The automobile of the future

How can we develop a good car that will last 20 years? Lyndon H. LaRouche, Jr. contributes the first in a series.

Will the automobile of the future be, like the fabled "Deacon's One-Horse Shay" of the story, "built to last for a hundred years and a day?" We can not expect any such extreme change in automobile designs to occur during the next years, but Detroit could begin to move in that direction soon, if urgent changes in current U.S. monetary and economic policy occur.

The most obvious keys to an early revolution in design of aircraft and motor vehicles, are three. First, the long-overdue shift from use of petroleum as a fuel, to use of hydrogen as a fuel for either simple combustion or as a source of electrical power of fuel cells. Perhaps, use of methane as a fuel might be an intermediate step. Second, the emergence of mass-production of new types of metallic ceramics, as replacements for conventional steel and aluminum products.

The basic problems of safety and other handling of methane or hydrogen as vehicular fuels, for aircraft and ground-vehicles, have been solved at the engineering level. The introduction of ultra-strong, temperature-resistant ceramics, to construction of both vehicular bodies and of vehicular engine-plants, promises qualitative improvements in the durability of these key components of vehicular construction, including improved protection to vehicle occupants. The ability to construct engines adapted to what are relatively very high combustion temperatures, creates a demand for rapid shifts into general use of hydrogen as a fuel.

The environmental gain in combustion of hydrogen is elementary: The waste-product of burning hydrogen is water. The major obstacles standing in the way of such use of hydrogen, have been the matter of cost of producing hydrogen cheaply enough in quantities required, and the need for effective distribution of the gas or fuel-cell charges through networks of local filling-stations. With the development of the high-temperature gas-cooled fission reactor, and the prospective development of fusion reactors, the problems of producing the fuel at acceptable costs, and in required quantities, are in reach of solution. As to the problem of distribution, the change in fuel modes could be made most readily for regularly scheduled air-transport, and in port-oriented water-borne transportation. In highway vehicles, the earliest use would probably appear in trucking. However, the existing networks of filling-stations can readily be adapted to the needs of the changeover for general use.

Considering the fact that the production of new steel is collapsing rapidly world-wide, moving toward less than 40% of 1970s' levels, the development and production of new types of metallic ceramics is already a major growth industry, relatively speaking. Strength of materials, and improved toleration of high-temperature processes, are leading incentives for growth. As a by-product of research and development under the auspices of the President's Strategic Defense Initiative, the use of devices such as lasers as cutting-tools, is opening up economical and effective methods of working ceramics not otherwise possible.

There is a twofold incentive for U.S. industry's moving toward use of ceramics on a mass scale.

First, the United States' production of primary metals must modernize, if it is to be competitive. It has the choice of either simply trying to catch up with the most modern such industries in Japan and Europe, or, the superior option, of

Reynolds Metals Company

To construct an automobile that will last, engineers will have to stop planning obsolescence into the automobile's design, as has been the trend in the U.S. auto industry for decades. Shown is Ford Motor Company's St. Louis assembly plant.

making a technological leap ahead of foreign nations. Already, Japan and Germany are engaged in developing the ceramics industry, whereas the United States has been stagnating in this field. We must rebuild our primary metals capacity, anyway, so why not take the long-range view, and concentrate on the newest technologies?

Second, in order to make these new investments, both the independents and captive industries must open up very large markets for sales of the new materials, markets whose appetites are large enough to bring the new plants up to breakeven levels of output very quickly. Production of vehicles, especially passenger cars, is the obvious market to open up.

It is therefore clearly in the strategic national interest of the United States, that both the automobile and primary metals industries cooperate to facilitate this change. On the condition that the present, recessive monetary and economic policies were corrected, it would be in the national interest, that the tax-code be adjusted to resume the successful investment-tax-credits policy launched by the Kennedy administration. Also, to encourage higher rates of reinvestment of retained earnings, federal statutes should be changed to discourage operations of corporate raiders. Under these conditions, the incentives to corporations for high rates of investment in new, technologically advanced work-places, would encourage going-ahead with the "ceramics revolution."

