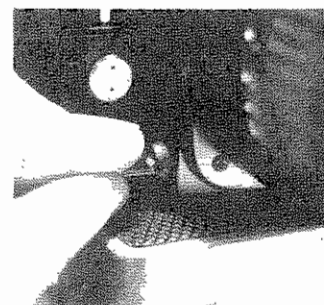
level finder (\$60) is a welcome addition, measuring in at only 3/4 in. (22mm) from the top of the finder



Press battery-check lever down; if red light lights, all's O.K.

receptacle in folded position and weighing in at a feather-light 3.5 oz. (100 g). While no apertures or shutter speeds are visible therein, it does present the eye with a life-size viewing image with a 50mm normal lens at an apparent distance of 1 1/2 ft. (5m), and erects instantly as you press the button on its back while pushing upwards. Following the reverse procedure will collapse the finder hood instantly—nicely done.

The last finder we were able to test is Minolta's high-magnification finder (\$130), a very worthwhile device which shows the entire viewing screen to non-eyeglass wearers at a magnification of 1.4X with a 50mm lens. Why would you want such a chimney-shaped finder? If you need to focus critically with a wide variety of interchangeable viewing-screen units for copying, microscopy, telescope and many other scientific purposes, no other finder can do a better job than this one. To these ends, the high-mag finder's color-cor-



Preview/mirror lockup works fine except atop a tripod.

rected four-element eyepiece has a knurled collar providing a very wide adjustment range—+3.5 to -4.5 diopters—according to your diopterscope.

As you might surmise by glancing at the resolution and contrast charts, both Rokkor-X lenses we tested along with the XK were decidedly better-than-average performers, particularly the 24mm f/2.8, one of the finest of its focal length we've ever examined. Both optics are nearly identical in size, very well finished in satin black, and fitted with 1/2-in. (13mm) wide diamond-studded-pattern rubberized focusing rings. Aperture rings and metric distance scales are very legibly

engraved in white-on-black, while footage scales are a bit less visible in green-on-black.

The 50mm f/1.4 Rokkor is about average in size for a lens of its speed and focal length, weighing in at 10.5 oz. (300g), measuring 2 1/2 in. (63mm) in diameter and extending 1 1/4 in. (44mm) from the camera body at infinity. The 1/4-in. (6mm) wide knurled aperture ring is click-stopped at half-stop intervals except between f/1.4 and f/2, and the lens focuses very smoothly to its minimum distance from infinity in just under 180°. Like all other Rokkor-X lenses (and many from Leitz), the 50 features a raised red plastic orientation dot, an aid to quick mounting in low light

Resolution Power

50mm f/1.4 MC Rokkor-X No. 3720831 At 1:49 Magnification				
f/no.	Center Lines/mm	Corner Lines/mm		
1.4	Exc.	55	Exc.	39
2	Exc.	62	Good	39
2.8	V/Good	69	Good	49
4	Good	62	Good	49
5.6	Good	62	V/Good	55
8	V/Good	69	V/Good	62
11	Exc.	69	V/Good	49
16	Good	55	Good	44

Actual Focal Length: 51.7mm

Image Contrast

50mm f/1.4 MC Rokkor-X No. 3720831				
f/no.	Center Percentage	Corner Percentage		
1.4	Medium	51	Low	23
2	Low	52	Low	22
2.8	Medium	62	Low	32
4	Medium	67	High	53
5.6	Medium	69	High	67
8	Medium	68	High	64
11	High	67	High	56
16	High	62	High	54

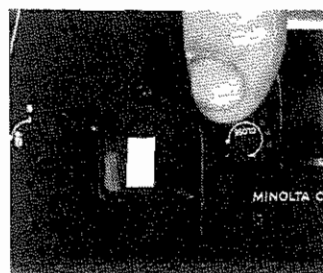
Central color fringing (causes image unsharpness with color fringing): On the optical bench the 50mm f/1.4's central image exhibited fairly strong red fringing, visible as a slight purplish fringe in transparencies shot at f/1.4, which disappeared when we stopped down to f/2.8.

Central spherical aberration (causes focus shift and flare): Flare on axis was present in normal amounts wide open, disappeared at f/2.8, and focus shift was very small: 0.04mm. As we expected, flare was quite noticeable on axis in transparencies shot at f/1.4, but absent by f/5.6. We were able to observe a slight double-line effect in out-of-focus images taken with the lens wide open, however.

