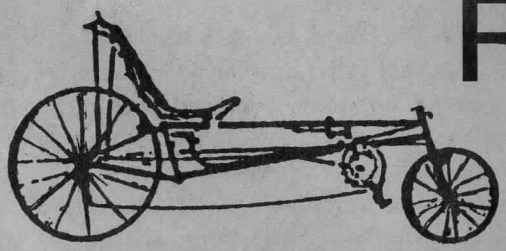

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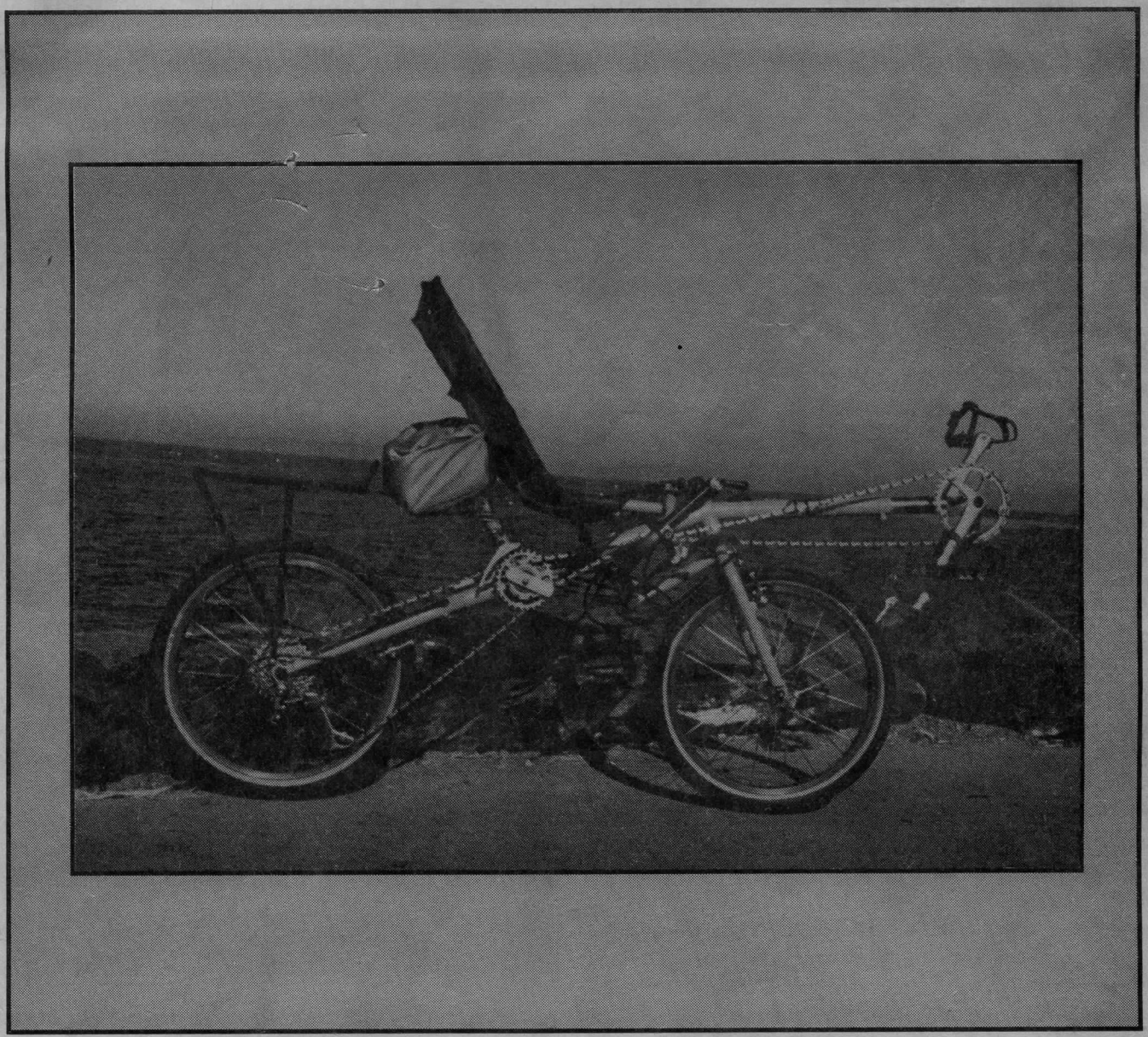


