Letters

Automotive Emissions

I would like to know why the automotive industry and the responsible agencies of the government are not attacking the root cause of the reason for the contribution of automobiles to air pollution by focusing more attention on the problem of combustion *within* the combustion chamber. Rather, they seem to prefer to "solve" the problem by hanging a chemical plant on the exhaust system of the automotive engine, thus uselessly converting up to 10 percent of our precious gasoline supplies to carbon dioxide and water and also converting sulfur dioxide to sulfuric acid (see News and Comment, 26 Oct., p. 368) to the probable discomfiture of the populace.

According to Antoni Oppenheim of the University of California, Berkeley, there is very little work being done on the fundamentals of combustion. The results of such work could be applied not only to this problem but also to making improvements in rocket and turbine engines. (There seems to be a general feeling among purse string holders that everything is known about this complex subject.)

In pondering the problem of automotive air pollution, I thought I had stumbled on a simple and brilliant solution—inject air under sufficiently high pressure into each combustion chamber at about 70° after top dead center during the power stroke, thus converting the original fuel-rich mixture into an oxygen-rich mixture that would burn up all the hydrocarbon and convert carbon monoxide to carbon dioxide. Nitrogen oxides would also be reduced, since starting with a rich mixture keeps the peak temperature lower. All of the power would be obtained from the gasoline because it would be burned up during the power stroke, and a good portion of the power used to compress the injected air would also be recovered. The air could even be injected through a hollow spark plug, thus simplifying the adaption of the system to existing automobiles and trucks.

I consulted with experts and scoured the journal literature, but I could find no reference to this approach. However, when I had a patent search made, I discovered five patents assigned to General Motors in the early 1960's that covered most of the elements of my proposed system, with some data indicating that automotive emissions could be practically eliminated.

Why has General Motors chosen not to pursue this eminently reasonable approach to the solution of the air pollution problem?

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Energy Conservation

In "Energy conservation through effective utilization" (13 July, p. 128), Charles A. Berg, using data from the Stanford Research Institute (*1*), breaks down the total national energy consumption into residential building services (19.2 percent), commercial building services (14.4 percent), industrial processes (41.2 percent), and transportation (25.2 percent). While I applaud his effort and think this type of analysis is necessary, such a listing invites comparison of the four categories, which is inappropriate. The building services and transportation categories are charged with only operational costs, while the category, industrial processes, includes its own operational and manufacturing costs and, in addition, manufacturing costs for the other categories. This lumping of energy costs could lead to serious policy errors in the future.

For example, Berg suggests that improved insulation and draft control in both residential and commercial buildings would result in a considerable energy savings. This seems reasonable; however, what would be the additional energy cost for the manufacture of storm windows and other insulation materials? The estimate of a 40 percent saving, had 1972 Federal Housing Administration standards for heat loss been applied to all buildings, is certainly high, because the manufacturing cost of these additional materials is not considered.

To improve utilization efficiency, the total cost—manufacture, repair, and operation—must be the basis for comparison. If comparisons are made on an operational basis alone, we may be presented with a bill for the "hidden" energy costs sometime in the future. Aren't many of our ecological problems today the result of such "hidden" costs?

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References

1. Stanford Research Institute, *Patterns of Energy Consumption in the United States* (Menlo Park, Calif., November 1971; prepared for the Office of Science and Technology, Washington, D.C., January 1972), p. 6.

In his discussion of solar energy absorbers Berg confuses cost of manufacture with price to the consumer. Cost is a crucial factor in the implementation of a viable solar energy program; without an efficient, low-cost device to collect solar energy, all the current speculation on its use becomes meaningless.

As far as I know, Fafco Incorporated is the only company in this country actively manufacturing, marketing, installing, and servicing flat plate collectors for absorbing solar energy. We are not aware of anyone who can produce a collector for domestic water heating for $18 per square meter (which is $1.67 per square foot), let alone "reduce this cost to $15 per square meter" as Berg suggests.

Even if this low manufacturing cost were possible, it should not be confused with the price to the consumer. A flat plate collector would have to sell to the consumer for approximately three times the manufacturer's cost to allow for his profit, the distributor's profit, and the retailer's profit. The cost of installation and service would be extra. Also, Berg's analysis of the cost of meaningfully implementing solar energy in this country seems to overlook the other essential components of a domestic solar water heater, storage capability and controls, both of which are items of major expense in addition to installation.

We are encouraged by the current