



How Mill Beat Malthus

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How Mill beat Malthus

Examples of substituting labor and/or capital for land and resources, via adapting processes (technology) and products (consumption)

We hear about "labor-saving inventions" until there is a tendency to think they are the only kind. J.S. Mill pointed out, though, that "scarcity breeds substitution," so as land and resource prices rise, human ingenuity goes to work to spare their use by using more labor and capital, instead. Note, we do NOT produce more land, nor do we ever dispense with it: we always need at least some, and the supply is fixed. However, we can use a lot less, and support a lot more people on this Earth, by combining each bit with more labor and capital. What follows is a list of examples.

The variety of these examples gives you an idea of what is meant by the word "immanent." The price system pervades life: its force infiltrates into millions of decisions, and it does so in many different ways, some of them unexpected and unpredictable.

Some of these examples also entail substitution between labor and capital; but the focus here is on substituting labor and/or capital for land.

1. Frequent replacement and modernizing (of vehicles, machines, buildings, furniture, furnishings, parts, utility lines, roads, etc.) so the land they occupy is always fully used.
2. Extending the life of capital goods by using labor to maintain and rehab old capital, rather than by using scarce resources up front to build in more durability. Repainting is a good example.
3. Packing instead of strewing. On a small scale, see your desk, bedroom or office; on a large scale, see the layout of our cities and other settlements. Cf. #8.
4. Cleanliness
 - a. Picking up trash
 - b. Cutting pollution
 - c. Cutting emissions by maintaining engine efficiency
5. Sewers for septic tanks. (Sewers use space, too, but septic tanks require septic fields, which require large lots and porous soil, and even then may pollute the ground water.)
6. Organic farming
7. Demand management
 - a. In energy, "negawatts for megawatts"
 - b. In water, better timing to smooth off peak loads,

instead of bigger reservoirs; full use of local sources, instead of messing up the Delta

8. By analogy, using Norton or other Utilities to defragment and save space on hard disk. On a larger scale, settling cities compactly (as in Portland or Vancouver) instead of loosely (as in the urban sprawl of Albuquerque or southern California).

9. High-rise buildings (even 2-story buildings save a lot of space, compared with "ramblers").

10. Forklift for stacking, using 3-d

11. High-intensity farming

- a. Organic methods
- b. Biological pest controls
- c. Choosing crops like fruits, nuts, and vegetables
- d. Ideas from Lappé, Susan George, David Pimentel, et al.

12. Using smaller machines, vehicles, with smaller "footprints."

13. Shipping cattle by rail instead of driving them, and droving hogs.

14. Chess, billiards, pingpong, hiking, bicycling, jogging, tennis, basketball, soccer, even football, in lieu of golf, polo, fox-hunting, horse-racing, power-boating, big-game hunting, etc.

15. Computers for storing data. (Quite an advance over the ancient cuneiform symbols carved in rock.)

16. Getting more signals on a given wire or radio bandwidth.

17. Using and operating capital once it is built and installed; processing data once it is collected. (A common tendency is to acquire it as a kind of trophy, then let it just sit there. Check your computer: how many unused software programs?)

18. Maintaining older cars and using them; then scrapping them quickly, to save space.

19. Storing food; also preserving, transporting and distributing it. (Contrast the anaerobic, glass-lined Harvestore silo with outdoor bunker storage of silage in the field.) Saving the harvest is as productive as producing more, and less exhausting to the soil.

20. Synthetic fibers.

21. "Appropriate technology," and "intermediate technology"; "soft path"; "low-tech"; etc.

22. Small loans, close to home office, vs. massive world bank loans for monuments, vast reservoirs, etc.

23. Use of cabs and mass transit, e.g. in NYC. (Note saving of parking space.)
24. Email
25. Renewing old brownfields instead of new greenfields, thus salvaging old infrastructure.
26. Traffic control, in lieu of new lanes.
27. Subbing paper money for gold; then checking accts., then electronic transfers.
28. "Cracking" and refining petroleum: more gasoline per bbl of crude.
29. Wood processing: pulping, chipping, using more of the tree, using younger trees. More generally, adding more value in the mills and factories, using less costly raw materials.
30. Using fuels other than wood.
Using renewable sources of energy: wind, water, solar, tidal, adiabatic - and back to wood, but in fastgrowing forms like hemp, and kenaf.
31. Using by-products,
 - a. Instead of slaughtering whole buffalo to get a little meat, as in days of Buffalo Bill et al. Now, the stockyard finds a use for "everything but the squeal." Navajo Indians have done so for centuries, with sheep and goats.
 - b. Using pot liquor as soup stock.
 - c. Using "hog-fuel" to power lumber mills.
32. Using vegetable products for animal products, e.g. tofu, vegetable oils, etc.
33. Using mechanical traction for animal traction.
34. Using manure for fertilizer in place, instead of polluting groundwater basins.
35. Changing diets to consume less beef, e.g. poultry or tofu for beef.
36. Finding uses for noxious weeds, e.g. the rank reeds in the Sta. Ana River.
37. Applying and controlling natural products sparingly, as needed.
 - a. Thermostats; thermal controls of all kinds, e.g. in modern "smart buildings";
 - b. Water delivery systems: spitters, drippers, emitters.
38. Raising turnover speed, moving materials through the

pipeline faster.