Cover Story: ATP R-20 Road Test

A.T.P. "R-20 SWB Recumbent

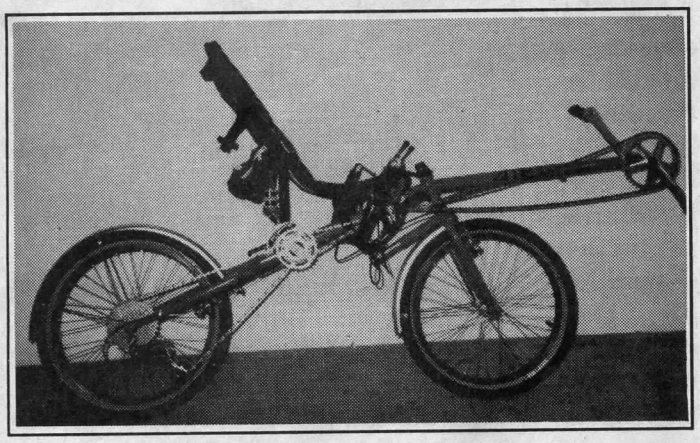
THE ADVANCED TRANSPORTATION PRODUCTS (A.T.P.) "R-20"

by Robert J. Bryant and the staff of the Recumbent Cyclist

The A.T.P. R-20 is part of a new breed of SWB recumbent bicycles. Why a new breed and what makes it different? This innovative new class of recumbent offers new answers to old problems. First of all, you'll notice two wheels of the same size, 20" wheels. Then you'll see that the bike was designed to offer virtually no heel/front wheel interference. Next you'll notice the innovative CycloPedia "Intermediate Drive" dual chain/intermediate idler drivetrain. The R-20 is the first production recumbent to offer this system. Besides a trick drivetrain, the ATP bike offers some interesting features in the rider comfort department; an elastomer (rubber bumper) sprung seat and an original underseat steering/handlebar set-up. All of these features combine to offer a package that is unlike any other currently available.

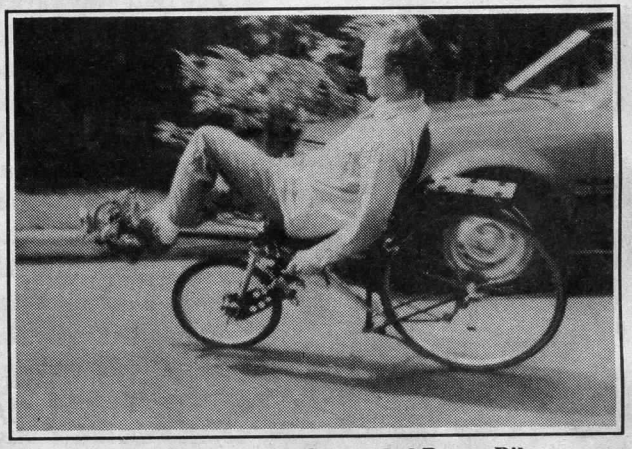
A.T.P. HISTORY & DESIGN

The A.T.P R-20 is a home town bike. It was designed and built by Edmonds Washington HPV enthusiast, Joel Smith. The R-20 production frames are built by a professional frame builder in the Seattle area who specializes in Titanium and builds custom-order bikes. He also has experience building recumbents. When Joel Smith isn't building and riding recumbents he is an Aircraft Structural Engineer for the Boeing Aircraft Company. Joel started to build his first recumbent nine years ago. His first serious endeavor was a recumbent trike built two years ago. It was a lean to steer trike built with three 17" wheels and painted shades of yellow and green. It was a striking vehicle and received much attention at the Portland (OR) International Human Powered Speed Championships in August of



