Pages 55 thru 58. Information on Hydrogen applications. Note the statement on page 57 concerning the hydrogen car in Carter's Parade.

Pages 59 thru 61. These U.S. Patents are for completely sealed reciprocating engines, with self contained fuel.

Page 62 & 63. These pages address a device that produces more energy than you put into it. I ordered a copy of Newman's book. When it was not received, I contacted Newman. He informed me that all the books that he received from the printer had problems. I ask for a copy of what he had. When I received the book the pages that describe the process were not printed by the printer.

Pages 64 Thru 77 (Page 74 is out of sequence). This concerns a permanent magnetic motor that requires no external power input. When I saw conflicts between the Science 83 article and the Science and Mechanics article I contacted the author of the Science 83 article. He stated that he would not be interrogated by me and hung up.

Pages 78 thru 82. This concerns an electric power generating device. The device could sit on a kitchen table and produced more than 50,000 Watts when connected to a six foot antenna. The device is also used to power a Russian weapon. The Ron Paul letter attachment was an approximately 40 page document. The document addressed the weapon and the Moray power generator. "The Sea of Energy" book was also not available at the Library of Congress in September 1990.

Page 83. A local paper article.

Page 84 & 85. Information concerning 100 MPG carburetors.

Page 86 thru 90. Information concerning a "new" type of transmission that doubled the MPG of an American made automobile. A similar transmission in a modified Volkswagon produced 75 MPG.

I wonder why we have an energy problem. Does someone want us to have an energy problem?

About 1980, the author of the following VPI paper was contacted concerning conflicts in the paper with achieved mpg. The author said, "I'll get back to you". I'm still waiting for his response. 9/26/97

COOPERATIVE EXTENSION SERVICE

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

MECHANICAL ENGINEERING NOTEBOOK

MECHANICAL ENGINEERING DEPARTMENT

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The following information is abstracted by W. H. Mashburn from a paper submitted to the Society of Automotive Engineers by Professor H. P. Marshall, Mechanical Engineering Department, VPI&SU.

MAXIMUM AND PROBABLE FUEL ECONOMY OF AUTOMOBILES

INTRODUCTION

Because of the interests in energy conservation and a need to evaluate devices for improving fuel economy of automobiles, this paper has been written to provide information on maximum and probable fuel economy of automobiles.

In this paper three vehicles are considered which are representative of the range of those used by Americans today. No particular vehicle is treated precisely. Table 1 shows weights and frontal areas of the three sizes selected. In each case the power required to propel the pseudo car at various road speeds is determined for still air, standard air, level-hard-service road, and with tires at recommended pressure. Energy losses which occur between the drive wheels and the input to the carburetor are considered and the resultant fuel flow required is determined. With these data the miles per gallon values are calculated and shown graphically.

TABLE I

SIZE	WEIGHT (lbs)	FRONTAL (Ft^2)
Small	2500	18
Medium	3500	21
Large	4500	22.5

FACTORS AFFECTING FUEL ECONOMY

Figure 1 depicts the energy utilization by internal combustion engine powered automobiles. Notice that the horsepower to the drive wheels is depicted as HP_{DW}. The horsepower required at this point is dependent upon the weight of the car, the frontal area, and the speed at which the car is to be driven. Going backward from this point on Figure 1 we see that there are many losses between the final output at the drive wheels and the horsepower equivalent of the fuel being supplied to the engine.

1

The first to be considered are the power losses in the drive train which are shown in Figure 1 as D, E, F, and G. Figure 2 shows the location of these losses within the drive train. The power required at the engine output shaft, or at the flywheel, is greater than that required at the drive wheels because of these mechanical losses in the drive train. The overall efficiency of the drive train is the product of the efficiencies of the component parts. The losses in the universal joints and in the axle-wheel-ground system are small relative to others. For estimating purposes the efficiency of these subsystems for actual cars was taken as 100 percent and that of the transmission and differential as 90 percent each. The product of these then gives an overall efficiency of 81 percent for the drive train.