39. Compacting settlement.

40. Regional specialization, linked by transportation: e.g. grow bananas in Guatemala rather than Alberta.

41. Greenhouses.

42. Aircraft

43. Using materials with less content of scarce resources, esp. energy.

Plastic piano keys for ivory.

Plastics for metals, woods.

Alloys

Bamboo scaffolding

44. Managing fisheries to optimize catch, preserve stock

45. Air traffic control

46. Smaller planes, more frequent service.

47. Round-the-clock use of valuable space, roadways, etc.
Diversified demand. Smoothing out peaks and valleys.

48. New opportunities arise for higher volume uses of land. Farmers may shift from cattle to small grains to dairy to vines to labor-intensive produce, as some of them have in California. As landholders intensify, "elasticity of production" rises and labor's share of total output rises even as net gains per acre also rise.

But the landholder who chooses to go high volume and low unit gain is choosing a peck of trouble, too. He may not want to leave the old quiet life behind. But that "peck of trouble" is a form of labor.

49. In a well organized society new frontiers arise from the effects of social synergy, mainly in cities. Urban lands have shown an enormous capacity to absorb labor in manufacturing, trade and services.

50. In an intellectual society demands develop for much more labor-using or "downstream" (near the consumer) activities like entertainment, medicine and learning. Feeding hogs isn't everything, (even if some of us enjoy getting back to it after a time indoors at the office).

51. Sanford Rose "The Far-reaching Consequences of High-priced Oil," *Fortune*, March 1974, pp. 106-12, 191-96.

Shows how producers economize on a resource-based product when its price rises.

52. Salvaging, recycling.
53. Underground mining instead of strip mining and open-pit mining.
54. Use of underground: for basements, storage, subways, tunnels, utility lines, etc.
55. Smaller airplanes with more frequent service (lets runways be shorter, terminals be smaller).
56. Smaller boats with shallower draft (lets harbors be smaller, needing less dredging).
57. Water-sparing farming in arid zones: avocados, citrus and vines give higher yields per acre, using less water per acre, than alfalfa and irrigated pasture.
58. Using the radio spectrum instead of wires to transmit signals.
59. Pooling resources, as in a library, for shared access and usage. A central power plant has a "load factor" of 65% or so, while your home generator, if you used one, would be at about 1-2%.
60. Using land around the clock and the calendar. Double cropping; use of swing shifts and graveyard shifts; use of stadia for more than one sport; staggering work hours to level out demand on freeways; etc.
61. Multi-family dwellings, like apartment complexes, sharing common drives, entrances, hallways, elevators, walls, roofs, landscaping, etc., and housing many more people per acre than detached housing does.
62. In southern California, many students cite shopping malls, which they are implicitly comparing with string developments along highways, or decayed old stores in abandoned cities like Holt Ave. in Pomona; but you always need to ask, "compared to what?" Malls with their vast parking lots use lots of land compared with downtown department stores with escalators, as in Chicago and New York and San Francisco.
63. Direct services mostly use few resources per worker: performing arts, education, religion, personal care, medicine, law, writing, composing, etc. "Man does not live by bread alone."
64. Use of greenhouses and other heat-conserving devices, especially in northern climates. (Up north, you plant fruit trees next to a wall's south face; you grow grapes on southern exposures; etc.)

65. Genetic adaptation of crops and techniques to fructify once-barren lands: crops that tolerate salts, cold, short growing seasons, pests, drought, etc.

66. Finding uses for "weed" plants, a la George Washington Carver. This includes overcoming ingrained prejudices against useful plants like tomatoes, formerly, and hemp, today. Kangaroo and ostrich meat may be on our tables tomorrow. Americans are only beginning to learn about nopales, tequila, yucca root, menudo, prickly pears, etc., not to mention the extensive treasury of little-known Asian foods.

67. Policing on foot or bike instead of patrol cars. Using radar instead of high-speed chases.

68. Training drivers, and weeding out bad ones, and regulating traffic, to avoid accidents that block highways and cut down their capacity.

69. Use of clothing and insulation to economize on fuel for heat and air conditioning. Development of better insulators.

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