

modern tests

linear barrel distortion could be detected in close-ups. Overall, all images in our test slides were very crisp and sharp.

No automatic SLR has given us more pleasure to handle and we were constantly learning something new about the camera and its design. For instance, we were at first upset that, apparently, there were no red markings moving upwards to cover the parts of the aperture scale not applicable to the lens mounted on the camera—until we discovered, in changing lenses, that the entire vertical scale moved downward or upward to cover or uncover the appropriate usable f/numbers. Gold stars go to the writers of the instruction book, which is the only one we know of for an automatic camera that clearly sets forth in chart form the exact apertures and shutter speeds available in automatic exposure for all ASA film indexes. Nevertheless we do feel Canon should have indicated these coupling limits in the camera itself as other automatic SLR's using mechanical exposure-setting systems do. Such criticisms aside, however, we feel that with the EF, Canon has taken the big step and made it quite successfully.

CANON LENS QUARTET: ULTRA-WIDE TO TELE

MANUFACTURER'S SPECIFICATIONS: 20mm f/2.8 Canon FD S.S.C. lens in Canon breech-lock mount. FEATURES: Apertures to f/22, focusing to 10 in., accepts 72mm accessories. PRICE: \$310.

24mm f/2.8 Canon FD S.S.C. lens in mount as above. FEATURES: Apertures to f/16, focusing to 1 ft., accepts 55mm accessories. PRICE: \$273.

200mm f/4 Canon FD S.S.C. lens in mount as above. FEATURES: Apertures to f/22, focusing to 8 ft., accepts 55mm accessories. PRICE: \$268.

300mm f/5.6 Canon FD S.C. in Canon breech-lock mount. FEATURES: Apertures to f/22, focusing to 12 1/4 ft. (3.8 m), accepts 58mm accessories. PRICE: \$381.

The newest innovation in Canon lenses since Canon replaced most of its FL lenses with FD lenses is Super Spectra Coating—a type of multilayer lens coating. The name Super Spectra is derived straightforwardly from the basic design concept. Canon has carefully adjusted spectral or chromatic characteristics of the transmitted light so that all Canon lenses in this series yield the same well-corrected color rendition in actual pictures. In

other words, effective multilayer coating is so efficient in reducing reflection and increasing light transmission, that unwanted color contributions of the glass materials themselves sometimes show up in pictures. These new S.S.C. lenses are designed to produce fine, uniform color renditions in photographs taken with various focal lengths. To evaluate this claim, we took the same emulsion number Kodachrome II, shot pictures under the same daylight illumination conditions and processed the films at the same time at the same Kodak lab. We were quite pleased with the results. The color rendition produced by the optical trio was completely free of yellowish haze, bluish casts or other color rendition differences often noted with other lens series.

Now, let's get down to the individual lenses themselves. The 20mm f/2.8 has a fairly wide barrel, but given its very fast aperture and super-wide focal length, this size (2 1/4 in. long, 3 in. in diameter, 12 11/16 oz.) is permissible. The finish of its finely-lacquered mechanical components is excellent. The barrel has a diamond-studded pattern rubberized focusing ring in the middle, requiring an 180° turn to focus the lens from infinity to its 10-in.-minimum focusing distance. White-on-black distance numerals and f/numbers are large and easy to read even in low light. All f/stops have intermediate click-stopped detents up to and including f/22, which is an unusually small aperture for this super-wide focal length.

Although focusing through the finder is possible at maximum aperture, it does require a bit of extra effort with this extremely short focal length lens due to its large depth of field. On the other hand, Canon's 20mm is so well constructed there is no visible decentering, despite its complex system of variably moving elements (Canon Floating System) which, in this design, requires eleven elements in nine groups.

On the optical bench the 20mm behaved very well. On axis, color fringing was very slight, spherical flare vanished by stopping down only one stop to f/4, and focus shift was marginal. In off-axis areas, just a touch of red fringing (caused by lateral chromatic aberration) was observable, but it was so small it didn't show in the pictures at all. Astigmatism was present in rather large amounts wide open, but was considerably improved by f/4. Our Kodachrome II transparencies evidenced slight radial streaks beyond 30° off axis, but this didn't affect image sharpness adversely and was consistent with the lens' very good overall performance. Coma and skew-ray flare were also present in normal amounts, but the intensity of the flare was so weak it did not decrease image

contrast. Distortion, often disturbingly present in super wide-angle lenses, was gratifyingly small (1.0 percent).