Edge lateral color fringing (causes persistent image unsharpness, possible multiple colored images): At the edges of the field, color fringing was so small as to be barely detectable on the bench or in the transparencies. **Edge astigmatism** (causes image streak): Astigmatism was very well corrected and caused no

visible streaking in the slides. **Edge coma** (causes flare): While edge coma was fairly large wide open, it too practically disappeared by f/2.8, and the on-film image retained its sharpness to the extreme corners. **Optical decentering** (causes problems in all areas): We were able to observe a moderate amount of optical decentering on the bench, but it wasn't visible in the pictures.

Residual ghosts and flare: With the exception of a strong, red,



Eyepiece blind closes from left and right as you turn control.

arrow-shaped ghost appearing in the corner opposite a very strong light source just outside the picture area in a few of our shots, flare was very well controlled for a non-multicoated lens.

Linear distortion: Barrel-type distortion was fairly large at medium distances to infinity, measuring -1.7 percent, but did not increase appreciably at closer distances.

Turning to the 24mm f/2.8, the first Rokkor produced in this speed and focal length, we have a lens of fairly moderate dimensions which nevertheless balances quite nicely on the XK. It weighs in at just under 14 oz. (400g), has a maximum diameter of 2 1/2 in. (63mm), and extends 2 in. (50mm) from the camera body at infinity. The 24 focuses to its 1-ft. (0.3m) minimum distance in a smooth, just-under-90° turn of the focusing collar, features legible white-on-black aperture and metric focusing-scale markings, and a green-on-black footage scale. The 1/4-in. (6mm) wide knurled aperture ring has click-stops at half-stop intervals except between f/2.8 and f/4.

Central color fringing (causes image unsharpness with color fringes): On the optical bench, the 24 exhibited a slight red fringe on axis which disappeared at f/5.6 and this was closely confirmed in field test pictures.

Central spherical aberration (causes focus shift and flare): It was quite low on the optical bench and on our test transparencies as indicated by a focus shift of only 0.03mm on stopping down—very good for an ultra-wide-angle lens.

Edge lateral color fringing (causes persistent image unsharpness, possible multiple colored images): While this optic manifested rather strong edge lateral color fringing on the

bench, the image retained its sharp core. This was confirmed in our test transparencies which were sharp, but exhibited purple fringing at all apertures.

Edge astigmatism (causes image streaking): Astigmatism was detectable only in the extreme corners of the picture field on the bench and caused image streaking only in the extreme corners of our test slides. The image retained very good sharpness.

Edge coma: Coma was outstandingly low throughout, contributing greatly to the 24's fine sharpness and contrast both on the bench and in the test slides.

Resolution Power

24mm f/2.8 MC W Rokkor-X No. 2115734 At 1:49 Magnification				
f/no.	Center Lines/mm	Corner Lines/mm		
2.8	Exc.	62	Good	31
4	Exc.	62	Exc.	39
5.6	V/Good	62	Exc.	43
8	V/Good	62	Exc.	43
11	Exc.	69	V/Good	39
16	Exc.	62	Good	34

Actual Focal Length: 24.3mm

Image Contrast

24mm f/2.8 MC W Rokkor-X No. 2115734				
f/no.	Center Percentage	Corner Percentage		
2.8	Medium	54	High	49
4	High	68	High	53
5.6	High	79	High	63
8	Medium	71	High	61
11	High	67	High	59
16	High	62	High	59

Optical decentering (causes problems in all areas): Decentering was detectable neither on the bench or in the transparencies. **Residual ghosts and flare**: Ghosts and flare caused by strong light sources just outside the picture area were very well controlled—as well as with most multicoated optics we've tested.

Linear distortion: Barrel distortion at medium to far distances measured a very low one percent and increased only slightly at closer distances. All in all, a very fine performance.

Unquestionably, the Minolta XK represents an all-out effort by a conscientious and renowned manufacturer to produce a top-grade system camera competing with the world's best, and our essentially minor complaints hardly obscure this fact. The XK's overall lab performance certainly places it among the top contenders, and the very high percentage of perfectly-exposed pictures delivered by its CLC metering system only enhanced our enthusiasm for this camera.

Of course, given an entrée of this stature, we're inclined to be impatient for the dessert, too. But there is no doubt that Minolta has planned its introductory technological feast to coincide with the desires and needs of the majority of advanced amateur and professional photographers.

WIDEST WIDE ANGLE FOR 35MM SLR CAMERA



MANUFACTURER'S SPECIFICATIONS: 15mm f/5.6 Nikkor-QD Auto for Nikon and Nikkoromat. FEATURES: Apertures to f/22, focusing to 1 ft. (0.3m), built-in rotating filter holder with clear, Y48 (yellow), O56 (orange) and R60 (red) filters. PRICE: \$1135.

