figures are distinct on either side of centre.

When sharply focussed, with a full aperture, expose a plate. When the same number that was focussed for is sharpest, there is no fault with regard to color correction. If a number is sharpest that is nearer than the centre, then there is chromatic aberration, the chemical light having a shorter focus than the visual, and the lens is under-corrected; in the contrary case, it is over-corrected. The over-correction will, as I have said, practically be a less serious fault than under-correction.

Now expose a second plate for a second test. For this purpose nothing is altered but the aperture—make sure that you are still sharp at the crossing point. Insert stop, say, f/16 in a rectilinear with an aperture of f/8. Expose; develop.

The centre should again be sharpest; if not, there is spherical aberration, because when a more distant point is sharp it proves that the axial rays have a longer focus than the marginal.

In the opposite case the spherical aberration is over-corrected.

Zeiss' (Dr. Rudolph's) focimeter.—This consists of a rail or rod in horizontal position, at right angles to the axis, on which are erected a number of sticks radially pointing toward the lens. On each of these are stuck some labels bearing letterpress or lines, and in such a manner that, seen from the lens, all are visible; thus some will be upright, others at angles of 45° and 90° from the upright position, or at 30°, 60°, and 90°. On these labels the corrections—spherical and chromatic, the depth of focus for each aperture, the curvature of field, the covering power with each stop—can be measured and tabled.

When focussed on central rod, and for central label, it is easily seen what the area of sharp definition amounts to in both directions, vertically to the axis and parallel to it. You can judge of the curvature of field, find out whether chromatic and spherical aberration are properly corrected. Get at the general covering power, or even at the approximate amount of astigmatism. It is a good universal instrument, and it is specially suited to our purpose, as it represents a system of objects at different distances and in different angles to the axis of the lens.

Flatness of Field.—Having treated the aberration of the central rays, we now come to those lying at an angle to the axis. The theoretically perfect lens is supposed to give a perfectly flat image over the whole of the disc which it is able to light up of a flat object. No lens does this.

The rays falling obliquely come to focus on a curve, and we have to see that this curve is reasonably large to allow us to obtain sharp images over a sufficient size of plate. The theory teaches us that the principal plane in which the marginal rays are refracted must be more convex towards the object and concave towards the image, and that the diaphragm must be in the place where the axis of the oblique rays cuts the axis of the axial rays. These are the best conditions for a flat field. Some excellent lenses have rather round fields, and it is a question for the maker to decide how much correction he will introduce in order to flatten the field without introducing too much astigmatism.

Our take is not difficult. An ordinary camera will suffice. We put the camera on its stand, focus in the centre for our test object, and then rotate it, noticing the amount of rotation we can do, without throwing our object out of focus.

Again we turn to the instrument specially constructed for these tests, the "Tourniquet." Having lens in the right position, we take a luminous point, best our white silver ball. We focus sharply

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