



Perspective

Science and Energy Resources Hold the Answers

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WHEN MALTHUS PUBLISHED his "Essay on the Principle of Population" in 1798, war, famine, pestilence, and death, the "Four Horsemen of the Apocalypse," were riding rampant across the overpopulated parts of the earth. Millions were starving to death and other millions were going to bed hungry every night. No means were known by which the food problem could be solved except through starvation and related population controls. Even when these had come to pass and only the strongest had survived, the number of people soon increased again to the limit set by the food supply.

Once overpopulation had fastened itself on a nation and the great mass of the people had become impoverished, men had little time for or inclination toward the pursuit of learning. Even when some individual succeeded in raising himself above the common level, the inertia of his fellowmen was so great that his efforts on their behalf came virtually to naught.

Fortunately for the United States, science came to our aid long before such a situation could develop. When Malthus' essay first appeared, the population of this country was less than 5 million. The laws of mechanics, chemistry, and biology were being formulated. Newton's "Mathematical Principles of Natural Philosophy" was already a century old. Lavoisier's "Traité Élémentaire de Chimie" had come off the press in 1789. Liebig, who presented his epoch-making lectures on "Organic Chemistry in Its Applications to Agriculture and Physiology" before the British Association for the Advancement of Science in 1840, was soon to be born.

Rapid growth in population in this country was accompanied by equally rapid growth in the development of the basic sciences and in their application to satisfying the wants of man. The horse was soon replaced by the automobile, tractor, and truck, with consequent release of many additional acres of cropland for production of human food. Synthetic fibers freed large acreages of cotton land for other purposes. The lime

and fertilizer industries grew in proportion to the need for replenishing the soil. Insecticides, fungicides, weed-icides, hormones, antibiotics, detergents, soil conditioners, and a great variety of other chemicals came into highly effective agricultural use.

From a lifetime study of our soil and related resources, I have come to the conclusion that this great land of ours is capable of producing enough to feed 1 billion people—and to feed them well. We would, of course, have to increase greatly acre yields. We would have to farm deeper into the swamps, higher up the mountain sides, and farther into the desert. We might even find it necessary to recover land from the sea as the Dutch have done. We would certainly have to husband our water resources, even to taking much greater advantage of the possibilities of rainmaking. And we would have to be satisfied with less meat, eggs, and milk, using vegetable proteins, including possibly chlorella and yeast, instead. But we know the direction we must go and the means that must be employed.

The final answer to the food problem, as well as to all other phases of our economy, lies in aggressive development of our energy resources. Use of atomic energy will, no doubt, be greatly expanded. Our coal and petroleum resources will have to be more fully exploited. The wasted desert sun will have to be put to work. Given plenty of energy, we can drain the swamps, fill up the gullies, bury the rocks, and bulldoze away the brush. We can even take water from the sea. Possibly we can discover the secret of chlorophyll and put the process to work on a factory basis.

It seems probable that, in a highly educated nation, factors other than lessening abundance of food will operate to bring our population to a state of equilibrium in due time. But, whatever may happen in this regard, there is nothing in the evidence to suggest that we cannot solve any problem that may arise, subject to continued faith in the mission and destiny of this nation.