When a photographer glances at the very steep price for this lens and then notes that it offers a bare few millimeters less length than others, he is very apt to wonder if he isn't being "taken." Granted, the 14-element, 24.7-oz. (700g) optic is an impressive 3 1/2 in. in diameter and 3 1/2 in. in length (92mm x 88.5mm), but must it really be that much bigger and heavier than the going, run-of-the-mill 18, 19, 20 or 21mm lens?

Having used the lens along with a battery of slightly longer, less expensive wide-angle lenses for a month, we can report that the lens is fantastic in optical ability and most definitely covers an appreciably greater angle than do slightly longer lenses.

First let's see why. If we have a 55mm lens and replace it with a 50, the increase in coverage is but 5mm, which works out to a 3° angle difference (since the 55mm covers 43° while the 50mm cov-



At f/16, depth of field extends from 1 ft. to infinity. Filter ring indicates orange filter in place.



Filter change lever also serves as aperture shutter when pushed.

ers 46°). That's only an increase in picture angle of about 7%. However, if we take a 20mm lens with its covering angle and replace it with the 15mm, we have changed the covering angle from 94° to 110°, a difference in angle of 16° and a percentage increase of 17 percent. In other words, a small change in focal length at wide angle is much more important and visible than a change of the same millimeters at a longer



15mm coverage produces 110°.



18mm with 100° coverage.



21mm's 90° looks like tele.

focal length. We shot three pictures using standard 18 and 21mm lenses plus the 15mm in our office to illustrate this visual difference among them.

In our opinion, for photographers seeking the utmost in true linear non-fisheye coverage, the 15mm f/5.6 Nikkor will make a real visual difference. Now let's see how the lens behaved.

Central color fringing (causes image unsharpness with color fringes): On the optical bench we could detect almost none at all, and our picture taking confirmed the lab test.

Central spherical aberration (causes focus shift and flare): On the optical bench, shift and flare were very small. This was borne out in picture taking.

Edge lateral color fringing (causes persistent image unsharpness, possible multiple colored images): Although it was very large on our optical bench and the image might, theoretically, separate at the extreme picture corners, the fringing was considered an acceptable amount. In picture taking the purple image was strong but the image did retain its sharpness.

Edge astigmatism (causes image streaks): On our optical bench it

appeared small and almost undetectable, but in our pictures, radial streaks could be seen in the out-of-focus images (far side), although they were not detectable in in-focus images.

Edge coma (causes flare): It appeared small on the optical bench and by f/8 had almost disappeared. This was borne out in the pictures we made.

Optical decentering (causes problems in all areas): Some was found on the optical bench, but wasn't detectable in our pictures.

Residual ghost and flare: Very low in our photos.

Linear distortion: Amazingly small in picture taking: only 1.5 percent barrel type.

Thankfully, the designers have built in a useful selection of filters—all basically for black-and-white photography—a medium yellow, orange and red. There is an N position, which in some instructional pamphlets indicates that it holds a skylight filter while in others indicates plain glass. We decided not to risk taking this very complicated lens apart to find out the answer.

The spring-loaded release le-

Resolution Power

15mm f/5.6 Nikkor Q.D.C. Auto No. 321707 At 1:45 Magnification				
f/no.	Center Lines/mm	Corner Lines/mm		
5.6	Exc.	90	Good	28
8	Exc.	90	Good	32
11	Exc.	90	Exc.	36
16	Exc.	80	V/Good	32
22	Exc.	57	Good	28

Actual Focal Length: 15.6mm

Image Contrast

15mm f/5.6 Nikkor Q.D.C. Auto No. 321707				
f/no.	Center Percentage	Corner Percentage		
5.6	High	65	High	37
8	High	70	High	49
11	High	71	High	54
16	High	64	High	53
22	High	47	High	52

ver for the filter ring also serves as a shutter mechanism masking the lens aperture during filter shifts. This can prove useful for those who might wish to employ the filters for creative effects on multiple exposures.

With the lens's extreme depth of field, some users of this lens might have focusing difficulty. However, the newly announced Nikon R focusing screen, which offers a split-image rangefinder specifically computed for lenses having maximum apertures between f/3.5 and f/5.6, works well and will allow you to obtain precise focus on the plane you want.

The lens is, needless to say, beautifully finished, has a very smooth stippled-pattern, 1/2-in.-wide (13mm) focusing ring, a specially designed, radically-cut partial sunshade to offer the best

modern tests

protection without becoming hopelessly huge, and very clear Nikon color-coded depth-of-field and aperture markings. At f/16, depth of field, according to the marks, extends from 1 ft. to infinity. Good gosh!

