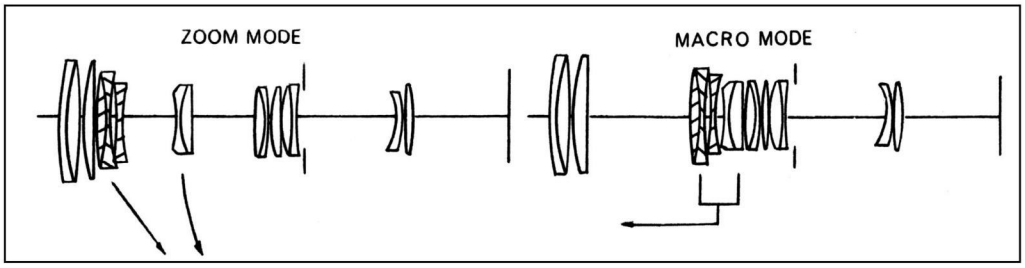
amateur photographer

TEST REPORT



How the central groups of elements are drawn together when operating in the macro mode. The rear corrective group remains stationary.

Vivitar auto zoom

series I 70-210mm f/3.5 auto zoom lens with macro focussing

BY RONALD SPILLMAN

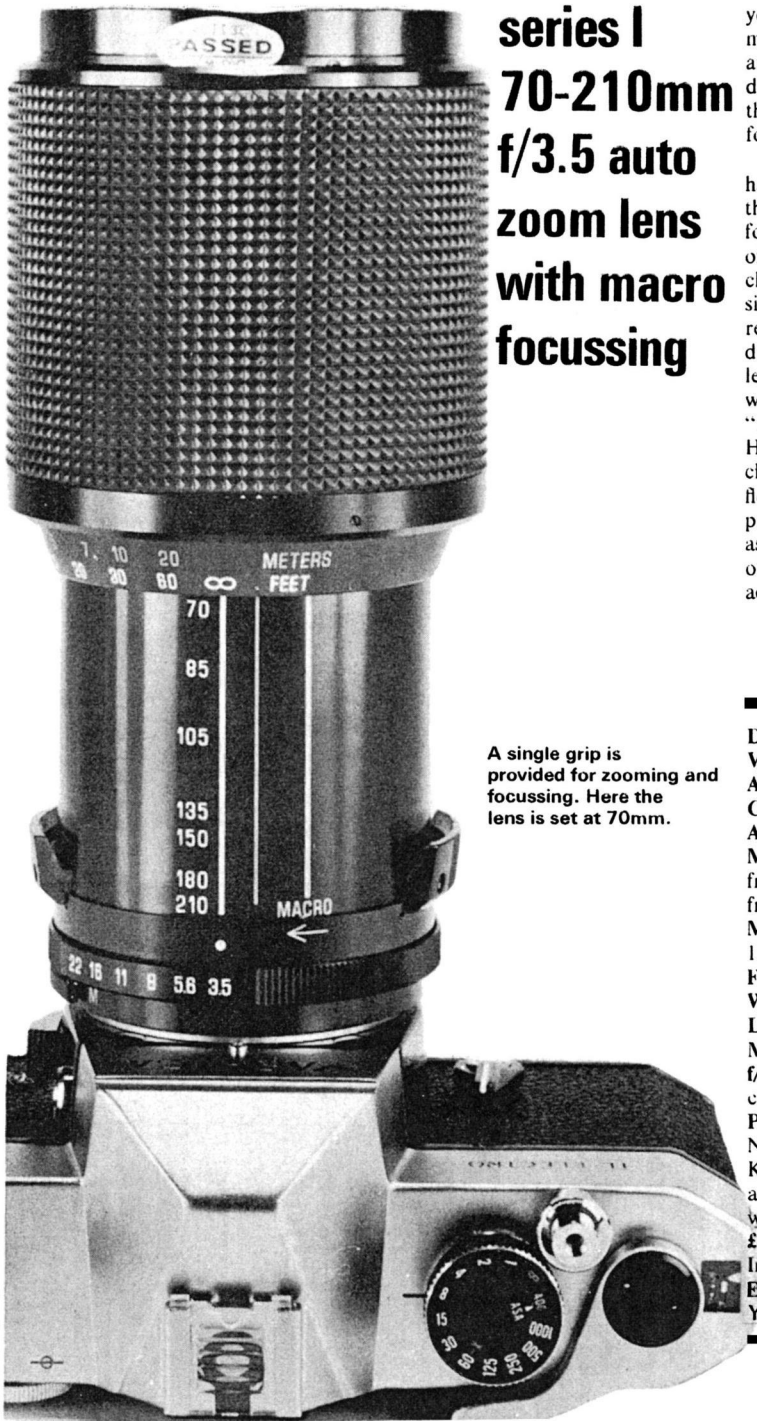
For the past few weeks we have been testing the first of the new Series I Vivitars to arrive in this country. Most SLR users are aware that Series I lenses have for the last year been hailed as a new breed of lenses with superior optical design and construction. They will also know that the Series I lenses owe their beginning to optical design techniques instigated by the US space programme and the US Defence Department, and were made possible by employing very large computers arranged in series.

