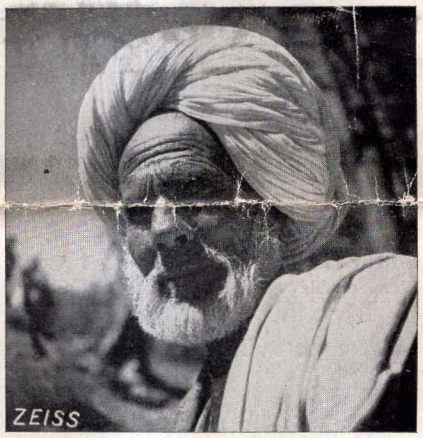
ZEISS

PROXARS AND DISTARS

added to a Tessar form a Set of convertible Lenses



Taken with a hand camera with single extension by slipping a Proxar over the Tessar

(Chilasman taken near the Nanga Parbat)

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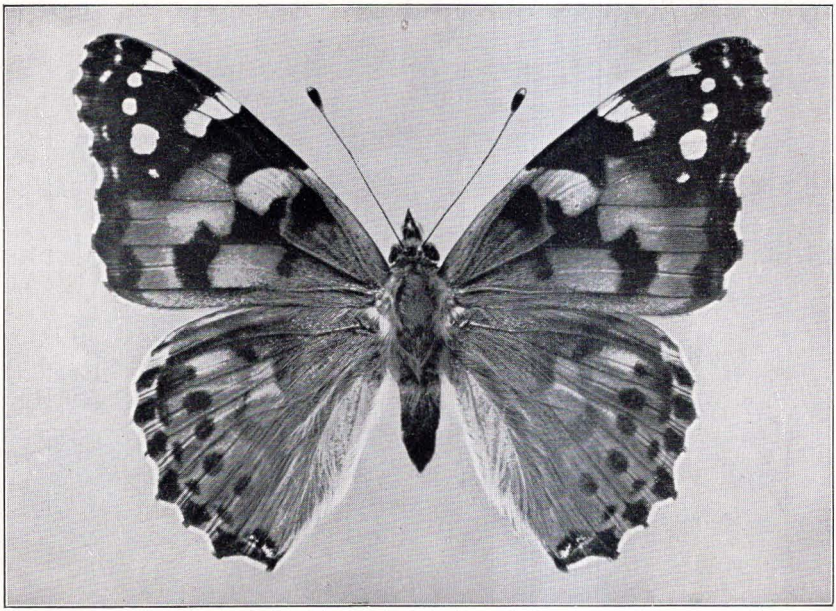

Unmagnified reproduction of a photograph taken with a camera pointed vertically downward on a 12×9 cm. plate with Tessar F/4.5, f = 13.5 cm. supplemented by a Proxar 2×37, the focal length being thereby shortened to f_c = 11 cm. Tessar stopped down to F/12.5; resulting rel. aperture F/10. Distance 17 cm.; double camera extension 30 cm. **Red Admiral,** natural width 52 mm., taken therefore $1\frac{3}{4}$ actual size.

Tessars combined with Proxars and Distars to form Convertible Sets of wide range

PROXARS are lenses of small converging power (see table on p. 8). When attached in front of the camera lens, they shorten the focal length. Thus, Tessar F/4.5 f = 13.5 cm. has its focal length reduced to about 13 cm., 12,5 cm. 12 cm., or 11.5 cm. according to the converging effect of the Proxar selected. *The range of uses of the Tessar is thereby widely extended in a twofold direction.* viz:

For obtaining large figures of near objects: Hand cameras with a barely sufficient extension and fitted with a standard camera lens, such as a Tessar, cannot, as a rule, be focused upon objects nearer than two yards, or in the case of small cameras nearer than 1½ yards, or possibly one yard, whether this be accomplished by bodily displacing the lens carrier on the baseboard or with the focusing lens mount of collapsible cameras. By attaching a Proxar to the front of the Tessar a camera with an ordinary focusing range of two yards can be made to take objects within distances ranging from 2

up to 1 yard, 1 to $\frac{2}{3}$, $\frac{2}{3}$ to $\frac{1}{2}$ and $\frac{1}{2}$ to $\frac{1}{3}$ yard, according as a weaker or a stronger Proxar is attached.

In the case of hand cameras with double extension, with which it is possible, with the Tessar alone, to approach the object sufficiently closely to enable full size photographs to be obtained, the use of a Proxar enables the object to be approached still closer, so that with the most powerful Proxar photographs up to almost twice actual size can be obtained.