1990. Joel says the design was lots of fun, but not suited for the mass market.

The R-20 was designed in late summer 1990. Joel built just one prototype, but modified it four different times and made even more changes in the first few production models. The original prototype has seen 2000+ miles in the last 1-1/2 years. In a discussion about his new bike, Joel mentioned that the two people who influenced him the most in recumbent design were Grant Bower, who is well known in the Northwest and HPV circles for his neat "Bower Bike" SWB recumbents and Jim Weaver, the



Grant Bower's 1991 Suspended Bower Bike

designer of the Counterpoint Presto SWB recumbent. The Presto is the original "new breed" SWB recumbent and was designed in the mid 1980's (the Presto will be tested later on this year).

We first saw the R-20 at last years Seattle Bike Expo where it received rave reviews. For those of you who have seen that bike, the 1992 production version is even more refined. The changes include: a better custom built fork, slight frame modifications, updated and more comfortable seat, a custom bend handlebar and updated componentry.

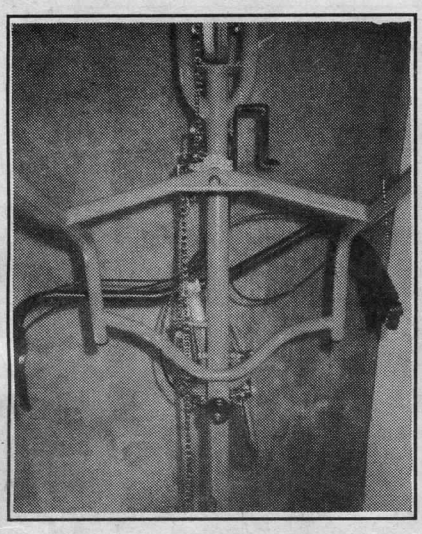
FRAMESET: MONOTUBE FRAME DESIGN

The monotube frame is built of .049 1-1/2" diameter chromolly TIG welded steel. The fork, seat frame and handlebars are also of chro-molly and is designed and built specifically for the R-20. There are no off-the-shelf BMX forks here. The R-20 frame is built on a custom-crafted frame jig that is built with no expense spared by the frame builder. The front boom is forged stainless steel and slides to accommodate riders from 4'11" to 6' 4" tall. Custom lengths are also available. The bikes are powdercoated a gorgeous Aqua Marine; custom colors are also available. The wheelbase is 38" with a weight distribution of approximately 57% front and 43% rear. The head tube angle is 68 degrees. The R-20 offers a brave new frame design with the monotube frame and stays along with the higher riding position. This well thought out frame design is also strong, Joel Smith does structural analysis in his profession and he

designed the R-20 to have a safety factor of 4, with a 200 pound rider. The bike is overbuilt in all respects.

MONOTUBE FRAME; UNSUPPORTED REAR STAYS

Monotube SWB recumbent frames are accepted and even preferred by some enthusiasts. The unsupported stays are fairly new, especially to recumbents. On the R-20, they are a topic of great interest among intrigued recumbent enthusiasts. ATP has supplied us with information on the design theory of the R-20, and the information is as follows.



The rear stays are extra tough MTB fork blades with top quality drop-out. They are TIG welded to both sides of the main frame tube. A cross-brace (1" ahead of the rear wheel) also connects the rear stays and main frame tube for added strength and stiffness. ATP feels that the 1" stays are even stronger than main frame because the two frame tubes are splitting the load that the 1.5" mainframe does. In other aspects of cycling, bikes with no rear triangle are gaining popularity. Many of the new suspension bikes have unsupported rear stays. In the recumbent scene the Kingcycle uses dual tubes that run the length of the bike. According to the R-20's designer, a conventional bike needs the stiffness of the diamond design to support the side to side twisting from the torque to the pedals. The R-20 does not require the triangulated stiffness of a diamond frame because the pedals are out front on the boom. In technical articles, bicycle stress analysis is not done to check total load (weight) or the road shock, but to check for stiffness related to the pedaling motion.