Canon's 24mm f/2.8 has the same high-quality black finish as the 20mm and the now-standard pattern, diamond-studded, rubberized focusing ring. A 140° turn gets you from infinity to the 24's closest focusing distance of 1 ft. This lens is rather compact (just a little over 2 in. in length and 2 1/2 in. in diameter) and very comfortable to handle. All f/stops have halfstop detents and the hexagonal diaphragm maintains its accurate symmetrical shape down to f/16, which assures consistently accurate aperturing. Its characteristics as observed on the optical bench were equally impressive. Axial color was well controlled. Only a very small purple fringe was visible wide open and it vanished by f/4. No color fringing was visible in the pictures. Spherical flare and focus shift were also admirably well-corrected. A touch of decentering was observable but it didn't appear in the pictures. As a re-

Resolution Power				
20mm f/2.8 Canon No. 11073 At 1:47 Magnification				
f/no.	Center Lines/mm	Corner Lines/mm		
2.8	Exc.	59	V/Good	33
4	V/Good	52	V/Good	33
5.6	Good	52	Exc.	47
8	V/Good	59	Exc.	47
11	Exc.	66	Exc.	47
16	Exc.	66	Exc.	52
22	V/Good	52	Exc.	42

Actual Focal Length: 20.6mm

Resolution Power				
24mm f/2.8 Canon No. 41164 At 1:47 Magnification				
f/no.	Center Lines/mm	Corner Lines/mm		
2.8	Exc.	66	V/Good	33
4	Exc.	66	Exc.	42
5.6	Exc.	66	Exc.	42
8	Exc.	75	Exc.	47
11	Exc.	75	Exc.	47
16	Exc.	66	Exc.	47

Actual Focal Length: 24.6mm

Resolution Power				
200mm f/4 Canon No. 69907 At 1:30 Magnification				
f/no.	Center Lines/mm	Corner Lines/mm		
4	V/Good	42	Exc.	38
5.6	Exc.	48	Exc.	42
8	V/Good	53	Exc.	48
11	Exc.	60	Exc.	53
16	Exc.	53	Exc.	48
22	V/Good	48	V/Good	38

Actual Focal Length: 198.6mm

Resolution Power				
300mm f/5.6 Canon FD Tele with S.C. Coating No. 30958 At 1:40 Magnification				
f/no.	Center lines/mm	Corner lines/mm		
5.6	V/Good	40	V/Good	32
8	V/Good	46	Exc.	40
11	Exc.	51	Exc.	40
16	Exc.	51	Exc.	40
22	Exc.	51	Exc.	40

Actual Focal Length: 302mm

sult, high resolution power was maintained. Both astigmatism and coma were present, but not in harmful amounts even wide open, and the image kept its sharpness throughout the aperture range. All in all, this is an excellent lens.

Canon's 200mm f/4 is a very compact telephoto lens of this focal length (2 1/2 in. in diameter and extending 5 3/16 in. from the camera body at infinity). Its fine finish is similar to other Canon FD lenses. While it isn't really lighter than other 200's, its balance is so good we were able to obtain a fair percentage of sharp pictures with it even at 1/30 sec. hand held! Almost all aberrations were found to be well-controlled and no visible decentering was visible. Color fringing in the picture center (axial) and zonal area to the corners (lateral) was well within tolerances and color fringing was not observable in our Kodachrome II transparencies. This is definitely an above-average performance for a 200mm lens.

