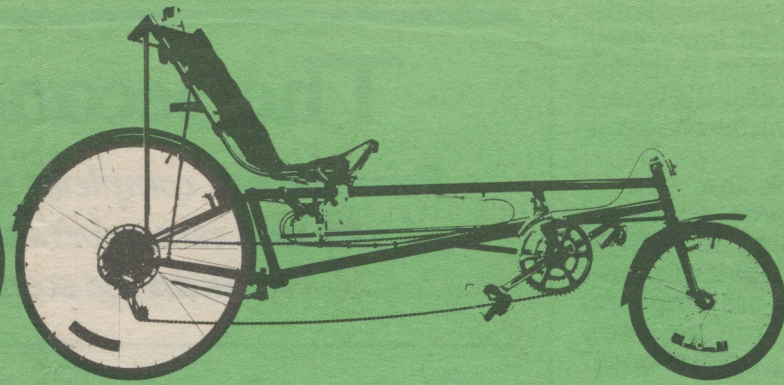


THE AVATAR

2000



Human-powered vehicles in which the rider reclines and pedals with feet forward are not new. There were some designs using this general position at the end of the last century. In the thirties a European machine called the "Velocar," ridden by a relatively unknown rider, broke many speed records and even beat the world champion. The bicycling world was so unsettled at the former supremacy of the conventional bicycle being toppled that its governing body met and summarily outlawed the "recumbent" bicycle from further competition. Subsequently, it was built only by enthusiastic experimenters.

With the exception of some earlier recumbents built by experimenters mentioned above, commercial bicycle designers and manufacturers have *not* addressed themselves to certain shortcomings which are inherent in the conventional design. Through tradition, these shortcomings have been tolerated over the years rather than accepted by the bicyclist. Efforts to make the bicycle more functional—more consistent with the human anatomy—have received virtually no attention in an industry which, in terms of meaningful innovations, has been bordering on stagnation for the past eight decades.

In 1978, realizing the absence of a bicycle which accommodates the human body, Richard J. Forrestall and Harald V. Maciejewski became fascinated with the recumbent principle. The two sold their bicycle stores and import business, and used the proceeds to form FOMAC, Inc. They joined with Dr. David Gordon Wilson, professor of mechanical engineering at M.I.T. in carrying on development work on the recumbent bicycle concept. Dr. Wilson, who is considered to be one of the paramount authorities on human-powered propulsion systems, initiated the development work in 1969; his reports concerning recumbents appeared in *Bicycle Science* (M.I.T. Press, 1975-1977) and *Pedal Power* (Rodale Press, 1977).

By January of 1981, this joint effort resulted in the introduction of the Avatar 2000™ recumbent bicycle, a product targeted for the bicycle enthusiast market. The bicycle weighs 29 pounds, has 16" rims, and features a 21-gear power train. The results from more than 10,000 miles of actual road testing were so convincing that FOMAC applied to have several design features patented in the United States (U.S. Patent 4,283,070 was granted in August of last year. Patents have been applied for in France, the Netherlands, Sweden, Switzerland, United Kingdom, West Germany, and Japan.)

"What we've done is to design a bicycle to accommodate the very functional human body, rather than asking the body to conform to the bicycle," said Harald Maciejewski. "In essence, we took on the conventional bicycle design, and didn't come up with much of a contest."

Here's the way FOMAC saw the scoring in the "contest":

- 1 Power delivery to the pedals is more efficient, because the rider pushes back into the seat with the hips rather than taking much of the reaction force through the back and arms. This reduces significant backstrain and general fatigue.
- 2 The whole of the rider's lung capacity, especially the diaphragm, is being used as opposed to a constricted diaphragm due to the crouched position used on the conventional bicycle.
- 3 Wind resistance is lower even without any form of shielding. The addition of shielding, to provide further drag reduction and also weather protection, is simpler than to a conventional bicycle—a fairing for the Avatar 2000 is currently being designed in California.
- 4 No more frame sizes to consider. A sliding seat undercarriage on two stainless steel tubes facilitates seat-to-pedals distance adjustments in infinite increments as dictated by the rider's leg length.

