# ADVANTAGES OF STANDARD SIZES FOR OPTICAL PANELS

CLARENCE R. SMITH

*Aurora College, Aurora, Illinois*

The experimenter in optics whose work leads him to set up equipment of any considerable variety will do well to consider standardization of size for certain parts which are in common use. Occasion will frequently arise for setting up combinations which are more or less complicated but which however, will soon serve their time of usefulness and be dismantled, many of the parts to be used again for new combinations. Such devices as lens holders, diaphragms, filters, etc. will be found more convenient if made with overall size and certain other dimensions according to a plan of uniformity.

The plan here suggested makes use of four basic squares which are as follows: 5 x 5 cm, 10 x 10 cm, 20 x 20 cm and 35 x 35 cm. If panels in any of these sizes are to be assembled by means of bolts or screws, two holes should be placed near each of the four edges of each square. The two holes near each edge should be symmetrically placed with a separation of 0.5L and a distance of 0.05L from the edge, where L represents the length of the edge. Thus a 20 x 20 cm panel would have near each edge, two holes 10 cm apart and 1 cm from the edge, while a 5 x 5 cm panel would have the holes 2.5 cm apart and 0.25 cm from the edge.

In recommending the use of the above four basic squares, no specification is intended as to which of the sizes is to be used for a given piece of equipment. Actual experience has shown the following to be convenient and the lists are given here merely as suggesting the usefulness of the idea.

5 x 5 cm

Light filters, for photography
Round hole diaphragms of various diameters, one small enough for pin-hole photographs
Slits, single, double and of various widths and separations
Mounted crystals, wedges, etc. for polarized light
"Double star" for resolving power measurements
Mounted needle point, needle eye, razor edge, and central disk for diffraction effects
Parallel wires, woven wire, mounted samples of cloth, for diffraction effects
Simple lenses of small diameter
Photographic lenses in miniature sizes
Telescope eyepieces
Projection lens for 2 x 2 inch lantern slides

10 x 10 cm

Photographic lenses in most sizes
Colored glass squares for general use in class demonstrations
Frames for Polaroid disks
Object holders for polarized light experiments
Panel with cut-out and clips to take the 5 x 5 cm size
Lenses, various, too large for 5 x 5 cm panel
Telescope objective lens
Projection lens for 3¼ x 4 inch lantern slides
Black and white surfaces for receiving images on optical bench

20 x 20 cm

Negative holder for photo enlarging
Lamp-house front for photo enlarging
Diffusion ground glass for photo enlarging
Panel with cut-out and clips to take the 10 x 10 cm size
Panel with cut-out and clips to take the 5 x 5 cm size directly
Film holders, various forms as camera backs, to take roll films, cut films, etc.
Photo dark room lamp front, to take 5 x 7 inch commercial colored glasses
Cell for 6-inch telescope mirror

35 x 35 cm

Photo enlarging easel
Photo copying easel or platform
Dark room window with cut-out for 20 x 20 cm panel
Screen for micro projection to small group

It will be found convenient to have for the most used sizes, various spacers, dark channels, holders, etc., then a great variety of combinations can be quickly set up. For example, a photographic enlarger or lantern slide printer can be made from a light source in a housing with standard front, a diffusing screen, negative holder, and easel, all mounted with suitable spacers. A useful laboratory camera can be made by constructing a basic body to take a 20 x 20 cm detachable back and a similar front. Various backs can be made for cut film and roll film in any desired size. Fronts can be made for various types of lenses, shutters, and focusing devices. Standardized sizes also lend themselves readily to the equipment used in regular practice in focal length, magnifying power, diffraction, index of refraction, and polarization. Any worker continuing in the field of optics, who will consistently adhere to the sizes recommended, will become more appreciative of the advantages of interchangeability of parts as his stock of equipment increases.

The 35 x 35 cm size appears in the series instead of 40 x 40 cm as might be expected, because it is more logically adapted to the hole spacing formula, and also because it makes a better transition to a series of still larger sizes which might be used, beginning with 50 x 50 cm. Plans are under way with such a series of larger sizes and also a series of smaller sizes, but more experimental work is needed before final recommendations are made.