Next to be considered is the engine efficiency. The losses within the engine are depicted in Figure 1 as B and C. The power loss (B) to pump work represents that required to pump the air-fuel mixture into the engine and the exhaust products. Engine auxiliaries such as the water pump, oil pump, fuel pump, and fan, plus internal friction within the engine make up the other loss (C) within the engine.

The thermal efficiency is the percent of chemical energy supplied to the engine in the fuel flow that is converted to mechanical energy in the engine cylinder. Notice in Figure 1 that loss A is the largest that occurs within the whole system. By the Second Law of Thermodynamics, the efficiency can never be 100 percent. The second law is: No engine, actual or ideal, can completely and continuously transform into work all the heat added to its working substance. An analysis of an ideal engine cycle using real mixture of air and fuel indicates the highest possible thermal efficiency for lean mixture and a compression ratio of nine to one is 45 percent.

RESULTS AND CONCLUSIONS

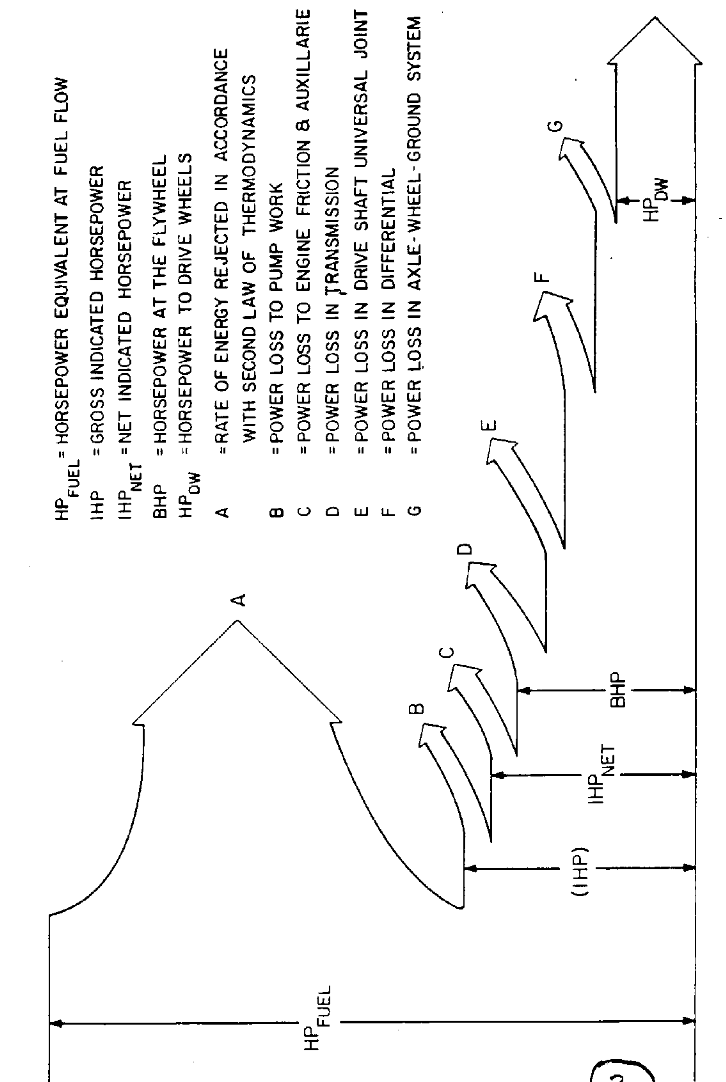
Figure 3 shows graphically the energy distribution for the large car for various road speeds. Figures 4, 5, and 6 show the fuel economy at various road speeds for the three sizes of cars. The first curve on the last three figures is entitled "Operation Possible with Current Technology" and represents the maximum fuel economy with present technology. The other curves show the decrease in fuel economy due to the inherent mechanical and thermal losses within the system. Any claims of fuel economy that project beyond the first curve should be suspect. These curves are also very useful in determining the effect of increased road speed on fuel economy.

The full report is available from Professor H. P. Marshall of the Mechanical Engineering Department.