For taking wide-angle photographs at greater distances, e. g. from 2 yards to infinity: whether in a room, in the street, in the open country or in the mountains the amateur ultimately finds himself in a position where, either to the right or to the left, above or below, he would like to include in his picture something more than the Tessar will embrace on the image field of the camera from the selected and maybe the only possible standpoint. A Proxar, slipped over the Tessar, will fulfill this desire by shortening the focal length of the Tessar and so making it possible to include a wider view on the same size plate. The higher the power of the Proxar chosen, the wider the field of view, as is shown by the figures on page 4 and below on this page. Further particulars of Proxars will be found on page 8 and on the card supplied with each lens (see the top of page 8).

Fig. 1, taken with Tessar F/4.5 f = 15 cm. + Proxar 2×42 from the same standpoint as Fig. 2 on page 4 and Fig. 3 on page 5

Fig. 2,
taken with Tessar F/4.5 f = 15 cm. from the same standpoint as Fig. 1 on page 3 and Fig. 3 on page 5

The Rococo castle of Dornburg

The Distars are single-lens components of small *diverging* power (see Table p. 8). When placed in front of the camera lens they increase its focal length with corresponding increase of the camera extension. They thus add to the scope of camera lenses, especially those of an unsymmetrical type, since these, from their very nature, are only adapted for use on cameras with single extension in that their components are not corrected independently for use as long-focus lenses. **In conjunction with the Tessars the Distars form wide-range sets of convertible lenses.** The lens curvatures of the Distars, when these are used in combination with an anastigmatic lens, notably with a Tessar, ensure a uniformly good image within a large field of view, and a moderate degree of stopping down suffices in order to obtain with a Tessar+Distar combination the requisite quality of sharpness for portraits, street scenes, landscapes, architecture, etc. — Over separate components of

symmetrical or hemisymmetrical objectives the Tessar+Distar combination has *the following advantages:*

Greater freedom in the choice of focal lengths: Symmetrical objectives furnish only *one* long focus, the *two* component lenses being alike. In the case of hemisymmetrical objectives, the front and back components give respectively two different long foci. By means of Distars it is possible to obtain with a Tessar within certain limits a choice of considerably more long foci.

Less distortion at the edge of the image field: All component lenses of symmetrical and hemisymmetrical objectives are subject, as every user of these knows, to an appreciable amount of distortion, which becomes very disturbing when buildings are being photographed. This distortion is "barrel-shaped" when the lenses are behind the stop and "cushion-shaped" when they are in

Fig. 3, taken with Tessar F/4.5 f = 15 cm. + Distar 3×42 from the same standpoint as Fig. 1 on page 3 and Fig. 2 on page 4

front. When the focus is lengthened by attaching a Distar to the front of a Tessar the barrel-shaped distortion is on the contrary so slight as to be permissible even for fairly wide-angle pictures of buildings.

Shorter camera extension: The back lens of symmetrical and hemisymmetrical objectives focused for distance requires the camera extension to be fully one-tenth longer than the focal length f, whereas with the "Distar+Tessar" combination it is only roughly equal to f. For example, with a focus 25.5 cm. the camera extension for the combination is cm., whereas for the required12.5 equivalent back lens it is 29 cm. The result is that the camera becomes available for taking nearer objects than would be practicable under otherwise similar conditions (see Table Distars on p. 8).

Greater convenience: In order to obtain a longer focus a Distar is simply slipped over the front mount of the Tessar after the manner of a yellow filter. To realize the convenience of this one need only recall the operations which have to be performed in order to transfer the front lens component of a hemisymmetrical objective to the rear of the shutter diaphragm of a roll-film camera with double extension.

Possibility of expansion: An existing Tessar may at any time be supplemented by one or several Distars to form a set of convertible lenses.

The illustrations on pp. 3, 4 and 5 show the extent to which the scope of a Tessar may be extended with the aid of a few inexpensive Proxars and Distars, which may be added at any time. From the particulars respecting the camera extensions given in the lists on p. 8 the following inferences are to be drawn:

With *collapsible cameras having a fixed extension* the Distars may scarcely ever be used, whereas Proxars can be used for close-up work, but not for wide-angle photographs at distances exceeding about two yards, because these cameras do not allow even a comparatively short extension, since their focusing range lies only in the inward and outward movement of the lens mount.

In the case of *cameras with single baseboard extension* the Distars may be used within a restricted range only, while fullest use can generally be made of the Proxars in the two ways explained above.

Cameras with double extension admit of Proxars and Distars being used throughout their entire range of application.

The **Distars** and **Proxars** are made in the sizes specified below (vertical column 1). They are suitable for use not only with Tessars but also with other photographic lenses. When ordering Distars and Proxars for use with an existing lens the photographic dealer should be furnished with the whole of the inscription engraved on the lens mount, the outside diameter of its front lens mount, and the range of the camera extension measured from the lens stop to the ground glass focusing screen.