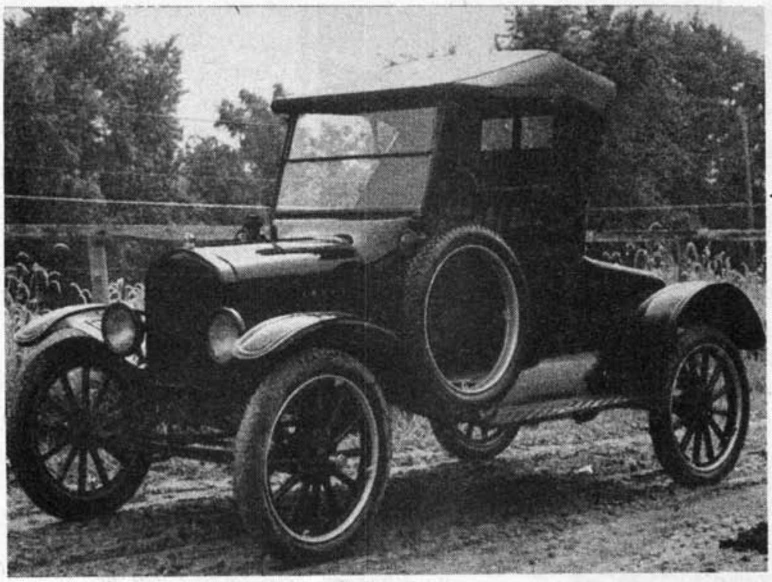
Why 'The Deacon's One-Horse Shay'

At first glance, the leading objection to the new type of passenger-vehicle would be, that it would cost significantly more than present types of construction. This would not have discouraged the Henry Ford who created the automobile industry: Remember the Model T, which it was almost impossible to kill, was easily repaired, and did about everything but milk the cow? The true cost of an automobile, is the average annual cost of ownership. So, if the purchase price is, say, twice that of the present models, if the new model lasts two to three times as long, with a lower rate of maintenance cost over its useful life, the purchaser owns the higher-priced new model at a saving in cost of possession over the cheaper present models.

If such improved models are mass-produced, the economic problems of marketing the new types are soon solved.

What about technological obsolescence? If the prospective buyer is the repressed (or not so repressed) sex maniac, whose automobile must match his wish to change his mistress each year, the long-lasting ceramic-based automobile will not meet the recent decades' emphasis on style-changes. As proud Mercedes owners attest, technological obsolescence and style changes are quite different matters.

If we ask the right question, the answer pops up almost immediately. How does one construct an automobile, so that it is both easily repairable, and easily modified by substitution of parts, to adjust to technological improvements which come along in the later years? This requires that the engineers chose a basic modular design, in relationship among the parts and whole, which they can foresee as durable for 10 to 15 years. This simply means reversing the trend to "Value Analysis" in design, which took over Detroit back during the 1950s. Instead of designing automobiles to force planned obsolesc-



Henry Ford's Model T was almost impossible to kill and was easily repaired. What replaced it? The car designed for the repressed sex maniac, whose automobile must match his wish to change his mistress each year.

General Motors

ence on the market, design for the opposite purpose: Put the emphasis relatively on production of parts and accessories, which are constantly being improved modularly, but which conform to those modular principles of design which favor easier repair and incorporation of supplementary features. Devote relatively less percentile of production capacity to production of assembled automobiles, and devote a relatively larger percentile of capacity to production of constantly improved lines of parts and accessories.

This takes us back to Henry Ford's marketing policy, which defined the family's automobile as a household's capital good: the durable, safer automobile, cheaper to own, an automobile which can not be "killed" without aid of shaped charges or a laser "cutting-torch," an automobile whose by-product "pollutant" is water.

The market of the future

Today, relative to 1970s standards, the net production of automobiles in the United States is the equivalent of 4 million units annually. Otherwise, in 1983 there were 127 million private passenger-cars registered as in operation, with gross-unit sales at a nominal 88.7 billion per year. How many new automobiles of the new ceramic series would Detroit market each year?

All other things being equal, assuming relatively full employment at wages adequate for a standard household, the potential demand for automobiles in use varies in proportion to two factors: 1) the number of households, and 2) the demographic fertility of households.

Therefore, assuming a continuation of present market-conditions, if we double the price and triple the life of the average new automobile produced, we would expect that the average number of automobiles produced and sold annually, would tend to level off at a rate not in excess of 4 million units per year, equivalent to a 12-million-units-per-year level during the 1970s. We would also expect a 50% increase in the ratio of parts and accessories sold to units in use.