William H. Mashburn
Extension Specialist

(2)

FIGURE 1. ENERGY UTILIZATION BY I.C. ENGINE POWERED AUTOMOBILES



(3.)

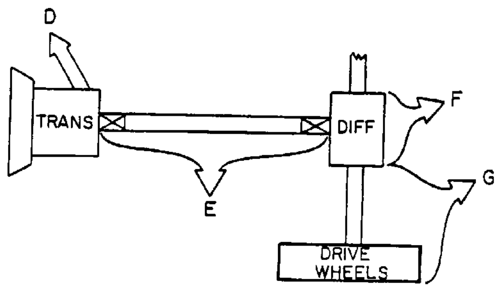


FIGURE 2. POWER TRAIN LOSSES.

(4)

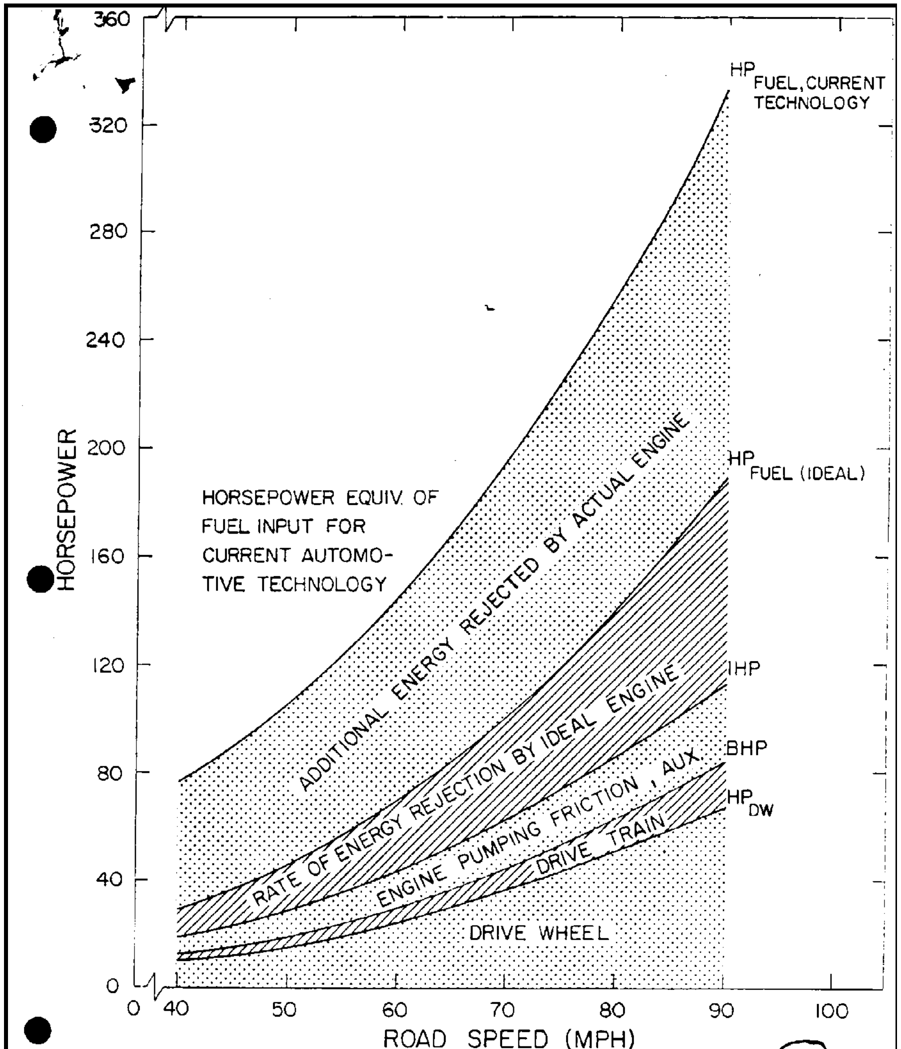


FIGURE 3. ENERGY DISTRIBUTIONS FOR CAR C

(5)