But the question uppermost in the mind of the prospective user will be, "Never mind the background, how's the quality?" We can state right away that Vivitar's claims are fully justified. If the remaining lenses in the series (135mm f/2.3 and 200mm f/3 auto telephotos) are as good as the 70-210mm zoom, they will be very good indeed.

OPTICAL CONSTRUCTION

As can be seen by the diagram, the lens has 15 elements arranged in 10 groups. There is nothing remarkable about this; as high quality zoom lenses of similar focal length with only 13 elements have been available for some time. Also, whereas a few of the more expensive zooms have multi-coating, the Series I is conventionally coated with single layers of amber and magenta. Thus, one must look elsewhere for the causes of the Vivitar's undoubtedly high performance, bearing in mind that lenses for 35mm cameras have traditionally been designed to produce optimum results when photographing objects at some distance from the camera. Since it is known that the degree of aberration becomes greater as the lens approaches close focussing, the improvements in optical design made possible by the latest computer programmes have emphasized the poor image quality at close distances. Many manufacturers have approached this problem by producing general purpose lenses that function optimally at Infinity, and separate macro lenses for close-up photography. With either construction, performance suffers at the intermediate distances. In recent years photographers have become more critical in terms of resolution and contrast and have long demanded an optical construction that would give optimum performance at all distances.

For some years designers have had methods available that would theoretically provide high performance at all focus settings, one of the more practical being to change the airspace between a single element or group from the rest of the lens as the focus distance was changed. Some existing lenses are built on this principle, which is usually referred to as a "floating element" construction. However, this slight mechanical change in the position of the floating element has been found practical only in wide-angle lenses as the more widely spaced elements of long focal length lenses are not adaptable to such modification.



A single grip is provided for zooming and focussing. Here the lens is set at 70mm.

DATA PANEL

Vivitar Series I 70-210mm f/3.5 AUTO ZOOM with macro focussing

Construction: 15 element, 10 groups

Angle of view: 11-32 degrees

Minimum focus distance: Normal: from focal plane — 6ft 6½in. Macro: from focal plane — 11½in.

Maximum magnification in Macro: 1:2.2

Filter size: 62mm

Weight: 29oz

Length: 6in

Maximum diameter: 3in

f/number range: f/3.5 — f/22 (EE coupled lenses to f/16 only)

Price: for Pentax, £205.50; for Nikon, Canon FD, Minolta and Konica Autoreflex T, £221.50. Front and back caps included. Zipped case with shoulder strap, Vivitar Type D, £4.54.

Importers: David Williams (Cine Equipment) Ltd, 5-9 Glasshouse Yard, London EC1.

The lens fits the hands well and has a good point of balance.

