Counterintuitive Behavior of Social Systems
Part I and Part II figures

FIGURE 1. Upon this world model are based the author's analyses of the effects of changing population and economic growth factors in the next 50 years. It shows the interrelation of population, capital investment, natural resources, pollution, and the fraction of capital devoted to agriculture on which is based the following discussion.

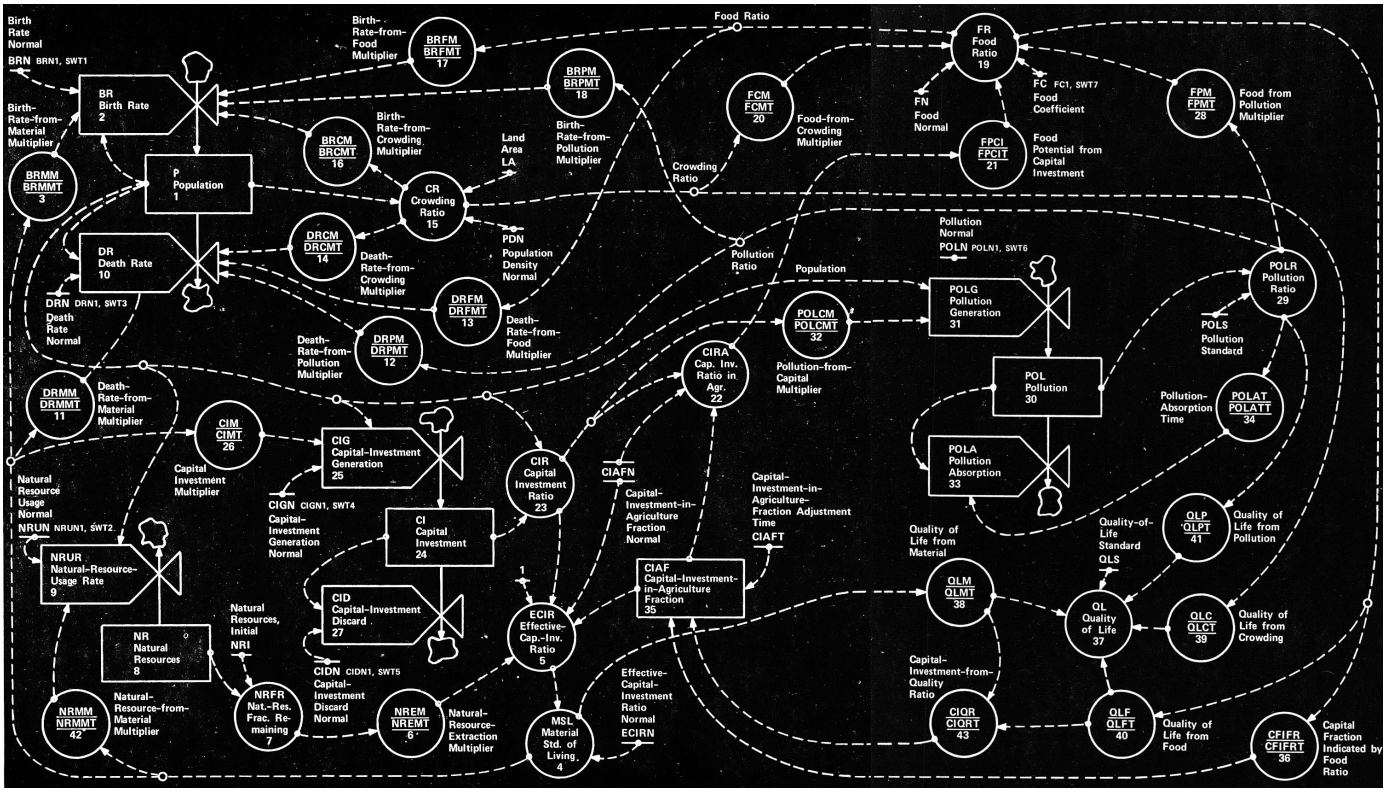

FIGURE 2. Basic world model behavior showing the mode in which industrialization and population are suppressed by falling natural resources.