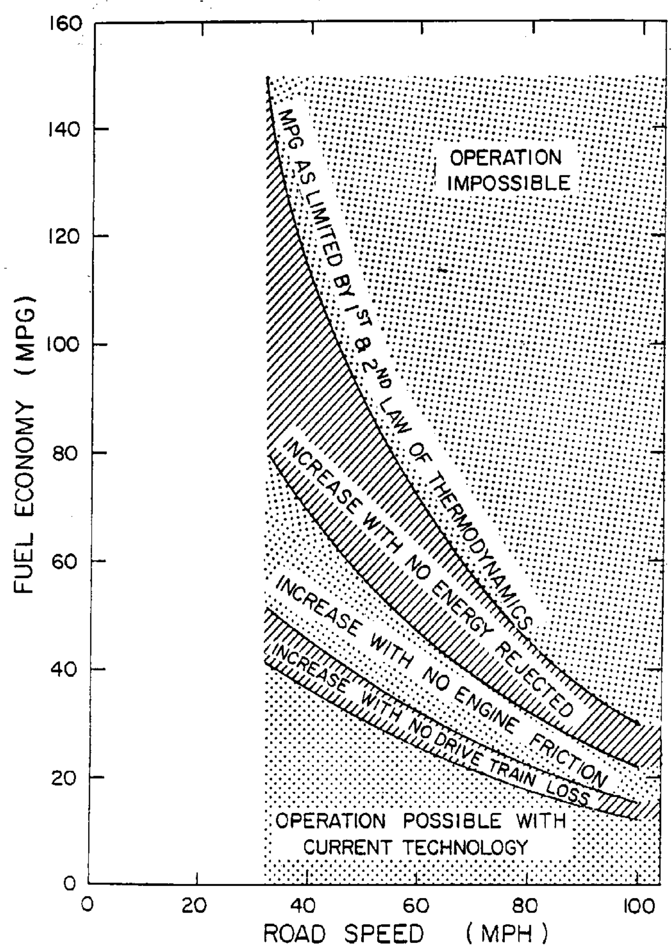


FIGURE 4. SMALL CAR FUEL ECONOMY FOR CAR A (2,500 LBS)

(SHELL OIL - 376 MPG)

6.