The approach of the Vivitar designers has been to offset quality deterioration as the lens changes its position relative to the film, by introducing a stationary rear compensating lens that corrects the abberations introduced as the lens moves away from the film. At the same time this design reduces the length of travel required for a given focussing distance and permits closer focussing with improved mechanical reliability. It is said that the Vivitar designers spent three years and many thousands of computer runs to develop the exact shape of this rear compensating lens, which is used on all the Series I long lenses including the zoom.

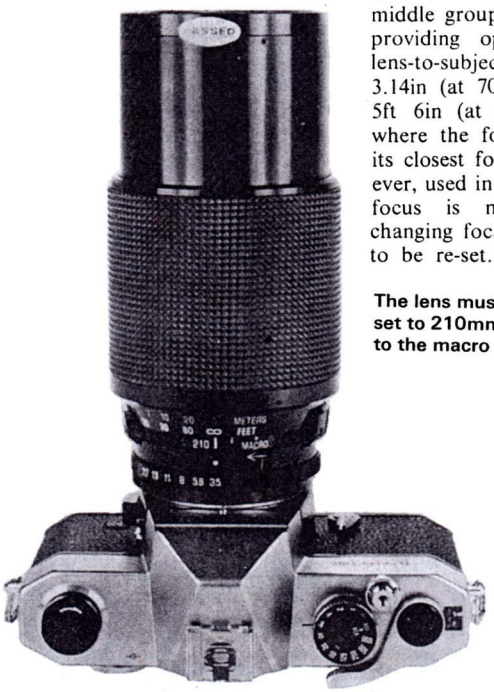
BARREL CONSTRUCTION

The zoom action is rectilinear with a single control operating both the zooming and focussing movements. In the forward position one has the shortest focal length of 70mm. Pulling back on the grip, a movement which can be achieved in as short a time as $\frac{1}{2}$sec, brings the lens to the maximum focal length of 210mm. Rotation of the grip is for focussing. The central barrel is $2\frac{3}{8}$in diameter and is engraved with three index lines, a white one giving focal lengths of 70, 85, 105, 135, 150, 180 and 210mm. The red line to the right of this is the offset mark for infrared photography, while the yellow line at the right is the index when the lens is used in the macro mode.

The grip itself is $3\frac{1}{16}$in diameter and has a studded vinyl surface $2\frac{1}{4}$in long. It fits the hand well, giving a steady grip and a feeling of security. The front part of the barrel over which the grip slides has a diameter of $2\frac{3}{4}$in, dictated by the size of the front three elements.

MACRO MODE

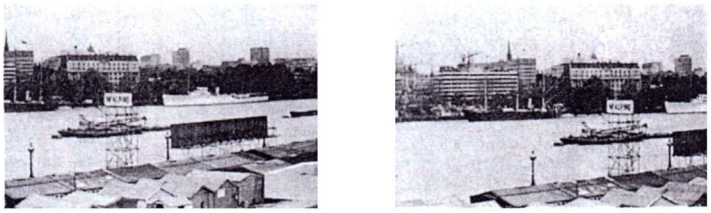
At the rear of the barrel, just forward of the click-stopped aperture ring, is the macro ring. In order to switch from the normal to the macro mode it is first necessary to set the lens on Infinity at its maximum focal length of 210mm. One then presses the white catch on the left hand of two projecting barrel lugs, after which the barrel can be rotated in the direction of the arrow until the macro line clicks into place by the red index dot. This has the effect of moving the middle groups of the lens together providing optimum sharpness at lens-to-subject distances between 3.14in (at 70mm focal length) and 5ft 6in (at 210mm focal length), where the focussing ring is set at its closest focussing distance. However, used in the macro mode sharp focus is not maintained when changing focal length, so focus has to be re-set. With the ring set at