There is another factor to be considered. The use of passenger cars for intraurban and interurban transport of persons, is part of a three-way trade-off among air, rail, and highway transport. The more available, and better, any one of these becomes, the smaller the relative share of the transportation market, in passenger-miles, for the other two.

There are two areas, in which the present patterns of transportation-habits are savagely counterproductive. The truck and passenger-vehicle congestion in urban centers is a disease on several counts, relative to increased reliance on modern rapid-transit. We can transport commuters more cheaply, more comfortably, and faster, by rapid-transit systems, than by highway passenger vehicles. There would be a great reduction in the combined costs of transportation to households, businesses, and government. The second area, is interurban transit between major population-centers, in which both air-traffic and interurban highway passenger-car traffic are excessive in terms of aggregate costs, time lost, and safety factors.

In addition to the excessive direct costs built into present patterns in transportation, including the costs of pollution to automobile owners and urban communities, the excessive use of the passenger-car has led to a counterproductive change in the organization and development of cities, and counterproductive uses of what have become suburban land-areas. The decentralization of urban activities, has been the principal cause for rising per-capita costs of basic economic infrastructure in urban areas, and has collapsed the tax-revenue base of the core-cities.

If the absurd, but now-popular, delusions concerning nuclear energy are overcome, the replacement of fossil fuel as a prime source of electricity and process-heat, will mean that industry becomes environmentally clean, to the degree that it should be located on the immediate outskirts of major population-centers, and linked to those centers by rapid-transit systems with high degrees of connectivity. In this circumstance, core-urban areas' land will be of high value, such that rebuilding of the sub-surface infrastructure, and use of new materials and methods for durable construction of buildings, will be favored.

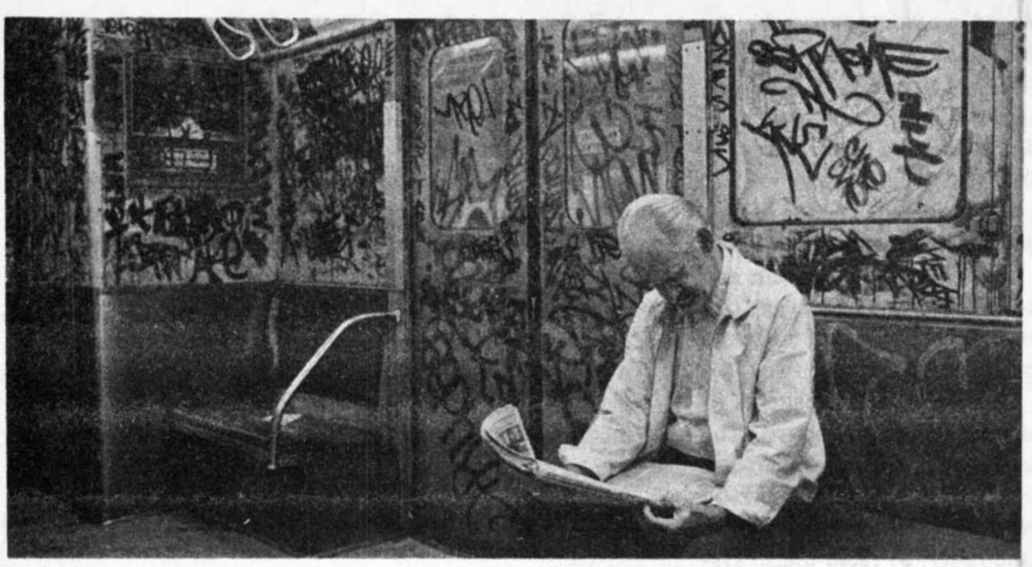
This change could develop rapidly during the remainder of this century, if urgent changes in monetary and economic policy occur. In nuclear energy, for example, the United States needs the addition of about 1,000 gigawatts of electrical-generating capacity by the close of the present century. This will require simplified plants, composed of modules of up to 350 megawatt units plugged together to form an energy-generating complex, and will encourage us to use alternate methods of mass-production of the components of such installations, such that a year's time for the installation of a unit would be the probable requirement. This would simplify safety procedures (if a 50 MW unit inside a 1.2 GW complex even threatened to sniffle, let alone sneeze, it would be shut down automatically, with no effect on the general level of total output of the complex). It would improve quality control of construction, through testing of each component in a series-production mode. For the first time in history, a city could be as clean, environmentally, as a pristine countryside.