All in all, Canon's optical trio proved to be a well-constructed, well-designed group of lenses. Ghost images were low and overall performance was high, indicating that Canon's Super Spectra Coating is certainly doing

Image Contrast				
20mm f/2.8 Canon No. 11073				
f/no.	Center Percentage	Corner Percentage		
2.8	Low	37	Med.	28
4	Low	42	Med.	29
5.6	Low	58	Low	38
8	Low	62	Low	42
11	High	60	High	43
16	Med.	57	Med.	39
22	Low	52	Low	32

Image Contrast				
24mm f/2.8 Canon No. 41164				
f/no.	Center Percentage	Corner Percentage		
2.8	Low	48	High	38
4	Med.	55	High	42
5.6	Low	62	High	58
8	Med.	67	High	61
11	High	62	High	52
16	Med.	56	High	50

Image Contrast				
200mm f/4 Canon				
f/no.	Center Percentage	Corner Percentage		
4	Low	28	Low	26
5.6	Low	31	Low	26
8	Low	39	Low	34
11	Low	44	Low	35
16	Low	44	Low	34
22	Low	42	Low	34

Image Contrast				
300mm f/5.6 Canon FD Tele with S.C. Coating No. 30958 At 30 lines/mm				
f/no.	Center Percentage	Corner Percentage		
5.6	Low	34	Low	25
8	Med.	52	Med.	42
11	Med.	54	Med.	42
16	Med.	50	Med.	40
22	Med.	48	Med.	40

its job quite well.

One Canon lens which offers a fine combination of photographic performance factors without the benefits of multi-coating is the 300mm f/5.6 Canon FD, a less expensive cousin of the 300mm f/5.6 FL-F. Canon's well-known fluorite design. There were 300's in the Canon line before, but these were as much as a full stop faster—f/4. In an effort to include a compact tele lens for the F-1 camera, Canon engineers chose to keep the maximum aperture at f/5.6, making the diaphragm mechanism easier for the camera to activate. The result is a lens only 7 in. long (178mm) and 2 1/4 in. in diameter (70mm), except for the wider tripod-mounting ring. Its weight is a moderate 2 1/2 lb. (1 kg). A neat, self-contained sunshade extends about two additional in., which means it shades satisfactorily without cutting into the off-axis light beam.

On the optical bench, this lens shows extra care in manufacture of the elements. The central (on-axis) image is clean and very well centered. Slight flare at f/5.6 disappears at f/6.3 and the image quality is limited only by diffraction off the diaphragm leaves for the rest of its aperture range. The focus shift for the deep red is about 0.4mm, which is well within typical values for standard glass lenses. Off axis at 3.8°, the point image shows a bit of coma and astigmatism, but only in very small amounts. There is some lateral color measuring .025mm from red to green light. In almost all respects, the image quality of this lens is judged to be truly outstanding.

Indoor and outdoor pictures taken with color and black-and-white films bear out the very high image quality of this lens. Even though it measures less than 75 percent in overall length compared to its focal length (which shows how compact it really is), there is less than 2 percent distortion in the pictures—another indication of the quality and design incorporated into this lens.

Our field tests demonstrated the 300's ability as a hand-held tele. It balanced nicely on our Canon F-1 and focusing was smooth and facile, due in no small part to a grippably-knurled 1 1/4-in.-wide (44.5mm) surface on the focusing ring which takes the lens to its minimum distance in about 300°. Fit and finish of all controls are up to the usual high Canon standard and the traditional black finish is beautifully applied to them also.

The tripod-mounting ring is sturdy, with a generous 1 1/2 x 1 1/2-in. (38mm x 38mm) mounting surface. What's more, the ring can also be loosened and rotated for any camera orientation, and is fully removable for hand-held shooting—a small but very worthwhile feature we'd like to see more of.

The diaphragm ring has a special set-and-lock position marked with a small green circle, a locking button for fully-automatic diaphragm operation on the F-1 reflex, plus standard half-f/stop click-stopped detents for operation on older Canon SLR's. The subject distance is marked in feet (white numerals) and meters (orange numerals) on the focusing ring. There is the usual depth-of-field calibration and also a small red dot indicating the infrared focus position.

Our resolving power and contrast tests show that this lens produces crisp, sharp images, with the small lateral color holding the corner contrast and resolving power at a medium level. Except for the more advanced and expensive fluoride lenses, there is no better performing compact tele than this one. Its relatively close minimum focusing distance permits convenient head-and-shoulders portraiture. While its viewing image is understandably less bright than that provided by wider aperture lenses, the 300 snaps in and out of focus decisively on the Canon F-1's or FTb's focusing screen in average or better outdoor illumination. For really low light work, either clamp on the collar and set up a tripod, or get on the waiting list for Canon's amazing 300mm f/2.8, which allows you to use fast shutter speeds at dimmest light (see our report in the March, 1974 issue).