6

7

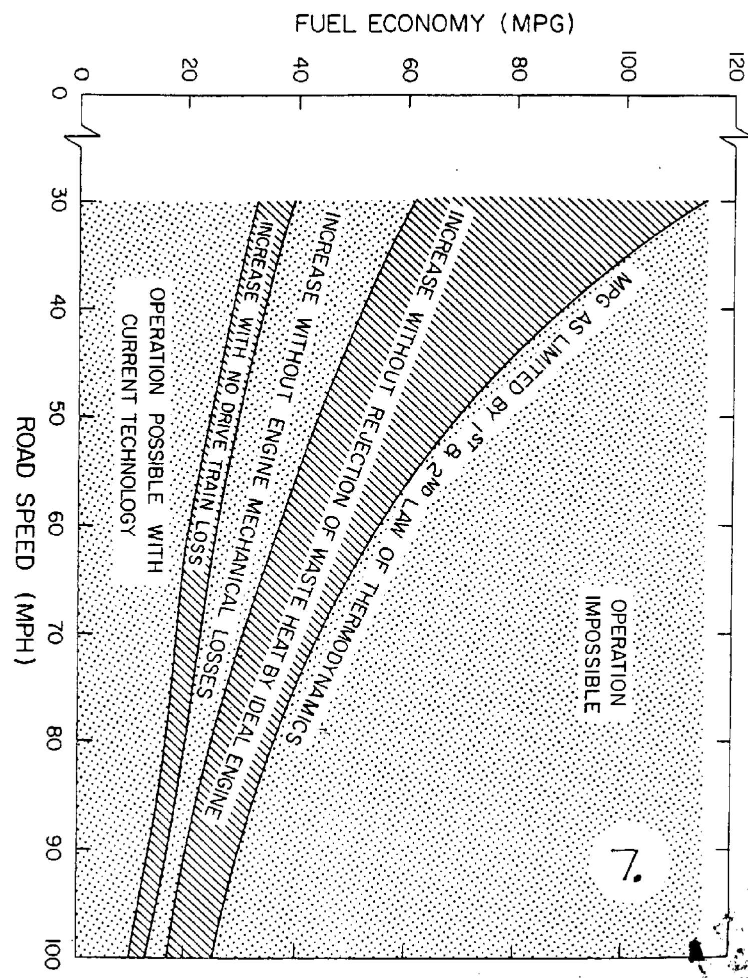


FIGURE 5. MID-SIZE CAR FUEL ECONOMY, CAR B 3,500 LBS

SHELL OIL 149 MPG

pumping losses and spark timing, the magnitude of the gains decreasing in the order given.

The author thus offers as a personal speculation of what is practically realizable over the next decade the following fuel consumption gains in European gasoline-powered cars.

(1) From engine design changes, 20%.
(2) From gasoline design changes, 5 – 10% according to driving conditions.
(3) From engine lubricant changes, about 3%.
(4) From transmission design changes, 5 – 10%.
(5) From transmission lubricant changes, about 3%.
(6) From design changes of a given vehicle (weight, drag, tyres, accessories), approximately 10%.
(7) From engine size and model mix changes, approximately 10%.
(8) From vehicle maintenance procedures, approximately 5%.

Since these different effects are largely independent of one another, the surprisingly high total emerges of about 50% potential improvement, which makes a very good target for the industry to aim at. It is not the first time that such an optimistic forward look has been taken. No less a person than Charles Kettering[35] when General Motors president in 1929 predicted '80 mile/gal by 1939'. Let us hope that, with the present depletion of oil reserves, the progress towards achieving the target will be faster in the coming decade than it was then.

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FUEL ECONOMY OF THE GASOLINE ENGINE

Fuel, Lubricant and Other Effects

(9)

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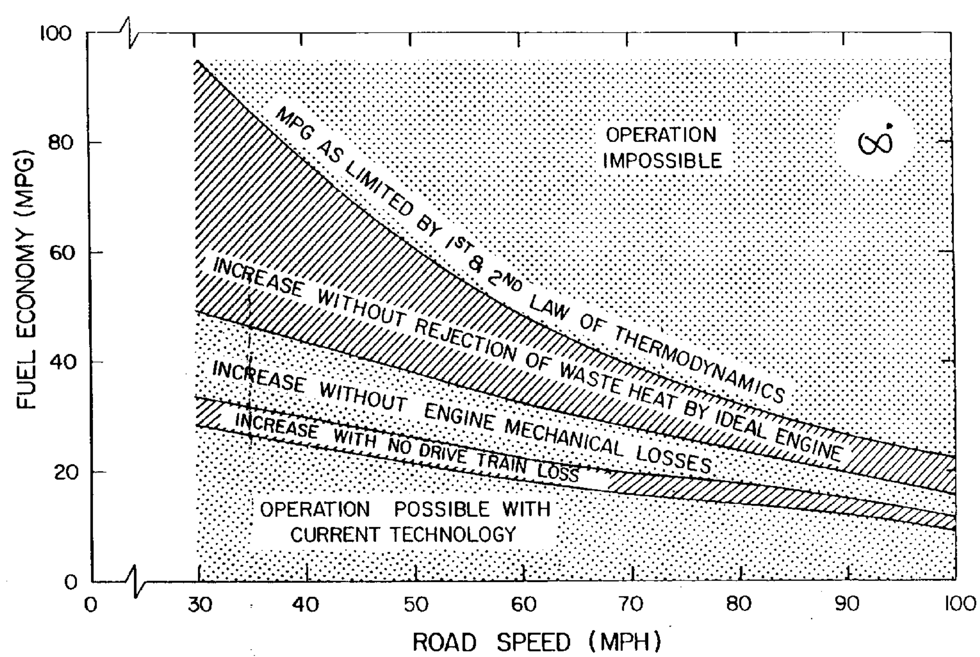

FIGURE 6. LARGE CAR FUEL ECONOMY, CAR C 4,500 LB

TOM OGLE MORE THAN 100 MPG
(4,177,779)