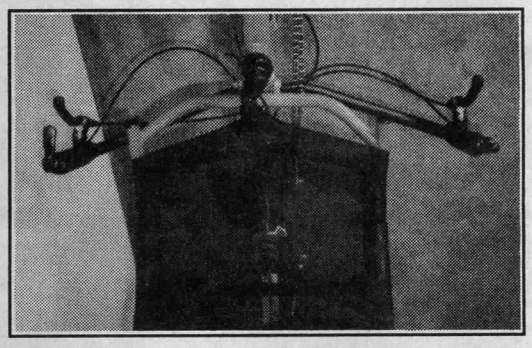
SLING STYLE SEAT

The nylon mesh seat is suspended on an expertly designed and built seat frame, powdercoat painted to match the R-20's frame. The seat is mounted in front at two rod end bearings connecting the seat frame to the main frame tube, to allow a pivoting action. In the rear it is attached via the elastomer suspension unit. This unit rests upon the fully supported front derailleur tube, which due to the intermediate idler that acts as the triple crank, is just behind the seat. The front center section of the nylon seat material is suspended upward from the head tube to keep you from sliding forward in the seat. This "soft seat horn" is virtually unoticable and works very effectively. The seat material is easily removable with four nylon snaps similar to those found on lightweight back and fanny packs. The seat frame itself is removable with three bolts. A rack attachment mounts at the front derailleur tube/ seat suspension connection. You can also add washers here to change the seat recline angle. The whole system is uniquely impressive.

Typically, the use of 20" wheels raises the bike, seat and boom's height. The R-20's frame and seat were designed so that all riders can rest both feet on the ground during stops and starts. How is this achieved? The seat siderails are fairly short and are positioned at a declining-forward angle to keep them as low as possible. The front center of the seat is attached to the head tube and also rests on a rubber doughnut that attaches to the seat cross support, which rises up and over the main frame tube. When looking back at the bike from a forward view, you will notice that the cross support runs from the right rail, drops downward and then back up to and over the main tube then back down and up again to the left rail. The two drops look like a very shallow "W", perfect for your thighs to rest in while at a stop. This makes the front side sections of the seat very low allowing shorter riders to rest with both feet flat on the ground. You also stay snug in the seat and do not slide forward. To check this out, RCM's 5'4" business manager was able to sit on the R-20 flat footed and ride with no problem. This instills confidence for first time SWB recumbent riders.

INNOVATIVE UNDERSEAT STEERING & CONTROLS

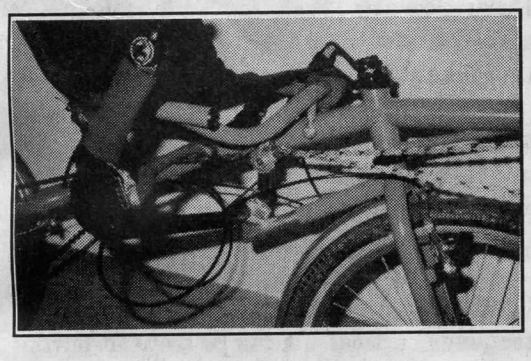
The R-20's steering and controls are very innovative. A very strong custom stem-extension is TIG welded directly to the front fork. A Sakae alloy stem inserts into the extension. The handlebars can be described as a custom shallow "V" (as they come away from the stem) with attached bar ends. There is no other production underseat steering recumbent with bars that are this well thought out. Many recumbent riders have modified their handlebars with aftermarket extensions, but no recumbent manufacturer has ever designed them into the handlebar like this. Similar bars will improve any SWB or LWB with underseat steering. The extension ends on the handlebar offer unbelievable control,



sort of a "dual joy-stick effect". With this type of controls, there is no problem reaching the handlebars as on some underseat steering recumbents. The controls are at your fingertips and unlike any other underseat steering recumbent, you can actually see them. NOTE: Bar extensions can be added to any underseat steering recumbent through the use of "Onza" or "Control Stix" type MTB extensions or custom machined extensions. We have even seen pieces of old lawn chain used for this purpose.

