Fig. 1.— Galaxies and quasars in the equatorial slice ($-2^\circ < \delta < 2^\circ$) of the Sloan Digital Sky Survey displayed in co-moving coordinates out to the horizon. The co-moving distances to galaxies are calculated from measured redshift, assuming Hubble flow and WMAP cosmological parameters. This is a conformal map – it preserves shapes. While this map can conformally show the complete Sloan survey, the majority of interesting large scale structure is crammed into a blob in the center. The dashed circle marks the outer limit of figure 2. The circle labeled 'Unreachable' marks the distance beyond which we cannot reach (i.e. we cannot reach with light signals any object that is further away). This radius corresponds to a redshift of $z = 1.69$. As 'Future comoving visibility limit' we label the co-moving distance to which a photon would travel from the inflationary Big Bang to the infinite future. This is the maximum radius out to which observations will ever be possible. At $4.50R_{H_0}$, it is suprisingly close.

Fig. 2.— Zoom in of the region marked by the dashed circle in figure 1, out to 0.06 $r_{\rm horizon}$ (= 858 Mpc). The points shown are galaxies from the main and bright red galaxy samples of the SDSS. Compared to figure 1, we can now see a lot of interesting structure. The Sloan Great Wall can be seen stretching from 8.7h to 14h in R.A. at a median distance of about 310 Mpc. Although the large scale structure is easier to see, a "zoom in" like this fails to capture and display, in one map, the sizes of modern redshift surveys.

Fig. 3.— Galaxies and quasars in the equatorial slice of the SDSS, displayed in lookback time coordinates. The radial distance in the figure corresponds to lookback time. While the Galaxies at the center occupy a larger area, this map is a misleading portrayal as far as shapes and the geometry of space are concerned. It is not conformal – it compresses the area close to the horizon (this compression is more explicitly shown in figure 5). Also, the galaxies are still too crowded in the center of the map to show all of the intricate details of their clustering. Figure 4 shows a zoom in of the region inside the dashed circle.

Fig. 4.— Zoom in of the region marked by the dotted circle in figure 3, showing SDSS galaxies out to 0.2 $t_{\rm horizon}$. The details of galaxy clustering are now displayed much better. However, like figure 2, it still fails to capture the whole survey in one, reasonably sized, map.

Fig. 5.— Square comoving grid shown in lookback time coordinates. Grid spacing is $0.1R_{H_0} = 422.24$ Mpc. Each grid square would contain an equal number of galaxies in a flat slice of constant vertical thickness. The distortion of space that is produced by using the lookback time is obvious as the squares become more and more distorted in shape as one approaches the horizon.

Fig. 9.— Sloan Great Wall compared to CfA2 Great Wall at the same scale in co-moving coordinates. Equivalent redshift distances cz are indicated. The Sloan slice is 4° wide, the CfA2 slice is 12° wide to make both slices approximately the same physical width at the two walls. The Sloan Great Wall extends from 14h to 9h. It consists of one strand at the left, which divides to form two strands between 11.3h and 9.8h, which come back together to fom one strand again (like a road that becomes a divided highway for a while). The CfA2 Great Wall (which includes the Coma cluster in the center), has been plotted on a cone and then flattened onto a plane. Total numbers of galaxies shown in each slice are also indicated.