A PAIR OF PETITE ZUIKOS FOR THE OLYMPUS OM-1

MANUFACTURER'S SPECIFICATIONS: 35mm f/2 Auto Zuiko in mount for Olympus OM-1 cameras. **FEATURES:** Apertures to f/16, focusing to 1 1/2 in. (29cm), accepts 55mm accessories. **PRICE:** \$259.95. 50mm f/3.5 Zuiko Auto-Macro for cameras as above. **FEATURES:** Apertures to f/22, focusing to 9 in. (23cm) (1:2), accepts 49mm accessories. **PRICE:** \$249.95.

Olympus continues to expand the already fairly comprehensive lens line offered for their remarkably compact full-frame 35mm SLR, the Olympus OM-1. Understandably, the optics themselves have been constructed and designed with an eye toward keeping everything as compact as possible—and that's not always an easy job. Take the multi-coated 35mm f/2 Zuiko lens, for example; its maximum diameter (at the 1/2-in.-wide [13mm] diamond-studded-pattern focusing ring) is just over 2 1/4 in. (57mm); it extends only 1 1/4 in. (44mm) from the camera body at infinity; and it weighs 8 1/2 oz. (241g).

The eight-element, seven-group 35mm f/2 focuses decisively to its rather close minimum focusing distance in a 135° turn of the focusing ring. It features click stops at whole-stop intervals throughout its aperture range and operates with commendable smoothness and precision. As with all OM-1 series Zuiko lenses, the 35mm f/2 is fitted with a spring-loaded, depth-of-field preview button situated at about 7 o'clock with the lens mounted on the camera. While the white-on-black metric and aperture scales are a bit more visible than is the orange-on-black footage scale in dim light, the latter is reasonably bright in most cases. The 5/32-in.-wide (4mm) knurled aperture ring is easy to differentiate from the diamond-pattern focusing ring by feel, though low-light manipulation would be facilitated if their diameters weren't so nearly identical.

On the optical bench, this lens exhibited only a very slight color fringing on axis at maximum aperture or stopped down—very good for a wide-angle lens of this speed. Flare was likewise well-controlled, and both focus shift and astigmatism were present in

smaller-than-average amounts. Off axis, a moderate amount of yellow fringing was visible, but of extremely low intensity and although skew-ray flare was pronounced wide open, it disappeared by f/4. Decentering was not observable, but a slight, photographically harmless excess of lens curvature at the edges was visible at maximum aperture.

Our test transparencies showed almost no color fringing on axis at maximum aperture, though a very slight yellow and purple fringe did manifest itself at smaller apertures. Flare, the

bugaboo of fast wide-angle lenses, was very low throughout. Lateral color was present only in very small amounts, and astigmatism was unobservable. A small amount of negative (barrel-type) distortion was present, but our Kodachromes were crisply sharp at all apertures. On the whole, we'd judge the 35mm f/2 Zuiko to be one of the better lenses of its type we've examined.

The 50mm f/3.5 Macro Zuiko is also very much in keeping with Olympus' "minimal" design philosophy—its maximum diameter is just over 2 1/4 in. (57mm), it extends only 1 1/4 in. (41mm) from the camera body at infinity, and it weighs in at a feather-light 7 oz. (200g). Its 1/2-in.-wide (13mm) diamond-studded-pattern focusing ring takes the lens from infinity to its minimum focusing distance in a smooth, backlash-free 315°, and the dual focusing scale is marked in ft. (orange) and magnification ratios (yellow). The former would be better in white-on-black for maximum clarity and differentiation. As with the 35mm f/2, the macro's 3/16-in.-wide (5mm) aperture ring is click-stopped at whole-stop intervals throughout its range, and there's a depth-of-field preview button at about 7 o'clock with the lens mounted on the camera. The macro is beautifully satin-black-finished like its pair of stablemates and, despite its modest aperture, provides a reasonably bright focusing image that snaps in and out of focus with alacrity.

On the optical bench, the five-element Macro Zuiko acquitted itself admirably, showing practically no on-axis color fringing and a normal amount of flare wide open which mostly disappeared by f/5.6. Astigmatism was also extremely well-corrected to the extreme corners of the field, and there was consequently a very small radial-to-tangential distance and no visible streaking. Coma was visible at maximum aperture as was off-axis, skew-ray flare, but both practically disappeared by f/5.6, and the image retained a sharp core throughout. Decentering was virtually invisible, but there was a slight excessive downturning of the lens elements observable. This tended to increase flare slightly at f/3.5, but was otherwise photographically harmless.