SHORT WHEELBASE DEBATE

Many readers feel that a wheelbase of less than 40" is too short. Some think the medium 40"+ wheelbase is the answer. Others do not acknowledge the existence of a MWB, and lump all "cranksets in front of the front tire" recumbents into the SWB category. Again, I will quote my nonscientific opinions. I have ridden many SWB recumbents with less than a 40" wheelbase which are as stable or even more stable than those with 40"+ wheelbases; therefore, I cannot say that more wheelbase means more stability. When asked to comment, Joel Smith had this to say, " Stability is mostly governed by steering geometry and proper trail. Many road bikes designed for high speeds have wheelbases much less than 45", usually around 38", which is the R-20's wheelbase".



COMPONENTRY

The components are upper-line Suntour, hand picked and work very well together. When comparing them to Shimano, I would say that XC-LTD is very close to Deore DX. The derailleurs are front-XC Comp, rear XC-LTD. Shifting is done by tried and true Suntour Bar-Cons. With the special handlebars, the shifters face upward. To shift, you slide your wrist forward and click—21 indexed speeds. The hubs are Suntour XC-LTD with a 12-28 (our test bike had the optional 12-32) 7-speed freehub. Rims are Sun Ultra Hard Anodized hand laced and trued with stainless steel spokes. Another special touch is the two great quality silver Suntour chains. The front single crank is a Suntour Radius; our test bike had a 39 tooth chainring.

BRAKING

No long reach BMX sidepulls here. The Suntour XC Cantilevers and matching levers offer the best braking we have ever experienced on a SWB recumbent, hydraulics not included. Joel Smith and A.T.P. have designed a pivoting cable mount that allows use of a front cantilever brake. Without this, the front cantilever would not work. It pivots off of the fork and allows each side of the brake to be pulled side to side and together, rather than up and together which would get in the way of the boom. The brake cable housing connects to the pivoting cable mount rather than running to a standard headtube or cantilever bridge mount. This setup works excellent and is a great innovation to SWB recumbent braking.

INTERMEDIATE DRIVE

The Intermediate drive was designed by and originated on Jon Stinson's "Stinson Flyer" faired HPV and is also available to home-builders and manufacturers through CycloPedia in Adrian Michigan. Gaylord Hill also utilized this drivetrain on his kit/plan built bike the Econ-Bent. The modified freewheel is made up of a top quality Regina freewheel body and four repositioned cogs of your choice. This is a basic modification; the pawls are removed and cog positions changed. Our test bike had intermediate (micro-like) cogs of 16-21-28. The shifting performance was very good. Shifting is done by a standard front derailleur. It is smooth and takes less effort to shift than the equivalent large chainrings (60+) needed to get the same 107 gear inch high gear. With slight variations in the intermediate cog sizes, high gears of nearly 130 gear inches are possible without sacrificing your low gear.

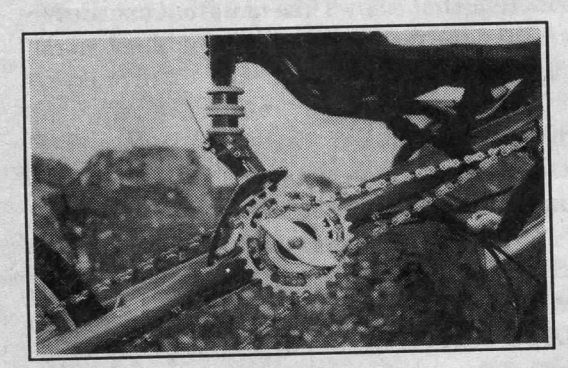
To get similar gearing without the Intermediate Drive, a triple crankset with chainrings of approximately 39-52-64 would be needed. 60+ tooth chainrings are large, expensive and can be difficult to find. When I researched these parts availability, there was some debate among bike dealers as to whether the Regina freewheel parts or the large chainrings were more difficult to find. CycloPedia provided me with a list of freewheel brands and models that will work as Intermediate Drives. Both set ups can be worked on by your local bike shop, however they may be more familiar with large chainrings.