The following tables show **approximately the focal length** fc cm. which results from the combination of a Distar (or Proxar) of a power D with a

Distars and Proxars

For Objectives having an outside diameter of mm.	Distar Designation †) D[1])	Tube	D[1])	Size[2])	Codeword	Proxar Designation †) D[1])	Tube	D[1]	Size[2])	Codeword
mm.	—		1×21		*Ybfeb*	—		1×21		*Ybjat*
21.0	—		2×21		*Ybfhe*	—		2×21		*Ybjbu*
24.0	—		1×24		*Ybfif*	—		1×24		*Ybjex*
	—		2×24		*Ybfli*	—		2×24		*Ybjfy*
27.0	2/C_o		2×27		*Ybfol*	0.5/C_o		0.5×27		*Ybjha*
	3/C_o		3×27		*Ybfso*	1/C_o		1×27		*Ybjle*
	3.5/C_o		3.5×27		*Ybfur*	1.5/C_o		1.5×27		*Ybjmf*
						2/C_o		2×27		*Ybjng*
28.5	2/C_o*		2×28.5		*Ybfxu*	0.5/C_o*		0.5×28.5		*Ybjoh*
	3/C_o*		3×28.5		*Ybfyv*	1/C_o*		1×28.5		*Ybjpi*
	3.5/C_o*		3.5×28.5		*Ybgaw*	1.5/C_o*		1.5×28.5		*Ybjum*
						2/C_o*		2×28.5		*Ybjwo*
30.0	2.5/C_{oa}		2.5×30		*Ybgea*	0.5/C_{oa}		0.5×30		*Ybjyr*
	3.5/C_{oa}		3.5×30		*Ybgie*	1/C_{oa}		1×30		*Ybkas*
	4.5/C_{oa}		4.5×30		*Ybgmi*	1.5/C_{oa}		1.5×30		*Ybkcu*
						2/C_{oa}		2×30		*Ybkew*
32.0	1/II		1×32		*Ybgog*	0.5/II		0.5×32		*Ybkgy*
	1.5/II		1.5×32		*Ybgto*	—		0.67×32		*Ybkia*
	2/II		2×32		*Ybgup*	1/II		1×32		*Ybkme*
	2.5/II		2.5×32		*Ybgyu*	—		1.25×32		*Ybkog*
	3/II		3×32		*Ybhav*	1.5/II		1.5×32		*Ybkri*
	3.5/II		3.5×32		*Ybhdy*	2/II		2×32		*Ybkul*
	4/II		4×32		*Ybhex*					
37.0	1.5/III		1.5×37		*Ybhja*	0.5/III		0.5×37		*Ybkxo*
	2/III		2×37		*Ybhid*	—		0.67×37		*Ybkyp*
	2.5/III		2.5×37		*Ybhje*	1/III		1×37		*Yblar*
	3/III		3×37		*Ybhni*	—		1.25×37		*Ybldu*
	3.5/III		3.5×37		*Ybhoj*	1.5/III		1.5×37		*Yblev*
						2/III		2×37		*Yblhy*
42.0	1.5/IV		1.5×42		*Ybhuo*					
	2/IV		2×42		*Ybhyt*	0.5/IV		0.5×42		*Ybliz*
	2.5/IV		2.5×42		*Ybhzu*	1/IV		1×42		*Yblja*
	3/IV		3×42		*Ybiau*	1.5/IV		1.5×42		*Yblne*
	3.5/IV		3.5×42		*Ybifz*	2/IV		2×42		*Yblof*
51.0	1/VI		1×51		*Ybiga*					
	1.5/VI		1.5×51		*Ybihb*	0.5/VI		0.5×51		*Yblsi*
	2/VI		2×51		*Ybiic*	1/VI		1×51		*Ybluk*
	2.5/VI		2.5×51		*Ybike*	1.5/VI		1.5×51		*Yblyo*
	3/VI		3×51		*Ybilf*					
57.0	1/VII		1×57		*Ybimg*					
	1.5/VII		1.5×57		*Ybioi*	0.5/VII		0.5×57		*Ybmap*
	2/VII		2×57		*Ybirk*	1/VII		1×57		*Ybmeu*
	2.5/VII		2.5×57		*Ybisl*					
60.0	—		1×60		*Ybiun*					
	—		1.5×60		*Ybivo*	—		0.5×60		*Ybmjz*
	—		2×60		*Ybiys*	—		1×60		*Ybmoe*
	—		2.5×60		*Ybizt*					

†) Both designations relate to the same size and for the present will be given together.
[1]) D = power of the lens in dioptres.
[2]) The number represents the outside diameter of the lens mount on to which the attachment lens fits.

lens of a focal length of f cm. They also state the camera extension K which must be available in order that it may be possible to focus the objective +Distar (or Proxar) combination to the distances stated in the table. Further useful particulars respecting the changes in the scale of the picture, in the relative aperture and the exposure times effected by the Distars and Proxars are given in the small cards supplied with the Distars and Proxars and will be sent to enquirers on application. These cards are small enough to be accommodated, as a rule, in the cases provided with the Distars and Proxars.