VIVITAR 35MM F/1.9 FITS MANY 35MM SLR'S

MANUFACTURER'S SPECIFICATIONS: 35mm f/1.9 Vivitar Auto lens in fixed mounts for Nikon, Canon, Minolta, Pentax, Konica and cameras with similar mounts. FEATURES: Apertures to f/16, focusing to 12 in. (0.3m), accepts 55mm screw-in accessories. PRICE: \$164.50.

While really fast wide-angle lenses have been showing up with increasing frequency on major camera makers' lens lists, the 35mm f/1.9 Vivitar is the first independently-produced optic of its speed and focal length to pass Modern Tests. An eight-element, six-group inverted telephoto design, it's still quite compact with a 2 1/2-in. maximum diameter at the 1/2-in.-wide, medium-knurled aperture ring and a weight of 12 oz. It's also only slightly longer than most normal f/2 lenses, extending 2 3/4 in. from the camera body at infinity, and is nicely finished in the traditional Vivitar satin black.

All scales on this lens are very legibly engraved in white-on-black, except for the green-on-black metric scale and the red-on-black normal focusing and infrared focusing indexes. Focusing to minimum distance is accomplished in a very smooth,

backlash-free 260°, and is aided considerably by an amply grippable 3/8-in.-wide focusing collar. We are also pleased to note that the Vivitar's front ring lists the 55mm screw-in filter size.

On camera, the 35 performed as well as the tabular results indicate. Precise critical focusing was considerably easier than with slower 35's due to the decreased depth of field provided by its f/1.9 aperture. We judged this particularly helpful in a lens of this focal length. The lens, incidentally, is click-stopped at all whole and half-stop intervals except between f/11 and f/16.

On the optical bench, this lens exhibited noticeable chromatic fringing on axis between f/1.9 and f/4—not surprising in a high-

Resolution Power				
35mm f/1.9 Vivitar No. 5005363 At 1:48 Magnification				
f/no.	Center Lines/mm	Corner Lines/mm		
1.9	Exc.	54	Good	30
2.8	Exc.	60	Exc.	43
4	V/Good	60	Exc.	43
5.6	Good	54	Exc.	48
8	V/Good	60	Exc.	54
11	Exc.	68	Exc.	54
16	V/Good	54	Exc.	43

Actual Focal Length: 36.0mm

Image Contrast				
35mm f/1.9 Vivitar No. 28300310				
f/no.	Center Percentage	Corner Percentage		
1.9	Low	33	Medium	27
2.8	Low	48	Low	27
4	Low	47	Low	36
5.6	Medium	66	High	57
8	Medium	64	Low	39
11	Medium	59	Medium	38
16	Low	53	Medium	37

speed wide angle—but the pronounced spherical flare visible wide open disappeared when it was stopped down only one-half stop. Lateral color was visible in average amounts beyond 80 percent off axis. Astigmatism was also reasonably well-controlled except in the extreme corners, and skew-ray flare, though quite visible at f/1.9, disappeared by f/2.8. We concluded that some of the color fringing visible with this lens stopped down was due to a moderate amount of optical decentering of the front element in our test sample.

Our test transparencies showed this lens to be a better performer than the optical bench observations alone might have indicated. Flare, while visible, was very low; out-of-focus images were not plagued with double-line patterns; and lateral color fringing was very slight for a fast wide-angle lens. Light falloff was surprisingly small for a 35mm f/1.9. Our Kodachrome test slides were very sharp and contrasty, but lateral color limited any marked improvement on stopping down. Astigmatism,

however, was very low, and coma flare, visible at wider apertures, did improve considerably at f/8.

All in all, Vivitar's 35mm f/1.9 compares very favorably with most of the costlier high-speed wide angles offered by leading camera manufacturers. Producing good quality lenses of this type at a reasonable price is no mean accomplishment and the Vivitar's manufacturer has succeeded quite well in doing so.