Merely rebuilding railway roadbed, and maintaining it properly, would permit interurban rail-transit at speeds between 120 and 150 miles per hour. More advanced technologies, would bring us to the range of 200 miles per hour. At those levels of performance and increased safety, it does not pay to board an aircraft for travel between such centers as Boston and New York City, or New York City and Washington, D.C. Air-traffic safety would be improved; costs of transportation would drop below levels of air or highway vehicle transport; and less loss of time, and of life and injury, would be suffered per passenger-mile traversed.

Will better cars mean fewer jobs in the auto industry? 'Labor-saving' technology has never actually caused a reduction in the number of operatives' work-places. True, there have been periods of reduction in employment. Technology usually causes marginal displacement, but never unemployment.

Our cities are generally rotted-out beyond repair. The subsurface infrastructure is the immense bottleneck now beyond mere repair. It were cheaper to dig entire areas of cities down to the subsurface roots. In so doing, we are able to build in new rapid-transit capabilities at relatively the lowest cost, at the same time we build in the service-ways for water, power, communications, and sanitation, building the future city which can be repaired without excavations, more cheaply than present designs. In this respect, we must expect the density of motor-vehicle traffic in metropolitan areas to drop by an order of magnitude.

Assuming a vehicle which costs twice as much, and lasts three times as long, a level of 4 million new units sold per year would be a reasonable asymptote-maximum for present U.S. population levels, even for a somewhat expanded population. The initial levels would probably reach to approximately twice that rate, under conditions of prosperity, as the



The subsurface infrastructure of our cities is rotted-out beyond repair. Shown here is the New York City subway.

population replaced existing kinds of stocks in use with the new series of models. As the new type of vehicle replaced most of the older types, the rate of replacement-sales of new units would drop toward an "equilibrium-level."

The impact on Detroit

Does this mean fewer jobs in the automobile industry? An auto which costs twice as much and last three times as long, means a cut of more than one-third in the number of operatives employed in that production, taking technological improvements' effects into account. This does not mean, however, fewer operatives' work-places in the industries which produce automobiles.

"Labor-saving" technology has never actually caused a reduction in the number of operatives' work-places. True, there have been periods of reductions in employment, and since the days of the Luddites, there have been strident voices which have insisted that "labor-saving" technology caused this unemployment. "Labor-saving" technology does reduce the total number of persons required to produce a bushel of wheat, or an automobile; this often causes displacement of some operatives from their present work-places. The Luddites of yesterday and today, point to this marginal displacement of work-places, and shriek as they point: "See, technology is causing unemployment right there!" It's a hoax; technology usually causes marginal displacement, but never caused unemployment.

In the history of industrial economy, technological progress causes two general kinds of marginal displacement in employment of operatives. Farmers move to employment in industry, and industrial operatives move from employment in production of households' goods to production of producers' goods. As part of this, the labor-cost of everything produced is cheaper, thus making possible a rise in the average income of employed labor. Under conditions of healthy investment, technological progress absorbs the operatives displaced marginally from production of households' goods, into production of producers' goods, such as construction of basic economic infrastructure, of materials and components of production, and capital-investment goods of industry.

The automobile industry is already a capital-investment-goods-producing industry, as well as a producer of automobiles. Under conditions of relative high rates of capital investment, encouraged by a properly designed investment-tax-credit policy, the operative in the automobile industry will tend to seek promotion from such locations as the assembly-plant, up the ladder toward employment as a machine-tool specialist. In a rational policy of adjustment to the effects of technological progress, the automotive industry's personnel policies, on the sides of both the company's and the unions, would use every marginal shrinkage of numbers of work-places required in automobile production, as the opportunity for upgrading that number of the best-qualified operatives to capital-goods work-places.

As the labor-costs represented by the present household goods' market-basket are reduced, by labor-saving methods, the portion of households' income spent for these goods is reduced, and the standard of living of the labor force is upgraded by adding new kinds of goods to the standard household market-basket. The same logic applies to the market-basket of companies producers' goods. The demand for new kinds of products is increased, to the effect that the demand for operatives to fill work-places is never reduced by technological progress; instead, the demand for operatives tends to be increased!