DISTARS

D →	1			1.5			2			2.5			3			3.5			4.5		
focused on →		K* ∞	K* 2 m.		K* ∞	K* 2 m.		K* ∞	K* 2 m.		K* ∞	K* 2 m.		K* ∞	K* 2 m.		K* ∞	K* 2 m.		K* ∞	K* 2 m.
f	f_c			f_c			f_c			f_c			f_c			f_c			f_c		
cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
9	—	—	—	—	—	—	10	10	10.5	—	—	—	11	11	12	12	12	12.5	—	—	—
10.5	—	—	—	12.5	12	13	13	13	14	14	14	15	15	15	16	16	16	17.5	—	—	—
12	—	—	—	14	13.5	14.5	15	14.5	15.5	15.5	15.5	17	17	17	18.5	18.5	18·5	20.5	21.5	22	25
13.5	—	—	—	17.5	17	19	18.5	18.5	20.5	20.5	20.5	23	22.5	23	25.5	25	25.5	29	—	—	—
15	—	—	—	19	19	21	20.5	20.5	23	23.5	23.5	26.5	26	26	30	29	30	35	—	—	—
16.5	20	20	22	22	22	24.5	24.5	24.5	28	28	28.5	33	32	32.5	38.5	—	—	—	—	—	—
18	22.5	22	25	25	25	28.5	28	28	32	32	32.5	38.5	37.5	38.5	47	—	—	—	—	—	—
21	26	26	30	30	30	35.5	34	35.5	42.5	42	43	54	—	—	—	—	—	—	—	—	—

PROXARS

D →	0.5								1							
focused on →	K* ∞	K* 2 m.	K* 1 m.	K* 50 cm.	K* 40 cm.	K* 30 cm.	K* 20 cm.		K* ∞	K* 2 m.	K* 1 m.	K* 50 cm.	K* 40 cm.	K* 30 cm.	K* 20 cm.	
f	f_c								f_c							
cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
9	8.25	7.8	8.3	8.5	9.5	10	11	14	8	7.5	7.8	8.3	9	9.5	10.5	13
10.5	10.25	9.5	10.5	11	12.5	13.5	15	20.5	10	9	9.5	10.5	11.5	12.5	14	18.5
12	11	10.5	11	12	13.5	15	17	24.5	10.5	10	10.5	11	13	13.5	15.5	22
13.5	13	12.5	13.5	14.5	17	19	22.5	—	12.5	11.5	12.5	13.5	16	17.5	20.5	32
15	14.5	13.5	15	16	19.5	21.5	26.5	—	13.5	12.5	13.5	14.5	17.5	19.5	23.5	—
16.5	15.5	15	16.5	18	22.5	25.5	33	—	14.5	14.5	15	16.5	20	22.5	28	—
18	17	16.5	18	20	25.5	29	38	—	16	15	16.5	18	22.5	25.5	33	—
21	19.5	18.5	20.5	23	30.5	36.5	54	—	18	16.5	18.5	20.5	26.5	31	42.5	—

D →	1·5								2							
focused on →	K* ∞	K* 2 m.	K* 1 m.	K* 50 cm.	K* 40 cm.	K* 30 cm.	K* 20 cm.		K* ∞	K* 2 m.	K* 1 m.	K* 50 cm.	K* 40 cm.	K* 30 cm.	K* 20 cm.	
f	f_c								f_c							
cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.
9	7.75	7.3	7.5	7.8	8.5	9	10	12.3	7.5	7	7.3	7.5	8.3	8.8	9.5	11.5
10.5	9.5	8.5	9	9.5	11	11.5	13	17	9	8.5	9	9.5	10.5	11	12.5	16
12	10	9.5	10	10.5	12	13	14.5	20	9.5	9	9.5	10	11.5	12	13.5	18
13.5	12	11	11.5	12.5	14.5	16	18.5	28	11	10.5	11	12	13.5	14.5	17	24.5
15	12.5	11.5	12.5	13.5	16	17.5	20.5	32.5	12	11	11.5	12.5	14.5	16	18.5	28.5
16.5	14	13	14	15	18	20	24.5	—	13	12	13	14	17	18.5	22.5	—
18	14.5	14	15	16.5	20	22.5	28	—	13.5	13	13.5	15	18	19.5	24	—
21	16	15	16.5	18.5	23	26.5	34.5	—	15	14	15	17	20.5	24	29.5	—

*) Exact focusing is effected on the ground glass focusing screen with the lens set to its working aperture.

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