he Animation Window lets you define parametrically the Eye Point, the Look Point, the Up Bector, and the Angle Aperture in a frame of an animation, as a function of the time t. The Animation Window looks like this:

he options are:

t range

These three fields at the top of the window completely describe the behavior of the variable t. During rendering, t will range from the left value to the middle value in the number of steps specified at the right. The steps will be evenly spaced between the max and the min, and both the max and the min will be included as endpoints. The beginning and end values may be mathematical expressions, but they may not contain the variable t. The number of frames must be an integer greater than zero.

Eye Point

This allows you to select the point from which the scene is viewed. The three fields specify the x, y, and z coordinates of the Eye point, and may be mathematical expressions in t.

Look Point

This allows you to select the point towards which we are looking. The three fields specify the x, y, and z coordinates of the Look point, and may be mathematical expressions in t.

Up Vector

This allows you to select the direction which is considered "up". This direction will point towards the top of the screen in the rendered image. The three fields specify the x, y, and z components of the Up Vector, and may be mathematical expressions in t.

Angle Aperture

This allows you to select the angular aperture of the view, specified in degrees. For instance, angles of 90° means that the entire hemisphere will be displayed, while an angle of 45° means only a pyramidal portion, with 90° angles at the vertex (the Eye Point) will be displayed (see diagram). The two fields specify the horizontal and vertical Angle Apertures, and may be mathematical expressions in t.

The following diagram shows the purpose of each of the animation parameters:

hen you make an animation, MacRTrace saves it to the disk as it renders, frame by frame. If you're making QuickTime movies, this has the advantage of saving you lots of disk space; a large animation might take 20 Meg on disk uncompressed, but

only 1 Meg compressed. If you are low on disk space, you should generally save your animation as a QuickTime movie.

The problem with this is that QuickTime movies are of lower quality than the original frames. If you choose the wrong QuickTime options, you may find yourself, after hours of rendering, with a movie that looks awful. Here are the possible compressors (as of this writing), and how well they do with MacRTrace pictures, in general. By way of comparison, I compressed a 16 Meg movie (100 frames, 200x200) using each, so see how small it got.

One note: it's best to use thousands or millions of colors for these animations, even if you can't display them all. Other people can, and your animation will look much better on full-color monitors. Plus, as the information below indicates, increasing the number of colors often decreases the file size.

Animation

A very good choice if you're more concerned about image quality than file size. On its highest setting, this compressed my movie down to about 1.2 Meg using millions of colors, or 1 Meg using thousands. Image quality on both was superb, though the one done with thousands of colors was noticably dithered on my millions-of-colors monitor. The movie done in millions mode was indistinguishable to my eye from the original images. Interestingly, using 256 colors increased the file size fo 2.2 Meg. Also, be careful using lower quality settings; normal quality or worse begins to develop noticeable horizontal artifacts, especially in thousands mode.

Cinepak

A very good choice if you're more concerned about file size than about image quality. Cinepak makes the smallest files except for Photo-JPEG, and can be played back at its full frame rate on most Macs (unlike Photo-JPEG). The quality is quite acceptable, though nowhere near as good as Animation. Cinepak's image quality does not degrade much as the quality setting is reduced, so it's usually best to set it low. On the very lowest setting, my movie compressed to 285K, and looked quite good. On low settings Cinepak seems to halve the quality of its key frames, with rather ugly effects, so you should set the key frame setting to something high, probably larger than the number of frames in the movie, so that you have only one key frame.

Graphics

This setting appears to only do 8-bit color (256 colors). Though its image quality is

very good (for 8-bit color), its files are large, 840K for my movie. There is little reason to use this compressor with MacRTrace.

None

This setting does no compression. Rather, it does no lossy compression, as the others do. So the image quality is the absolute best possible. Unfortunately, since it does very little compression, the files are gigantic, 12 Meg for my movie.

Photo-JPEG

This compresses each frame as a JPEG image. JPEGs are small; it compressed my movie to 375K on the highest setting, and to 245K on the low setting. However, JPEGs are not really appropriate for ray tracing, because ray tracing tends to have a lot of sharp, clear edges, and JPEG compression can't deal with that; it makes "halos" around them. Even on its highest setting, this looks fairly bad. Also, JPEGs take a long time to decompress, so only a PowerMac will be able to play a JPEG movie at full frame rate. There is little reason to use this compressor with MacRTrace.

Video

This appears to be a thousands-of-colors compressor. There is slight but noticable dithering on my millions-of-colors monitor. Other than that, though, this is a reasonable choice. It compressed my movie to 670K on its highest setting, and to 365K on its normal setting. Quality was acceptable, but slightly worse than Cinepak.

I usually do my compression with Cinepak, on its normal setting. When I want a really high quality movie I use Animation instead.

Actually, there is a way around having to choose your compression and be stuck with it. You can save the animation as a series of PICT files (using the PICT Files option in the animation saving window), and then use the freeware utility PICTs To Movie to convert the sequence to a movie. This require that you have enough disk space to store both all the uncompressed images and the resulting movie. The advantage is that if you don't like the resulting movie because of your compression settings, you can just recompress the movie with different settings, without re-rendering. PICTs To Movie is available at Mac ftp sites.