Controlling Scurvy in the British Navy *

Many technologists believe that advantageous innovations will sell themselves, that the obvious benefits of a new idea will be widely realized by potential adopters, and that the innovation will diffuse rapidly. Seldom is this the case. Most innovations, in fact, diffuse at a disappointingly slow rate, at least in the eyes of the inventors and technologists who create the innovations and promote them to others.

Scurvy control illustrates how slowly an obviously beneficial innovation spreads. In the early days of long sea voyages, scurvy killed more sailors than did warfare, accidents, and other causes. For instance, of Vasco da Gama’s crew of 160 men who sailed with him around the Cape of Good Hope in 1497, 100 died of scurvy. In 1601, an English sea captain, James Lancaster, conducted an experiment to evaluate the effectiveness of lemon juice in preventing scurvy. Captain Lancaster commanded four ships that sailed from England on a voyage to India. He served three teaspoonfuls of lemon juice every day to the sailors in one of his four ships. These men stayed healthy. The other three ships constituted Lancaster’s “control group,” as their sailors were not given any lemon juice. On the other three ships, by the halfway point in the journey, 110 out of 278 sailors had died from scurvy. So many of these sailors got scurvy that Lancaster had to transfer men from his “treatment” ship in order to staff the three other ships for the remainder of the voyage.

These results were so clear that one would have expected the British Navy to promptly adopt citrus juice for scurvy prevention on all ships. Not until 1747, about 150 years later, did James Lind, a British Navy Physician who knew of Lancaster’s results, carry out another experiment on the HMS Salisbury. To each scurvy patient on this ship, Lind prescribed either two oranges and one lemon or one of five other supplements: a half pint of sea water, six spoonfuls of vinegar, a quart of cider, nutmeg, or seventy-five drops of vitriol elixir. The scurvy patients who got the citrus fruits were cured in a few days and were able to help Dr. Lind care for the other patients. Unfortunately, the supply of oranges and lemons was exhausted in six days.

Certainly, with this further solid evidence of the ability of citrus fruits to combat scurvy, one would expect the British Navy to have adopted this innovation for all ship’s crews on long sea voyages. In fact, it did so, but not until 1795, forty-eight years later, when scurvy was immediately wiped out. After only seventy more years, in 1865, the British Board of Trade adopted a similar policy and eradicated scurvy in the merchant marine.