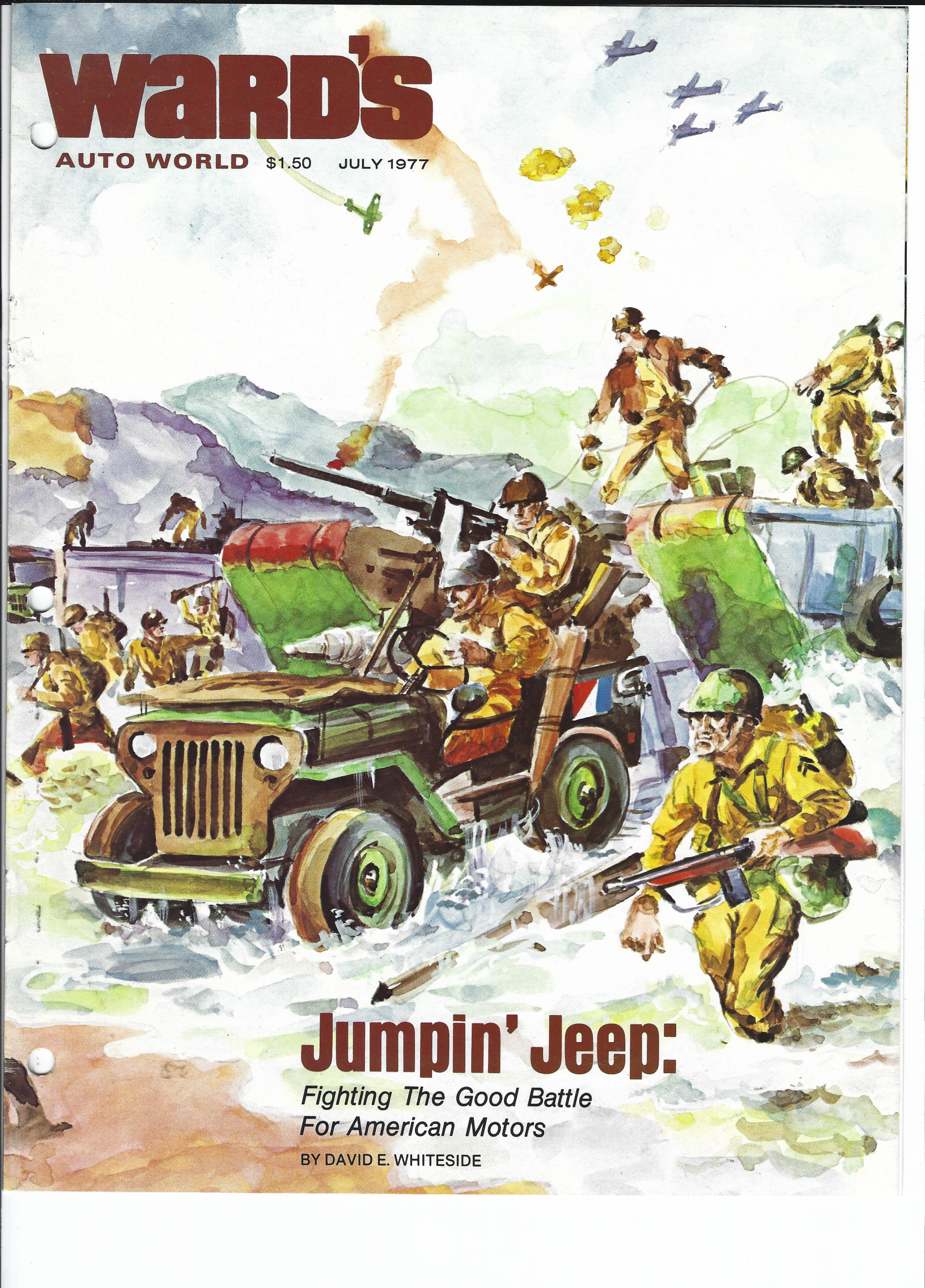


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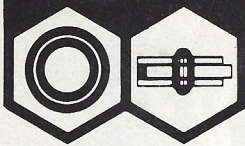
AUTO WORLD \$1.50 JULY 1977



Jumpin' Jeep:

*Fighting The Good Battle
For American Motors*

BY DAVID E. WHITESIDE



Alcohol Fuel Getting Attractive

by Gary L. Witzenburg

"The only thing wrong with today's cars is the stuff that goes into the gas tank! We can soon achieve our national goals of cleaner air and energy independence by widespread use of alcohol fuels, but not by forcing people into smaller cars. The time has come to change our fuel, not our cars!"

So says alcohol fuel activist Richard F. Merritt in an open letter to Henry Ford II, whose grandfather, Henry Ford, was one of the earliest advocates of alcohol as an alternative to petroleum-based fuels.

The late Mr. Ford's alcohol fuel campaign during the 1930s Depression, like other early efforts, died young because of the then-low cost and universal availability of petrofuels. But conditions have been changing rapidly in recent years, and alcohol is looking better and better almost daily.