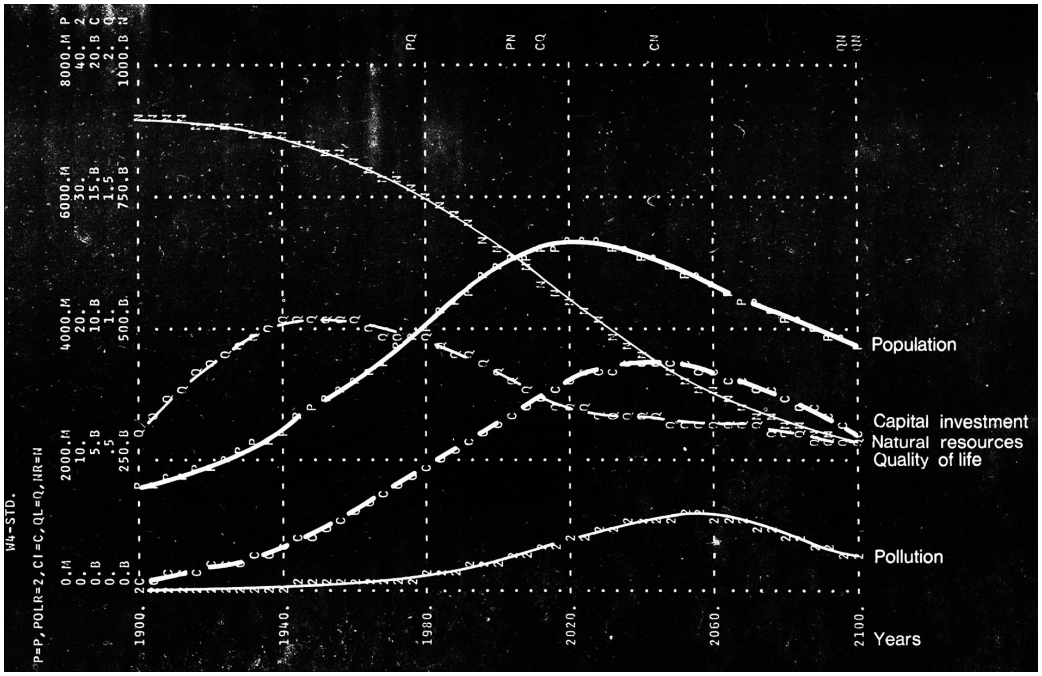

FIGURE 3. Pollution crisis precipitated by lower usage rate of natural resources. In 1970 natural resource usage is reduced 75 percent by more effective technology without affecting material standard of living.