SCIENTIFIC TAKUMARS FOR IR, UV WORK

MANUFACTURER'S SPECIFICATIONS: 85mm f/4.5 Ultra-Achromatic Takumar for Pentax and other cameras with similar screw-thread mount. FEATURES: Apertures to f/22 with click halfstops, auto diaphragm, focusing to 2 ft., accepts 49mm screw-in filters. PRICE: \$1400 with case and special filters. 300mm f/5.6 Asahi Ultra-Achromatic Takumar for Pentax and other cameras with similar screw-thread mount. FEATURES: Auto diaphragm, apertures to f/22, focusing to 16 ft., built-in sunshade, accepts 58mm screw-in filters. PRICE: \$1600 with case.

Why \$1400 for an 85mm f/4.5 in a case with a few filters, and \$1600 for a 300mm f/5.6 with a case but without filters? Has Asahi Optical Co. suddenly flipped its corporate lid? Not really. This pair of lenses was specifically designed for extremely good color correction over the infrared and ultraviolet range in addition to the visible spectrum. This permits specialized scientific photography in such diverse fields as police work, art history research, anthropological and astronomical photography—in short, any application requiring special films and filtration. Nevertheless, both these optics will fit any Pentax-thread SLR and can be used for extreme high quality, general photography as well.

The 85mm f/4.5 Ultra-Achromatic Takumar is one lens designed to cover this wide a spectral range and is necessarily made of materials other than glass. The 85mm Takumar uses synthetic calcium fluoride and fused silica, both known to be transparent in the ultraviolet down to the limit of atmospheric transmission near 2000 Angstroms. However, the color (and other aberration) corrections are difficult, hence this lens is limited to an f/4.5 maximum aperture. The design features no less than three fluoride elements, plus two silica elements.

To aid the lens user, Asahi furnishes certain special filters for the UV and IR, as well as some standard glass types.

On the optical bench, this lens can be examined in visible light

modern tests

only. The visual images were extremely sharp, being close to the theoretical optimum at all apertures. Since the lens materials have relatively low indices of refraction, anti-reflection coatings were not put on the surfaces. However, the measured lens transmission was almost 80 percent for most of the UV, visible, and IR spectral ranges. This amounts to less than a halfstop transmission loss. Off-axis images were also of very high sharpness, with but a little coma and astigmatism appearing. When stopped down to f/8, the off-axis images also approached their theoretical limits. Evaluation in the UV and IR was left to the photographic tests on film.

This nicely-finished satin black lens is just a bit larger than a Pentax normal lens. It is 2.5 in. long and weighs slightly less than 13 oz. Although the filters are 49mm screw-in types, the special filters provided with this lens to isolate the UV or IR are actually only 27mm in diameter. But, this is enough to cover the lens aperture. The 85 focuses very smoothly to its minimum distance in an approximately 240° turn of its 1-in.-wide knurled focusing collar.

Outdoor and indoor pictures, some taken with a mercury arc lamp for UV illumination, were all very sharp. The lens is not fitted for the Pentax ES, but it can be used with stop-down metering and automatic shutter speeds. Since some of the lens elements are made of fluoride, it is necessary to avoid sudden temperature changes. This lens, with proper light sources, can give the photographer spectrum coverage not available with any other stock lens. The slow aperture is the only noticeable shortcoming.

Color-corrected lenses covering a wide spectrum have been available from some of the leading lens manufacturers, but the 300mm f/5.6 Takumar is one of the few in its focal length range with an auto diaphragm. It features the use of synthetic calcium fluoride, a crystal material often used in high performance microscope optics. Its five-element arrangement includes two fluoride lenses.

On the optical bench, this lens showed virtually no color fringing or lateral color—the enemy of sharpness off axis. A slight flare when wide open almost passed unnoticed and disappeared completely at f/6.3, which is one of the intermediate click-stopped apertures available. A small focus shift was noticed for the very deep red, but was difficult to measure visually. Infrared photographic testing showed this (see below). Since this lens focuses to 16 ft., which represents

an image magnification of 1:15, it was also tested for close-up image quality. The optical image quality is virtually the same for close-ups, with only a small increase in the wide-open flare. Again, this disappeared at f/6.3.

