Tritan Aero 135

PHOTOGRAPHY: AARON KILEY

An answer to a question that nobody's asking.

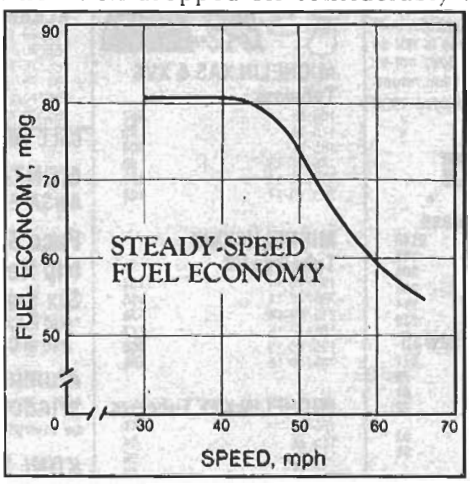
• Even the current frenzied pace of automotive progress is too slow for some. They have a vision of the car of the future, and they simply can't understand why conventional automotive designers aren't moving in their direction. Rather than wring their hands over the major manufacturers' blindness, however, they see an opportunity to jump into the vanguard: they build their own cars.

One such is the Tritan Aero 135. It looks more like a stubby jet fighter than a car, with its sleek body, twin tail fins, and tandem seats under a bubble canopy. It has but three wheels, which are almost fully enclosed, and a whirring amalgamation of overgrown lawn-mower components for propulsion. All in all, it's about as far removed from convention as any car we've seen.

The Aero was conceived by James and Douglas Amick, a father-and-son team that judges a car's virtue primarily by its fuel economy. Since the senior Amick has an extensive aerodynamics background, they placed the heaviest emphasis on developing a wind-cheating design. The result is a sleek fiberglass body with a frontal area of 14.9 square feet (the typical econobox is in the 20-square-foot range) and an estimated Cd of only 0.135. Our coast-down testing supports this claim with a measured aerodynamic power requirement at 50 mph of only 2.5 hp, far better than our previous low of 6.5 hp.

Even more incredibly, side winds, which increase aerodynamic drag for most cars, actually reduce drag on the Aero. This occurs because the two large tail fins are in fact vertical airfoils; they produce a forward-acting force when the airflow is not parallel to their surfaces. According to the Amicks' wind-tunnel tests, with a very strong side wind these forces are actually greater than the overall drag. Under certain circumstances, then, the Aero 135 is (in theory) wind-propelled. The fins also move the aerodynamic center of pressure behind the center of gravity, thus improving stability during heavy side winds or strong buffeting. Under calm conditions, however, the tail fins do nothing for the Aero's drag or stability, while still adding to its weight and bulk.

Unfortunately, the Amicks' level of innovation dropped off considerably when they attacked the nonaerodynamic areas of vehicular design. The Aero's three-wheeled chassis is an example. The concept itself is not necessarily bad: rolling resistance is lower with three wheels, the single nose wheel is compatible with the aerodynamic body, and rollover tendencies are minimized when the center of gravity is nearer the two-wheeled end, where the Amicks put it. The execution, however, is back-yard at best.



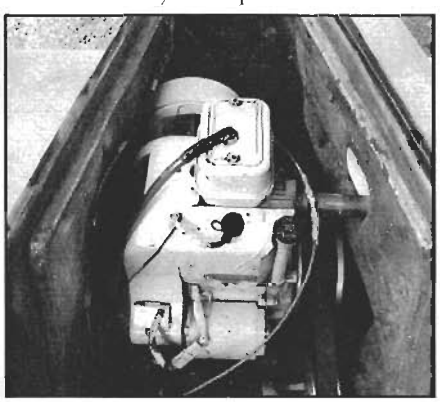
The various chassis components appear to have been selected largely on the basis of expediency rather than function. The front tire (a fugitive from a small utility trailer) is mounted to a leading-link suspension best likened to a Vespa motor scooter's front end. As it steers, the trailer tire that was meant to run vertically is made to camber sharply against the road. The steering is a Volkswagen Beetle box tied to the solo wheel through a very convoluted linkage. The automotive rear tires are located by a HydraGas trailing-arm suspension liberated from an Austin Allegro.