Our test transparencies shot with the Macro Zuiko corroborated our optical bench findings quite closely. Flare was virtually invisible at all apertures, no chromatic aberration was noticeable on axis and it was only barely visible at the edges of the field. A very small outward-type coma could be differentiated through our 50X loupe, but only at wider apertures. Astigmatism was very low at all apertures and a very small amount of negative (barrel-type) distortion could be seen. Under more normal viewing circumstances, the Kodachromes we shot with this macro were

crisp and color-saturated under a wide variety of conditions. While there are a few more flexible macros on the market (ones that go down to a life-size image without accessories, for example), few can match the Macro Zuiko's clever combination of very high quality and minuscule dimensions.—THE END

Resolution Power

35mm f/2 Zuiko No. 100395 At 1:48 Magnification				
f/no.	Center Lines/mm		Corner Lines/mm	
2	Exc.	54	V/Good	30
2.8	Exc.	54	Exc.	34
4	V/Good	60	Exc.	48
5.6	V/Good	60	Exc.	54
8	Good	54	Exc.	48
11	V/Good	54	Exc.	48
16	Exc.	68	V/Good	38

Actual Focal Length: 35.0mm

50mm f/3.5 Macro Zuiko No. 100431 At 1:48 Magnification				
f/no.	Center Lines/mm		Corner Lines/mm	
3.5	Exc.	60	Exc.	43
5.6	V/Good	60	Exc.	54
8	Exc.	76	Exc.	68
11	Exc.	76	Exc.	60
16	V/Good	60	Exc.	60
22	Accept.	48	Accept.	38

Actual Focal Length: 52.0mm

At 1:4 Magnification				
f/no.	Center Lines/mm		Corner Lines/mm	
3.5	Exc.	70	Exc.	50
5.6	Exc.	79	Exc.	56
8	V/Good	70	V/Good	63
11	Exc.	70	Exc.	63
16	Good	56	V/Good	50
22	Accept.	50	Accept.	39

Image Contrast

35mm f/2 Zuiko No. 100395				
f/no.	Center Percentage		Corner Percentage	
2	Low	44	Medium	30
2.8	Low	51	Medium	30
4	Low	60	Low	36
5.6	Medium	72	Medium	45
8	Medium	74	Medium	50
11	High	65	High	53
16	High	62	High	51

50mm f/3.5 Macro Zuiko No. 100431				
f/no.	Center Percentage		Corner Percentage	
3.5	Low	42	Medium	40
5.6	Low	52	High	56
8	Medium	68	High	65
11	Low	62	High	65
16	Medium	58	High	56
22	Low	53	Medium	47

Image Contrast

35MM CAMERA LENSES 61MM-105MM					
Apertures	Center			Corner	
	Percent	Rating	Percent	Rating	Rating
Maximum aperture	20.46	Low	24.35	Low	
	47.54	Medium	36.41	Medium	
	55+	High	47+	High	
Next largest aperture	37.48	Low	28.38	Low	
	49.64	Medium	39.43	Medium	
	65+	High	44+	High	
Medium aperture	40.53	Low	37.41	Low	
	54.69	Medium	42.51	Medium	
	70+	High	52+	High	
f/11 to f/22	40.51	Low	36.44	Low	
	52.64	Medium	45.53	Medium	
	65+	High	54+	High	

35MM CAMERA LENSES 106MM-250MM					
Apertures	Center			Corner	
	Percent	Rating	Percent	Rating	Rating
Maximum aperture	28.43	Low	22.30	Low	
	44.57	Medium	31.37	Medium	
	58+	High	38+	High	
Next largest aperture	30.47	Low	26.35	Low	
	48.63	Medium	35.41	Medium	
	64+	High	42+	High	
Medium aperture	38.57	Low	30.39	Low	
	53.69	Medium	40.49	Medium	
	70+	High	56+	High	
f/11 to f/22	40.47	Low	34.41	Low	
	48.59	Medium	42.51	Medium	
	60+	High	52+	High	

35MM CAMERA LENSES 251MM-2000MM					
Apertures	Center			Corner	
	Percent	Rating	Percent	Rating	Rating
Maximum aperture	24.40	Low	20.27	Low	
	41.51	Medium	28.35	Medium	
	57+	High	36+	High	
Next largest aperture	28.46	Low	24.32	Low	
	47.61	Medium	33.39	Medium	
	62+	High	40+	High	
Medium aperture	36.50	Low	28.38	Low	
	51.67	Medium	39.47	Medium	
	68+	High	48+	High	
f/11 to f/22	38.46	Low	32.40	Low	
	47.57	Medium	41.47	Medium	
	58+	High	46+	High	