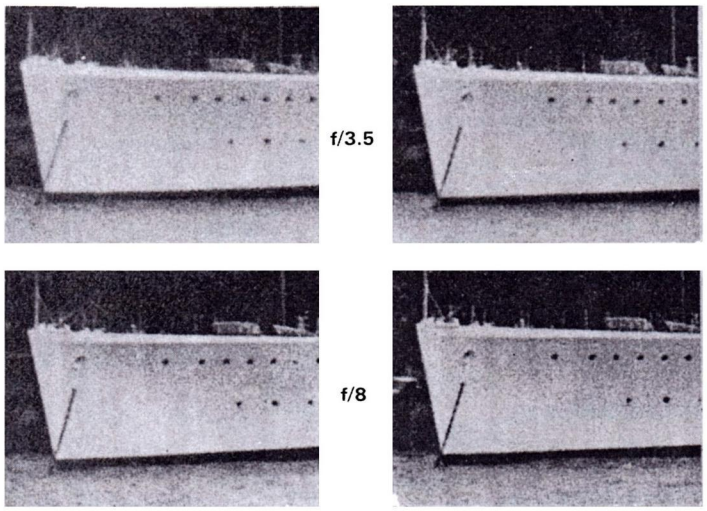
The lens must be set to 210mm before changing to the macro mode.

The upper two pictures show the entire field of view with the bows of the ship positioned first at the centre, then at the edge of the frame (at 70mm). The remaining pictures are sections of 20in linear enlargements. Agfapan 25 in Atomal.