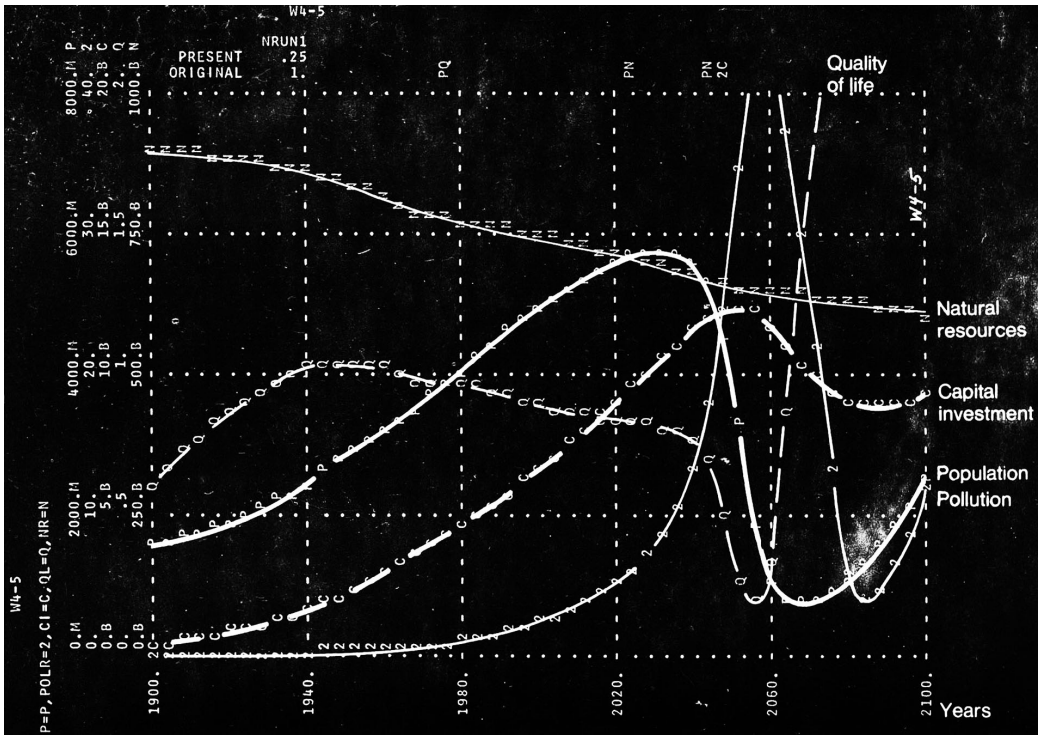

FIGURE 4. In 1970 the rate of capital accumulation is increased 20 per cent in an effort to reverse the beginning decline in quality of life. The pollution crisis occurs before natural resources are depleted.

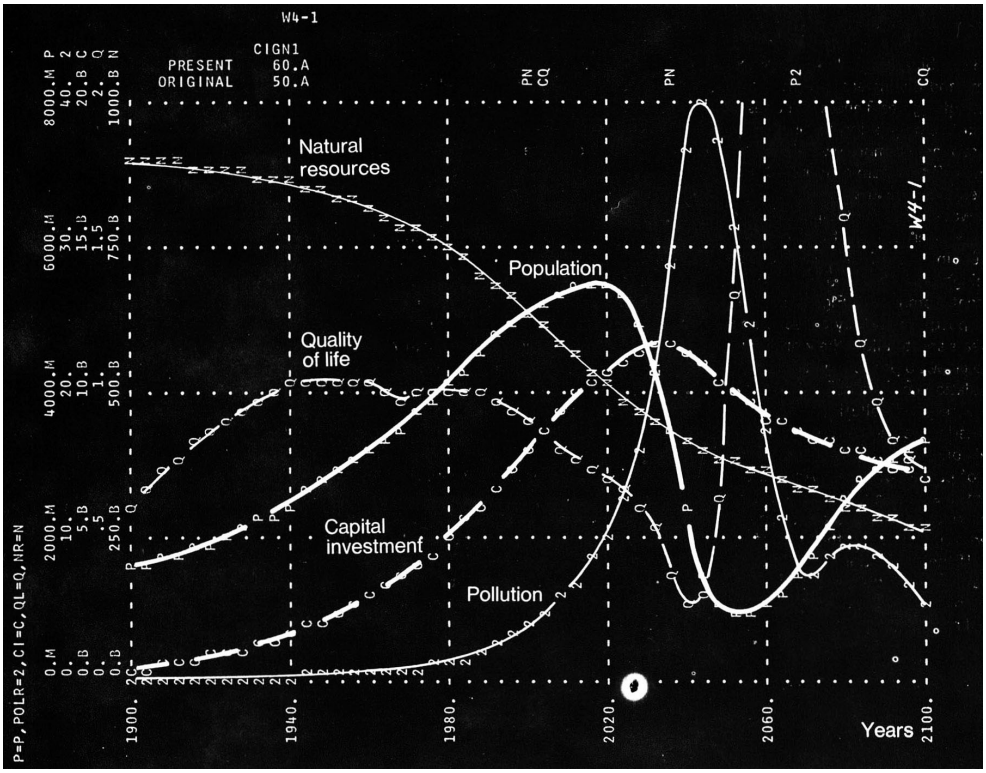

FIGURE 5. In 1970 the 20 per cent increase in capital accumulation of Figure 4 is retained and "normal" birth rate is reduced 50 per cent. Capital investment continues to grow until the pollution crisis develops. After an initial decline, population is again pushed up by the rapid rise in quality of life that precedes the collapse.