- 5 As a result of the lower center of gravity, "over-the-handlebar" spills, which with traditional bicycles too often lead to skull and spinal fractures, are virtually impossible. In the event of a spill, one tends to land on one's feet, not on the face or head.
- 6 It is virtually impossible to catch the pedals on the ground, a frequent cause of sometimes-disastrous spills on traditional bicycles. One can, therefore, pedal through curves.
- 7 The lower center of gravity, improved weight distribution and the utilization of tandem cantilever brakes yield much more effective braking than is possible with traditional bicycles.
- 8 The sitting position of the rider facilitates just about the same eye-contact level as that of drivers in regular automobiles, (communication with drivers seems easier and friendlier). Possibly some dignity is recaptured by being able to put ones feet on the ground at a stoplight.
- 9 The now-medically recognized nerve damage to the hands and crotch region which comes from intensive use of conventional ten-speed bicycles is *completely* absent in our recumbent design. Furthermore, the back is unstrained and fully supported in an optimum curvature, making our AVATAR 2000™ beneficial for both healthy and weak backs. The recumbent is very comfortable.
- 10 Storage and shipping options are greatly enhanced, because the seat can be folded or removed without any tools and, most important, without disturbing the seat-to-pedals distance relationship.
- 11 An optional luggage rack is available which yields three times the dimensional loading capacity of conventional racks. It fastens to the seat frame without having to use tools.
- 12 One does not have to swing one's leg over the seat. This makes it easier to carry a safety flag provided with our AVATAR 2000™, along with an amber sixty flashes-per-minute beacon to enhance greater visibility.

"In short, the only design criteria we considered were greater efficiency, safety and comfort when compared with the conventional bicycle. That's the core of our approach," said Dick Forrestall.

Current demand for the totally hand-built AVATAR 2000™, costing \$2,127.00 (fob Wilmington, Massachusetts) still exceeds FOMAC's building capacity. Utilization of more frame jigs has enabled the builders to shorten the delivery time from nine to six months (to be further reduced shortly). FOMAC has managed to earn an impeccable reputation for excellence in design and workmanship, with convincing endorsements by authoritative sources through the media and, most importantly, by AVATAR 2000™ owners. "We are, of course, very eager to provide such references. Most of our machines are sold by word of mouth as the direct result of the owner's unqualified endorsements; there is no other way to sell a quality product as far as we are concerned," added Dick Forrestall.

FOMAC, in addition to being involved with the AVATAR 2000™, is fully committed to other practical applications of human-powered propulsion systems from the design conception to the marketing stage. A pedal-powered lawn mower and pleasure boat prototypes have produced extremely encouraging test results. These efforts are strongly supported by Dr. Wilson, FOMAC's consultant, who is considered one of the paramount authorities on human-powered propulsion systems.

"To be a viable business on a relatively small scale as we are and, at the same time, be an innovator with uncompromising design criteria and workmanship, is a tall order," said Harald Maciejewski. "But these two objectives don't have to be mutually exclusive."

"The philosophical dilemma we find ourselves in is how to make our innovation available to a larger market segment by virtue of economy-of-scale cost benefits *without* lowering our criteria in terms of design standards and quality," adds Dick Forrestall. Licensing others with sufficient financial resources and an attitude consistent with our way of doing business, or significantly expanding our own capacity which would definitely necessitate the solicitation of venture capital, are two options we're pondering."

"In terms of efficiency, comfort and safety, we offer a very attractive alternative to the conventional approach, dollar for dollar, feature for feature," said Maciejewski, "especially for those who use their bicycles for touring and/or commuting."

Lenny Vreeland, who last year crossed the United States (from Los Angeles to New York) in 14½ days with an AVATAR 2000™ rolled up in front of New York's city hall, on his 51st birthday. After dismounting Vreeland commented to Maciejewski "For over thirty years I have been riding antique bicycles and didn't even know it."

If you are interested in more details on the
AVATAR 2000™, kindly submit \$3.00 to:

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Wilmington, MA 01887
Tel.: (617) 658-2478

The \$3.00 covers the costs for FOMAC's time
to handle the inquiries, printed materials, and
postage.

BikeReport • September/October 1982 • 11

This promotional article was published by the bicycle advocacy organization known at the time as BikeCentennial. Formed about 1976 to promote cycle touring, later changed its name to Adventure Cycling Association. It has always been headquartered in Missoula, MT.