FULL FIELD AT 70mm



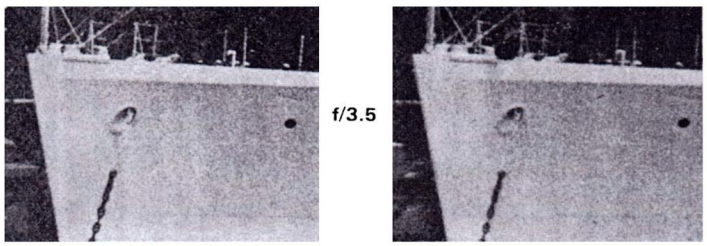
CENTRE 70mm EDGE



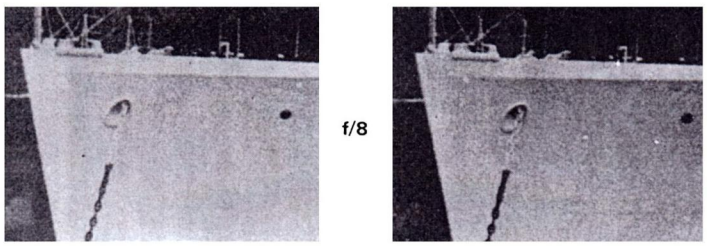
f/3.5

f/8

135mm

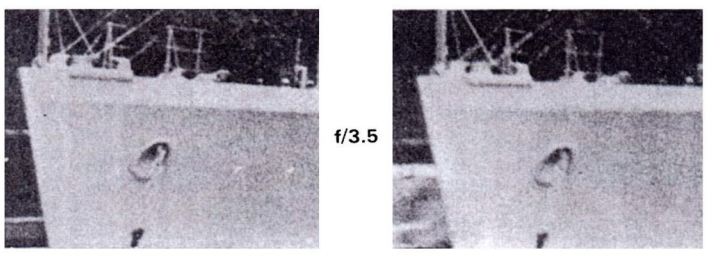


f/3.5

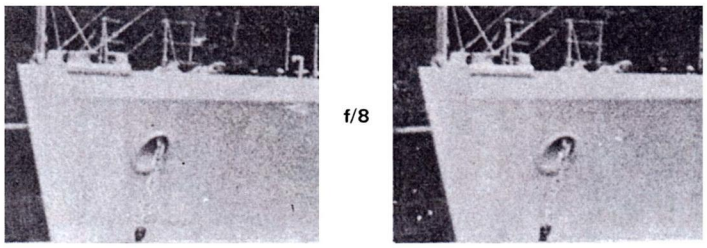


f/8

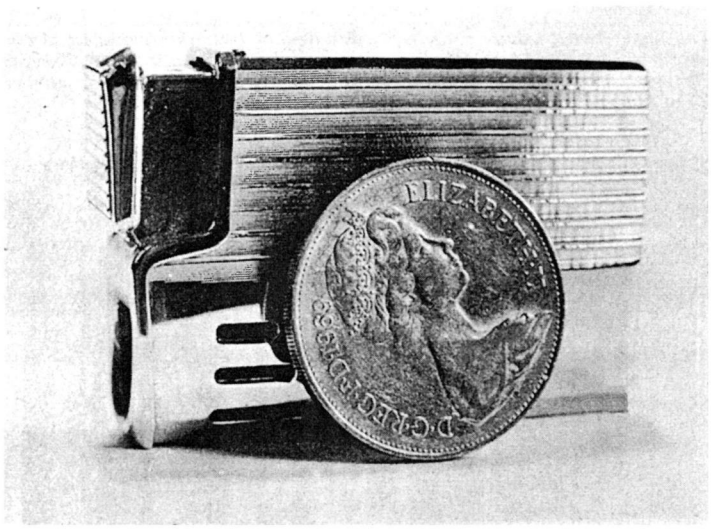
210mm



f/3.5

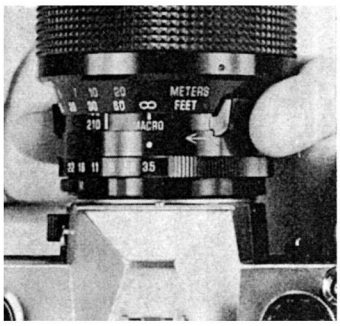


f/8



With the lens in the macro mode at 70mm and with the focussing ring turned to minimum distance, there will be optimum sharp rendering of a subject 70mm from the front of the lens.

The small white button must be pressed in order to switch to the macro mode. The A-M lever can be seen at the rear. The lens has a fixed mount and is available for Pentax, Nikon, Minolta, Canon and Konica autoreflex.



After the white button is pressed, the barrel can be turned to the macro index for extreme close-up photography.

Infinity even closer lens-to-subject distances are possible, i.e., 70mm at 70mm focal length. The degree of magnification can be seen in the picture. In practice, it will be found that the most rapid method of macro operation is to leave the focussing ring turned to a given distance and effect focus simply by zooming backwards or forwards at any given subject distance. To return the lens from macro to the normal range the white button is pressed and the grips rotated until the white zoom line clicks into place by the red index dot. Again, it is necessary to have the lens on maximum focal length and on Infinity before making the change-over.

PERFORMANCE

For a conventionally coated lens of 15 elements the Vivitar Series I auto zoom gave better contrast than we had expected, just above average in fact, and we were impressed by the difficulty of inducing flare. Even with a bare light bulb directly in the field of view reflections were only occasionally visible, and then without degradation of the rest of the image. This is largely due to the excellent interior barrel design, carefully baffled and blacked. Colour transmission is strictly neutral. There was no appreciable astigmatism, and although barrel-type distortion was evident it was average for a zoom construction.

The ship pictures shown were taken at Infinity but further tests were carried out to see whether sharp focus was held while zooming in the normal range. First, the lens was focussed on a test chart at 15ft and a series of negatives made at each marked focal length without refocussing. The series was then repeated, refocussing at each focal length, and the negatives compared under a high-power magnifier. This test showed accurate focus held over the entire range. In fact, even where a shorter focal length is to be used for the exposure, one can confidently focus at maximum focal length where the image detail is larger then zoom forward to the shorter focal length.

CONCLUSION

The Vivitar Series I 70-210mm f/3.5 Macro Focussing Auto Zoom has a finish and quality of construction comparable to that of the best marque lenses, which is reflected in the price. Perhaps future models may be introduced with multi-coating but even with the present single coatings of amber and magenta the optical performance is extremely high.