chord. Figures 20c, d, and e, illustrating respectively the trusses of the St. Louis Municipal Bridge, the Elizabethtown Bridge, and the South Tenth Street Bridge, Pittsburg, all show a pleasing curvature for the top chord.

Another evidence of the coincidence of aesthetic correctness with scientific efficiency is afforded in the relative slope of the diagonals of trusses with curved top chords. Examining Figures 20a to 20e, it is at once evident that a wide variation in the slope of these members is aesthetically objectionable, from the lack of satisfaction with the general outlines, probably, from a breach of orderliness. Figs. 20 (d) and (e) exhibit this defect particularly, but in the trusses of the Municipal Bridge, St. Louis, it has been obviated by varying the panel length, making it 30 ft. at the ends and 48 ft. adjacent to the centre. In Fig. 20 (e) the defect is enhanced by carrying the main diagonals over one panel only for the first three panels from the ends and then over two panels, producing further mystification in the mind of the observer. This dislike of large variation in the slope of diagonals has a scientific basis, when we learn that there is an economic inclination of diagonals—about 45 degrees—and that this inclination of such members is the one most pleasing to the eye.

Further indication of the truth of the fifth principle enunciated is afforded in a study of the form of arch rings.

It may be asserted that, in general, the most pleasing axial curve for an arch ring is the one which corresponds most nearly to the dead-load line of pressures. For spandrel-filled arches the structurally correct axial curve for low ratios of rise to span is not far from a parabola or the segment of a circle. As this ratio increases the curvature becomes sharper, particularly in the region between the haunches and the springings, until, for an arch having a rise of one-half of the span, the correct axial curve lies outside a semi-circle and is of the nature of an oval. In the case of open-spandrel arches the statical conditions necessitate an axial curve lying somewhere between a parabola and the segment of a circle.

It is therefore most significant when we note that arch rings which are noticeably out of conformity with the general lines mentioned are not pleasing to the eye. This condition arises most frequently from the employment of curves which are, or appear to be, too flat on the haunches, and which give the impression that settlement at these points is imminent, accompanied by tensional failure on the extrados near the springings. Such an effect is likely to follow the use of a ring for which the axial line lies on or approaches a semi-ellipse, or even where the intradosal curve is a semi-ellipse. The Brunswick steel arch bridge (Fig. 21 on plate) exhibits this defect, although the axial curve is only about midway between a segment of a circle and a semi-ellipse. The