Alcohol fuels are gaining acceptance by fuel researchers and chemists, engineers and officers of respected automakers, certain local and federal governments and even some oil industry officials.

Volkswagen, Mercedes-Benz, Volvo and others have been actively pursuing alcohol, both by itself and as a blend with gasoline. And Ford Motor Co. has cautiously put itself on record as favoring alcohol as a cleaner-burning fuel—pending large-scale economical production and distribution, of course.

The State of Nebraska has been pushing its own 10% grain alcohol gasoline blend, dubbed "Gasohol," for several years (they grow a lot of grain in Nebraska) and even successfully mixed and marketed some 93,000 gallons of the stuff from one rural station in 1975 with good consumer acceptance.

But Brazil has mounted the most vigorous conversion campaign yet, with the major purpose of attaining energy independence and the secondary goal of effectively utilizing its enormous reserves of both arable land and inexpensive labor.

Brazil's President, General Ernesto Geisel, is a former president of the country's national oil company, Petrobras. He knows a thing or two about fuels and energy, and so far has com-

mitted more than \$400 million to the country's grain alcohol fuel development program. Considering Brazil's annual \$3 billion expenditure for imported oil, that would seem like money well spent.

Much of the negativism leveled at alcohol as an automotive fuel seems to result from a lumping together of the two basic types—methanol and ethanol—and the resultant false attribution of the disadvantages of one to both.

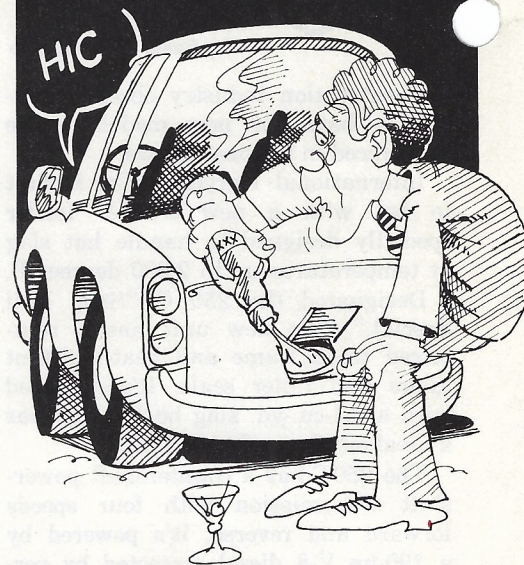
Methanol, also known as methyl alcohol or "wood" alcohol, can be derived from coal, waste wood, garbage and even sewage, and by itself can be an excellent IC engine fuel. However, its energy content on a volume basis is only about half that of gasoline (meaning double-size fuel tanks and twice the flow rate for comparable output).

And it creates some difficult problems when blended with gasoline—most notably a tendency to cause vapor lock (even in very low concentrations it increases vapor pressure and alters the fuel's distillation performance). It's also inclined to separate from the gasoline in the presence of even small quantities of water, and it tends to raise CO and HC pollutant levels in late-model (lean-running) emission-controlled engines.

Ethanol (also called ethyl or "grain" alcohol—the same stuff we drink in commercial beverages) appears to have none of these important disadvantages. It's easy to produce by fermentation of any agricultural product containing sugar or starch, and in fact is given off in large quantities by naturally fermenting organisms.

It mixes more easily with hydrocarbons than methanol, so it suffers less from water sensitivity and vapor lock. And it has a heat-content advantage: 89,000 BTUs per gallon vs. 57,000 BTUs for methanol.

Ethanol's only disadvantage at present seems to be its relatively high production cost. Thus most alcohol fuel research conducted in this country has used the cheaper and more readily available methanol—and the resulting problems and disadvantages encountered are widely and mistakenly attributed to



alcohol fuel in general.

Researchers point out that a U.S. ethanol program like Brazil's could have significant impact on the country's energy supply situation. J. P. McCloskey, retired from the Rockwell International Corp.'s Electronic Group technical staff, for instance, reports the following:

- Using the reasonable estimate that 500 gallons can be produced from an acre of sugar beets, just the 60 million acres of arable land held in the government's "soil bank" as of 1973 could have produced 30 billion gallons of ethanol—an amount equal to 30% of all the gasoline sold in the U.S. that year.

- As gasoline prices increase and production of grain alcohol is undertaken on a massive scale and improves in efficiency, the latter's cost will become competitive.

- Tests have shown that gasoline ethanol blends as high as 25% require no significant modifications to existing engines and have no detrimental effect on regulated emissions. Eventual conversion to pure ethanol would significantly decrease pollutant levels, particularly that of NOx.

Nebraska Gasohol research to date indicates that full conversion to the 10% ethanol blend could be accomplished within the state by construction of five 20-million-gallon per year distilleries, that the grain alcohol could be sold profitably at \$1 per gallon, and that Gasohol could then be blended and sold at a pump price easily competitive with gasoline. □