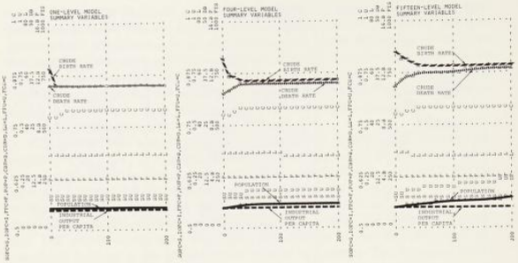

Figure 2-87 Run 2–4: constant low income

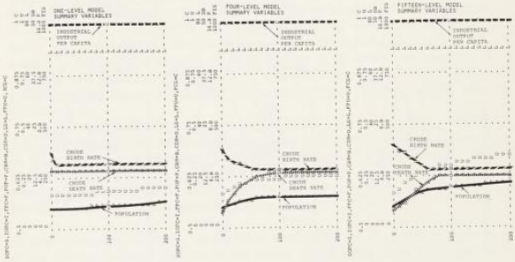

Figure 2-88 Run 2–5: constant high income

If the model run does not agree with our expectations, we must examine both the World3 assumptions and our own mental model assumptions to find the source of the discrepancy. In the process we can both improve the formal model and increase our own understanding of the real-world system.

Run 2–4 (Figure 2–87) shows the behavior of the model population under conditions of economic stagnation. The values of industrial, service, and food output per capita are held constant, all at low levels (industrial output per capita IOPC equals 100 dollars, service output per capita SOPC equals 150 dollars, and food per capita FPC equals 250 vegetable-equivalent kilograms per person-year). Thus this run represents a population living at a subsistence level, with no modern services.

Since the model assumes that social conditions are linked to economic conditions, nothing operates in Run 2–4 to change either the birth rate or the death rate. After an initial transient to achieve a stable age structure, birth and death rates are nearly equal at about 36 per thousand (higher in the fifteen-level model). The population grows only very slowly, if at all. The life expectancy is 28 years. This run might represent a traditional, nonindustrial society of the last century, with the typical fluctuations in the death rate smoothed out.

Another constant-income population is shown in Run 2–5 (Figure 2–88), but here the per capita values of industrial output, services, and food are fixed at high levels, characteristic of a fully industrialized economy such as the United States (IOPC=$1,000, SOPC=$1,500, and FPC=2,500 vegetable-equivalent kilograms per person-year). Birth and death rates are again constant (this time at about 14 per thousand), after a stable age structure has been attained. The age-structure transition takes about 50 years because the population is initialized with a developing-country age structure.

One more simulation under constant-income conditions is shown in Run 2–6 (Figure 2–89). In this case the per capita income is again held steady at a low value, but now the switch in the lifetime multiplier from health services is applied at year 40, with no other changes in the system. The slight increase in life expectancy from 30 to 35 years, when unaccompanied by any other model change, upsets the equilibrium between births and deaths and causes the population level to increase exponen-

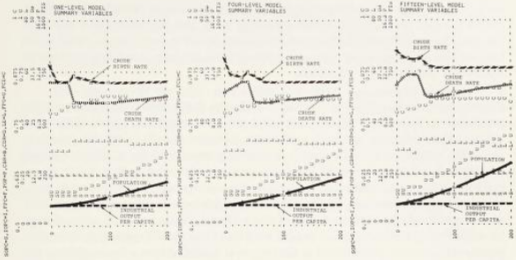

Figure 2-89 Run 2–6: constant low income, improved health care