A net loss of employment is caused by lack of investment. Under any circumstance, there is an average amount of investment needed to create one operative's work-place in the U.S. economy. Divide the disinvestment in the economy by this average amount, and that is a fair estimate of the number of work-places lost because of disinvestment.

The new work-places created at Ford, General Motors, and Chrysler, will be in the capital-goods, components, and materials sectors. Laser technologies and ceramics technologies, will be the obvious major factors of such in-company growth through diversification. These firms will tend, under healthy economic and managerial policies, to become increasingly vendors of the kinds of capital-goods and materials technologies which they develop in connection with automotive technologies.

This is very, very desirable. We should desire an improved per-capita market-basket of households' goods, of which the transportation element is one part. We should desire that this more and better be available at a reduced net cost per unit to society. We should desire, that the greater part of the labor-saving accomplished, should be swung into increased investment in better materials, better components, and capital-investment goods. When that occurs, we are experiencing true economic growth.

So, why shouldn't everyone desire an automobile which is much better, which costs twice as much, but lasts three times as long, even if this means fewer new units sold each year, over the longer run? Better, the automobile might last four times as long, with even fewer units sold each year over the longer run. An automobile that is sound for 20 years, a house or apartment which lasts several hundred years, and is relatively maintenance-free, relative to present types, is also very desirable. We might not wish the new type of automobile to be exactly as durable as "The Deacon's One-Horse Shay," but perhaps 20 years would be a reasonable objective, provided we could incorporate technological improvements into "old faithful," as easily inserted parts or accessories.

The accelerating collapse of the U.S. auto industry

The automotive industry remains the driver of the U.S. economy—largely by default. The urgently needed expansion of urban and intra-city public transportation, which could have followed on the heels of the NASA program, never occurred.

The growth in the number of automobiles on the road, has more than kept pace with the growth of the U.S. population, as the tables show. However, this does not take into account the fact that people are holding on to their cars much longer—not because they are built any better, but because of the high cost of financing new purchases. In 1960, the average (mean) age of an automobile was 5.9 years; in 1975 it was 6.0 years; and by 1983 it had increased to 7.4 years. We have therefore adjusted the figures for automobile stock downward, to what they would have been if people had been getting rid of their cars at the same rate as they were in 1970. From this standpoint, it can be seen that the automobile stock is actually *dropping* with respect to population growth.

FIGURE 1

Automobiles and the population

(millions)

	1950	1960	1970	1979	1980	1981	1982	1983	1984
Population	152.3	180.7	205.1	225.1	227.7	229.8	232.1	234.2	236.0
Workforce	58.7	68.5	82.8	105.0	106.9	108.7	110.2	NA	113.5
Operatives	18.2	19.3	22.4	NA	25.1	NA	23.4	NA	22.7
Cars produced	6.6	6.7	6.6	8.4	6.4	6.3	5.0	6.7	7.6
Cars in operation	NA	56.9	80.4	104.7	104.6	105.8	106.8	109.0	112.0
In operation (adjusted)*	80.4	86.9	85.1	86.3	83.7	80.7	NA		
New cars									
Steel (1,000 tons)	8,364	5,868	5,435	4,147	5,213	5,532			
Pounds per new car	74	51.5	47.3	35.7	44.5	46.8			

*The number of cars which would be in operation if people were getting rid of their cars at the same rate as in 1970; that is, assuming the current population of cars 5 years old or less, constituted 61.4% of the total population, rather than 45.5%, as it was in 1983.

FIGURE 2

Persons per automobile

(individuals)

	1960	1970	1979	1980	1981	1982	1983	1984
Per car	3.18	2.55	2.14	2.18	2.17	2.17	2.14	NA
Per car (adjusted)*	2.55	2.59	2.68	2.66	2.77	2.90	NA	
Per new car	27.0	31.1	26.8	35.6	36.5	45.5	34.4	31.0
Workers per car in operation	1.20	1.03	1.00	1.02	1.03	1.03	NA	NA
Cars in operation per operative	2.96	3.58	NA	4.16	NA	4.57	NA	NA

*The number of cars which would be in operation if people were getting rid of their cars at the same rate as in 1970; that is, assuming the current population of cars 5 years old or less, constituted 61.4% of the total population, rather than 45.5%, as it was in 1983.