The nicely-finished satin black lens is only 9 in. long and weighs 25 oz. The built-in sunshade extends another 2 in. or so. In spite of this compactness, the lens has a tripod-mounting flange which fits into a knurled ring on the lens barrel, resulting in more-than-adequate tightness when fully clamped. The large clamp knob is easy to grasp and turn. The lens can be oriented through a full rotation (360°) and focuses smoothly to its minimum distance in an approximately 280° turn of its heavily-knurled 2¼-in.-wide focusing collar.

Because of its relatively high price and special applications, the 300mm lens may have only limited use. All fluoride lenses do require a little extra care when transported from a hot to a cold environment, or vice versa.

The 300 is not fitted with the proper keying lug for full-aperture metering with the Pentax ES. However, it can be put on that camera and metered using the stop-down method (with fully-automatic shutter speeds on the Pentax ES and ES II).

Photographically, this lens produced very sharp pictures. However, the infrared focus was shifted a little, landing at the 300-meter mark for best sharpness at infinity. Altogether, this lens gives very high optical and photographic performance. You'll have to choose your filters with care to avoid disturbing this quality. When the infrared resolving power test photographs were taken, due consideration was given to the fact that infrared film is grainy and reduces the observed values.

Although these lenses are basically made for scientific applications or to be used for special effects, they're also usable in normal applications.—THE END

Image Contrast

85mm f/4.5 Super-Achromatic Takumar No. 2472002				
f/no.	Center Percentage		Corner Percentage	
4.5	High	65	High	46
5.6	High	70	High	50
8	High	75	High	52
11	High	66	Med.	48
16	Med.	62	Med.	47
22	Med.	61	Med.	46

300mm f/5.6 Super-Achromatic Takumar No. 2506147				
f/no.	Center Percentage		Corner Percentage	
5.6	Med.	50	High	38
8	High	63	High	48
11	Med.	60	Low	40
16	High	60	Low	40
22	High	60	Low	40

EDITOR'S NOTE: Beginning with this issue, MODERN PHOTOGRAPHY will provide test results with metric figures in parentheses, along with the usual inch-pound figures. In about a year, when the metric system becomes standard in the U.S., we will reverse the system, putting inch-pound system figures in parentheses, thereby making the switchover as painless as possible. The few reports that will appear in the next few months lacking metric equivalents are items which are already in printed form.

Conversion factors for the new and conventional systems are as follows:

1 in.....	25.4mm or 2.54 cm
1 ft.	304.8mm or 30.48cm
1 yd.....	914.4cm or 0.9144m
1 m.....	3 ft. 3⅜ in.
1 gal.....	3.78 l
1 qt.	0.946 l
1 pt.	0.473 l or 473 ml
1 fluid oz.....	29.6 ml
1 liter	33.8 fluid oz.
	1.06 qt.
	0.264 gal.
1 grain	0.0648 g.
1 oz.....	28.4 g
1 troy oz.....	31.1 g
1 lb.....	0.454 kg
1 g.....	15.4 grains
1 kg.....	2.20 lb.

Resolution Power

85mm f/4.5 Super-Achromatic Takumar No. 2472002 At 1:50 Magnification				
f/no.	Center Lines/mm		Corner Lines/mm	
4.5	Exc.	64	Exc.	56
5.6	Exc.	70	Exc.	56
8	Exc.	70	Exc.	64
11	Exc.	64	Exc.	64
16	Exc.	56	Exc.	56
22	Exc.	56	Exc.	56

Actual Focal Length: 87.2mm

85mm f/4.5 No. 2472002 At 1:50 Magnification				
f/no.	Center Percentage		Corner Percentage	
4.5	Good	40	Accept.	28
5.6	Good	45	Good	32
8	Good	45	Good	36
11	Good	45	V/Good	36
16	Good	45	V/Good	40
22	Good	45	V/Good	40

Infrared

85mm f/4.5 No. 2472002 At 1:50 Magnification				
f/no.	Center Percentage		Corner Percentage	
4.5	Exc.	56	Exc.	36
5.6	Exc.	56	Exc.	40
8	Exc.	64	V/Good	40
11	V/Good	56	Exc.	40
16	V/Good	50	Exc.	44
22	V/Good	50	Exc.	44

