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## Synthetic Rubber in World War II

It is ironic that in the bicentennial year of our Declaration of *Independence*, one of the major national issues is concern about our *dependence* on foreign nations for some of our vital resources. However, the idea of a foreign cartel setting the world price for a crucial world commodity is not new. Southeast Asia is particularly well suited to the growth of rubber trees on plantations. This fact made that part of the world even more important to the rubber industry than the Persian Gulf is to today's oil industry, and the owners of the rubber plantations were not slow to take advantage of that.

In 1922, Great Britain felt secure enough in its command of the rubber supply to set in motion a cartel program called the Stevenson Plan. They succeeded in quadrupling the price of raw rubber within 4 years. Incidentally, the "Sheik Yamani" of the Stevenson Plan was Britain's Foreign Secretary, a rising young politician named Winston Churchill. In 1934, the Dutch joined the British in a second rubber cartel. Between them, they were able to control prices and dominate world markets. This situation persisted right up until the beginning of World War II. Indeed, only tentative steps were taken to alleviate our dependence during the first 6 months *after* Pearl Harbor.

In short, it certainly was not due to the foresight of the American people or their leaders that we managed to pull off the amazing feat of going from complete dependence on foreign rubber supplies to virtually complete rubber independence in three short years. How did we manage it?

There were two unusually lucky circumstances. First, some imaginative people had been attracted to the emerging field of polymer science in spite of the rather dim prospect of anything forthcoming that would be practical on a large scale. Second, the Germans had had the lack of foresight to export to the United States a lot of technological know-how in the chemical field. However, the synthetic rubber program involved much more than luck. At least one aspect of the program carries a lesson which is applicable today.

America's "rubber crisis" of 1942 underlined an important point about technology and human nature. That is, it is easier to meet a problem through the large-scale use of technology than to get people to make a major change in their style of living. Let me explain how the rubber program illustrates this.

After Malaya and Indonesia fell to the Japanese in 1942, the reality of the nation's rubber shortage began to dawn on our national policy-makers. Two obvious courses of action presented themselves. One was to step up the effort to find a "technological fix"—that is, to greatly accelerate the synthetic rubber program. The other was the idea of "resource conservation"—that is, to drastically curb civilian uses of rubber and collect scrap rubber to meet our needs.

At first, the idea of conservation got the main attention. The papers were filled with the exploits of people like Abner Peel of Rahway, New Jersey, who figured out a way of patching and recycling ladies' girdles.

But conservation was a disappointment. Much less scrap rubber was collected than had been expected, and problems of storage and transportation prevented even that from being used. The problem was not lack of patriotism or public willingness. Rather, it was the simple impossibility of totally turning around the ingrained habits of a society in a short time.

Fortunately, the technological fix solution was a bit more successful. Indeed, the success of the synthetic rubber program was fantastic by any standard. In 1940 not a single pound of general-purpose synthetic rubber was produced in the United States. By 1944, the annual production was over 670,000 tons.

What can this story teach us? The synthetic rubber program showed that a joint university-government-industry effort *can* be an effective method of meeting a national need that is just too big and too risky to ask a single industrial firm to undertake. The program also showed that we should not let important efforts be impeded by artificial distinctions between "pure" and "applied" research. Planning, research, and development are all necessary components of a total technical effort.—ARTHUR M. BUECHE, *Vice President for Research and Development, General Electric Research and Development Center, Schenectady, New York 12301*

This editorial is excerpted from a convocation address delivered on 26 September 1975 at the dedication of George Stafford Whitby Hall, University of Akron, Akron, Ohio.