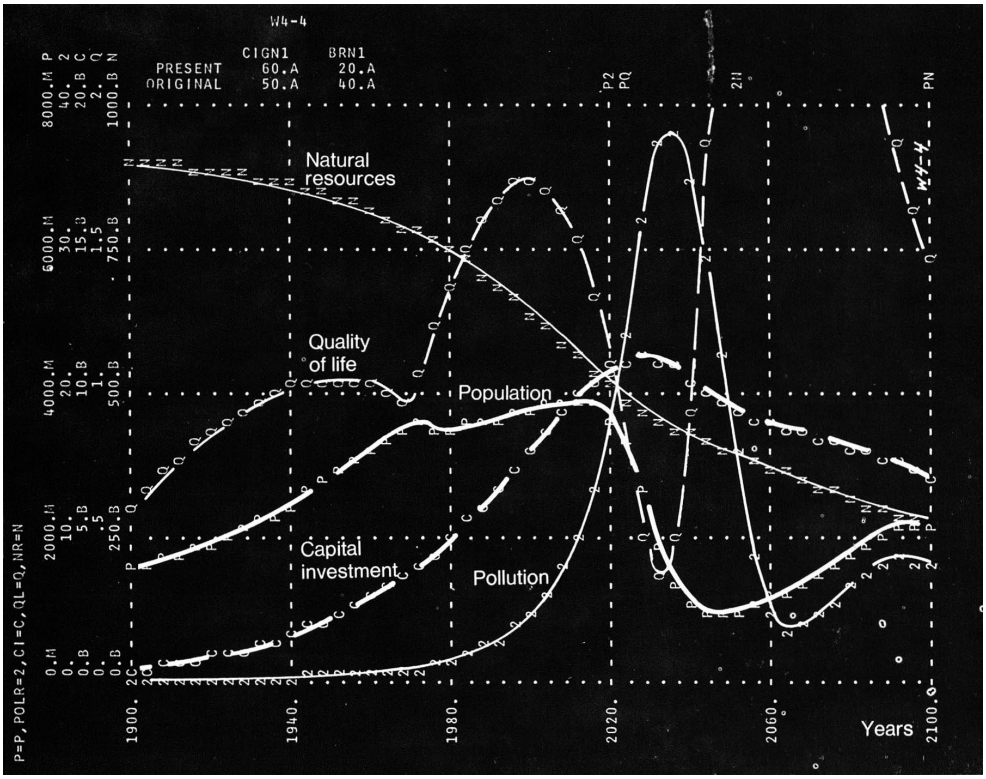

FIGURE 6. The 20 per cent increase of capital investment from Figure 4 and the 75 per cent reduction of natural resource us-age from Figure 3 are combined.