This hodgepodge of parts keeps the Aero's body from dragging on the ground, but doesn't do much else well. The nonlinear steering and suspension linkages produce darty handling. There is enough caster to keep the Aero running in a straight line if you don't move the wheel much, but the suspension does little to isolate the passengers either sonically or kinetically from road irregularities.

Another expediency was the decision to fit brakes only to the rear wheels. The Amicks reasoned that with a static weight distribution of 24/76 percent, front/rear, a front brake was unnecessary, but the stopping distance indicates otherwise. A 190-foot stopping distance from 60 mph (the Aero can't reach 70 mph) is not very good. (It translates into a 260-foot stop from 70 mph.) The problem is that with deceleration-induced weight transfer, roughly 38 per-

cent of the Aero's weight is on the front tire under braking, and that's too much traction to throw away.

The drivetrain is another area of minimal sophistication. The Amicks decided on a small engine for good fuel economy. Unfortunately, their choice was a Tecumseh 360cc single-cylinder garden-tractor engine. It sits sixteen inches behind the rear wheels and transmits its 14 horsepower to the tires via a total of eight pulleys and four belts, including a snowmobile-style torque converter and



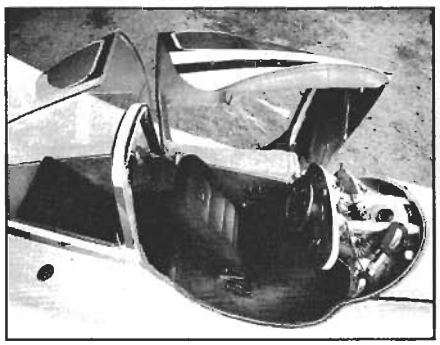
one differential. With about 80 pounds for each horsepower to motivate, this mini-agricultural drivetrain offers little in the way of performance. Even with the excellent aerodynamics, the top speed is a meager 66 mph, and the acceleration times could be measured with an hourglass.

Vehicle type: rear-engine, rear-wheel-drive, 2-passenger, 1-door coupe
Price as tested: $6000
Engine type: single-cylinder, aluminum block and head, 1x1-bbl carburetor

Displacement	22 cu in, 360cc
Power (SAE net)	14 bhp @ 3600 rpm
Transmission	variable-ratio automatic
Wheelbase	85.0 in
Length	162.5 in
Curb weight	970 lbs
Zero to 60 mph	63.2 sec
Standing ¼-mile	31.4 sec @ 48 mph
Braking, 60–0 mph	190 ft
Roadholding, 282-ft-dia skidpad	0.63 g
Road horsepower @ 50 mph	5.5 hp
Top speed	66 mph

Nor is the fuel economy particularly stunning. We measured 74 mpg at a steady 50 mph; this is about 50 percent better than current high-mpg econoboxes can achieve, but still disappointing when we consider the Aero's much lower weight and superior aerodynamics. The Tecumseh engine's rudimentary carburetion, ignition system, and basic design limit its thermal efficiency, while the complex drivetrain absorbs and wastes power with every turn of its multifarious pulleys. A driveline from a contemporary Japanese 600cc-class car would do wonders for the Aero's fuel efficiency.

As a human transportation device, the Aero has other design flaws. The tandem seating and high noise level preclude normal conversation. The large glass area and poor ventilation combine slowly but surely to bake the occupants on warm, sunny days. And for the projected $6000 price one can buy any of several conventional cars that are infinitely superior to the Aero in every transportation and sporting respect with the exception of fuel economy.



The Aero does show that talented amateurs can demonstrate advances over production cars when they concentrate their efforts in one area—in this case, aerodynamics. But it also shows that cars are extremely complex machines, and that excellence in one area cannot cover for mediocrity everywhere else. Which is why, despite the initiative and creativity of the back-yard auto manufacturers, their products rarely see common use.

—*Csaba Csere*