On our test bike the complete Intermediate Drive consists of (from the outside inward) a custom machined chainguard is bolted on the outside, next is a 17 tooth cog that drives the forward chain out to the single crankset. Next in line is the 28 tooth cog, then the 21 tooth cog and finally the 16 tooth cog on the inside. These act as the triple chainring that drive the second (rear) chain back to the rear wheel and standard 7-speed Suntour cassette freehub. Got it?

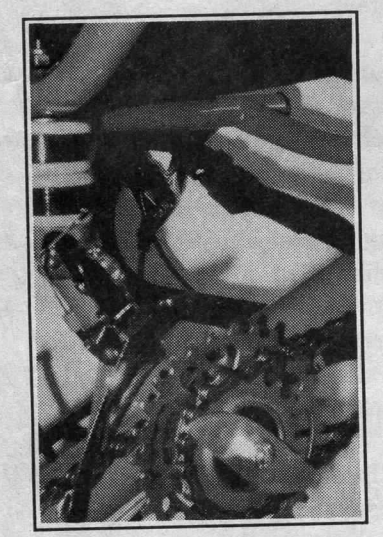
INTERMEDIATE PRO & CON

We found a few points worth mentioning. Not being able to see the Intermediate Drive (triple crank) takes some getting used to; you must learn to feel where your three

chainrings are to trim your shifts. Skeptics will argue that this system adds friction which robs efficiency. Similar drive systems are used on racing HPV's where this does not seem to be a problem. The amount of friction lost (if any) should not be a consideration to most recreational riders. However, the Intermediate Drive is a more complicated system than a standard drivetrain. To decide whether it is adaptable for your specific needs, you should chart the gears that you plan to use. The benefits of Intermediate Drive come when high gears of 100 gear inches and up are called for (most recumbents have high gears of 104-112). Standard drivetrains with large chainrings and 20" wheels usually allow high gears of around 100 gear inches. This may change if someone comes out with an 10 or 11 tooth small cog.



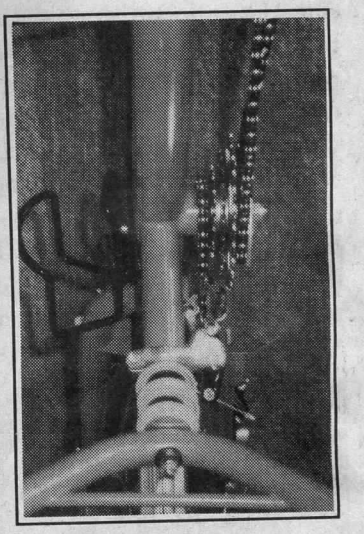
You will notice there is lots of chain on the R-20. It is expertly handled by this drivetrain. The forward chain has one idler (a single derailleur pulley) that is under the seat, it guides the chain out to the crank. The tension on this chain must be correct, not too tight or too loose. This takes the exact amount of chain links along with the proper boom adjustment, otherwise the forward chain can have to much slack.



The Intermediate Drive system also adds some weight, between one and two pounds. Our test bike weighed in at 32 pounds without accessories. The manufacturer's target weight is 30 pounds. A lighter weight fork and other minor changes should bring the weight down. An ultra-light weight machine was not the design intention for the R-20. The goal of it's application on the R-20 is wide range and high gears. If you don't need this, the Intermediate Drive may be over-kill. In this test, we were very pleased with the Intermediate Drive's overall performance.