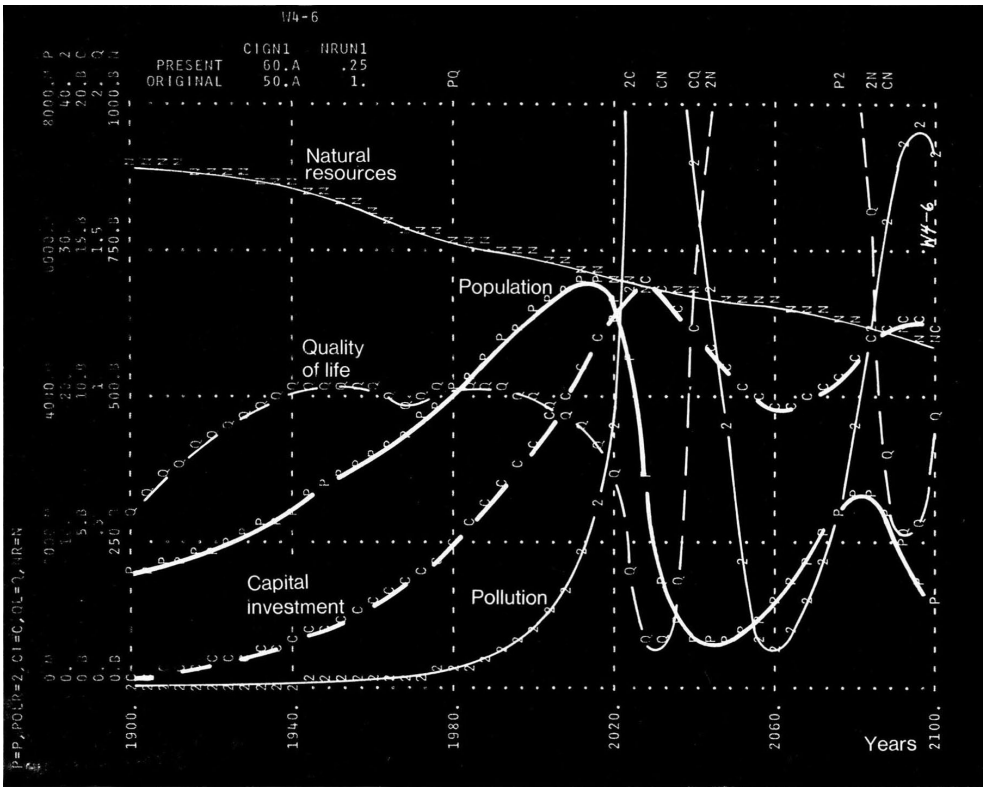

FIGURE 7. Increased capital investment rate and reduced natural resource usage from Figure 6 are retained. In addition in 1970 the "normal" rate of pollution generation is reduced 50 per cent. The effect of pollution control is to allow population to grow 25 per cent further and to delay the pollution crisis by 20 years.

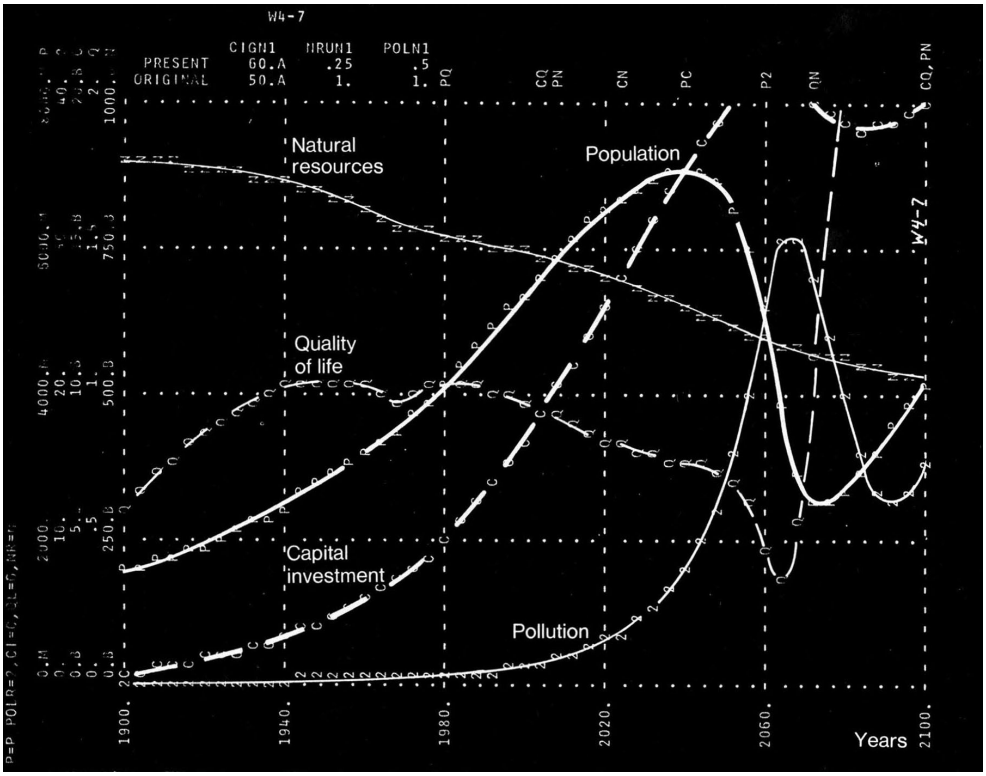

FIGURE 8. One set of conditions that establishes a world equilibrium. In 1970 capital investment rate is reduced 40 per cent, birth rate is reduced 50 per cent, pollution generation is reduced 50 per cent, natural resource usage rate is reduced 75 per cent, and food production is reduced 20 per cent.