Ultraviolet

300mm f/5.6 Super-Achromatic Takumar No. 2506147 At 1:50 Magnification				
f/no.	Center Lines/mm		Edge Lines/mm	
5.6	Exc.	56	Exc.	56
8	Exc.	56	Exc.	56
11	Exc.	64	Exc.	56
16	Exc.	56	Exc.	56
22	Exc.	50	Exc.	50

Actual Focal Length: 303.5mm

300mm f/5.6 No. 2506147 At 1:50 Magnification				
f/no.	Center Percentage		Corner Percentage	
5.6	V/Good	40	Good	28
8	Accept.	40	Accept.	28
11	Good	45	Good	33
16	Good	45	V/Good	36
22	V/Good	40	V/Good	36

Infrared

Here are Modern Tests' standard tables for resolution power of telephoto lenses. These, together with the tables already published in our previous issues and the tables which will be published in the future, are part of our total revised standard.

RESOLUTION POWER

35MM CAMERA LENSES 50MM TO 105MM						
Apertures	Center		Corner		Rating	Rating
	Lines/mm	Rating	Lines/mm	Rating		
Maximum aperture	12.5	Accept	76.78	Accept	Good	Good
	18-42	Good	79.31	Good	Good	Good
	43-47	Very Good	77.34	Very Good	Very Good	Very Good
Next largest aperture	34-49	Accept	78.10	Accept	Good	Good
	41-46	Good	71.57	Good	Good	Good
	47-51	V/Good	74.36	V/Good	V/Good	V/Good
Medium aperture	57+	Exc.	77+	Exc.	Exc.	Exc.
	36-47	Accept	76.33	Accept	Good	Good
	43-49	Good	74.37	Good	Good	Good
f/11 to f/22	50-55	V/Good	78.41	V/Good	V/Good	V/Good
	56+	Exc.	42+	Exc.	Exc.	Exc.
	36-41	Accept	77.34	Accept	Good	Good
	47-47	Good	75.37	Good	Good	Good
	48-51	V/Good	76.40	V/Good	V/Good	V/Good
	54+	Exc.	41+	Exc.	Exc.	Exc.

35MM CAMERA LENSES 105MM TO 250MM						
Apertures	Center		Corner		Rating	Rating
	Lines/mm	Rating	Lines/mm	Rating		
Maximum aperture	28-35	Accept	75.78	Accept	Good	Good
	46-41	Good	79.31	Good	Good	Good
	42-47	V/Good	77.34	V/Good	V/Good	V/Good
Next largest aperture	38-45	Accept	76.28	Accept	Good	Good
	46-41	Good	79.31	Good	Good	Good
	47-47	V/Good	77.34	V/Good	V/Good	V/Good
Medium aperture	58+	Exc.	40+	Exc.	Exc.	Exc.
	17-38	Accept	78.31	Accept	Good	Good
	39-45	Good	77.35	Good	Good	Good
f/11 to f/22	46-53	V/Good	76.39	V/Good	V/Good	V/Good
	58+	Exc.	40+	Exc.	Exc.	Exc.
	36-35	Accept	76.10	Accept	Good	Good
	46-42	Good	77.34	Good	Good	Good
	43-49	V/Good	75.39	V/Good	V/Good	V/Good
	50+	Exc.	40+	Exc.	Exc.	Exc.

35MM CAMERA LENSES 250MM TO 700MM						
Apertures	Center		Corner		Rating	Rating
	Lines/mm	Rating	Lines/mm	Rating		
Maximum aperture	10-24	Accept	74.36	Accept	Good	Good
	15-39	Good	77.39	Good	Good	Good
	40-43	V/Good	76.37	V/Good	V/Good	V/Good
Medium aperture	44+	Exc.	33+	Exc.	Exc.	Exc.
	36-40	Accept	75.31	Accept	Good	Good
	41-45	Good	77.35	Good	Good	Good
f/16 to smallest aperture	46-49	V/Good	76.39	V/Good	V/Good	V/Good
	50+	Exc.	40+	Exc.	Exc.	Exc.
	40-34	Accept	76.35	Accept	Good	Good
	45-39	Good	77.35	Good	Good	Good
	40-41	V/Good	74.37	V/Good	V/Good	V/Good
	44+	Exc.	33+	Exc.	Exc.	Exc.