ACCESSORIES

The R-20 will take many standard bicycle accessories. A Blackburn 24" MTB Rack is offered as an option. Custom fenders are also available through the manufacturer or dealers. A computer mount comes standard and your favorite fanny-pack snaps into place behind the seat frame. With the lack of a rear triangle, hitching up our Burley trailer was tricky. Once the Blackburn rack was mounted, a triangle was formed which solved the problem. With a bike this new, fairings are not yet available but are currently on the design table. A nose and tail section fairing are most probable.



R-20 PRACTICALITY

This bike is extremely practical. It can be transported on a roof rack or standard bumper type car racks. The seat and the two 20" wheels remove quickly providing a compact package. The bike has a great gearing range for all types of terrain. The "RL Edge ACS 20" X 1.75 100 p.s.i. tires are

hard, tough and they roll very fast. During our winter test, it was the rainy season in the Northwest. Every day we faced new weather challenges. On one occasion, while out on a bike trail, the trail was under construction and I was forced to ride for four miles on crushed rock, gravel and uneven pavement. The R-20 was able to handle this with ease and maintain stability all of the time. One morning there was a heavy frost on the trail and a dog jumped out in front of my path. Under hard braking, the bike hit a patch of ice and went into a skid. The R-20 handled it in a very controlled manner. As for touring, A.T.P. told us that

they have taken the R-20 out on the road and it carries a touring load with ease. Our test bike was outfitted with Esge fenders and a Blackburn 24" MTB rack that kept the rain and spray off effectively.

MARKET NICHE

Hopefully, the R-20 will develop it's own market niche. There are only three ready-to-ride SWB recumbents and one sold as a framekit available in the USA. We feel that they are all slightly different and designed for different purposes. If you can decide between performance and recreation, above leg and underseat steering and finally the bottom line, how much do you want to spend, the choice is narrowed. Each of the SWB recumbents has it's own niche.

THE RIDE

We found the R-20 easy to get used to with no special reflexes needed. The steering is lively, fun and predictable. We feel that this is a compliment to the design. The R-20's handlebars offer the rider excellent control and seem to slow down the bike handling without the use of a dampener. Several production SWB recumbents use headset steering dampeners to slow down the steering; the R-20 does not. The bike is easy to climb on and off of due to the placement of the handlebars/ controls. The seating position is more reclined than some SWB recumbents, but can be easily modified. The placement of the seat gives the illusion of a heavily loaded front wheel, but we can assure you that we tried several times to lift the rear wheel off of the ground under hard front braking and could not. Acceleration and hill climbing are excellent due to the higher boom/ crankset placement. The 1.5" diameter main tube offered a very limited amount of boom flex under heavy loads. Overall, the frame seemed very stiff and what bumps there were, the suspension soaked up nicely. On my first test ride, we found a fairly steep hill and took the R-20 up to 30 m.p.h. The bike actually gained stability at speed, even on wet pavement. This could be due to the sure-footed feel of the 20" ACS 100 p.s.i. tires. The control I felt on this bike was excellent.

The R-20 is a bike designed more for the average recumbent rider than for racers. It is very comfortable and feels sporty. The theory that underseat steering recumbents have a aerodynamic disadvantage may prove true here also; however, the R-20 is a fairly fast bike. We found it faster than many recumbents that we have tested on the same (basically flat) bike path, but not as fast as the more performance oriented recumbents.

Most any rider can learn to track a LWB recumbent in a straight line. With SWB bikes it is more difficult. This is due to the shorter wheelbase and more weight on the front wheel. The R-20 is the only SWB that we have tested that does not have a headset steering dampener. This is a compliment to the bikes handling; however, a dampener may benefit the bike. At low to medium speeds or when coasting, R-20 tracks very straight. As you gain speed and are exerting force on the pedals, tracking takes more concentration. This is a trait that is common with most SWB recumbents. The more time and miles you spend on them, the easier it gets. The bottom line is that SWB enthusiasts either do not notice this, get used to it or do not mind this quickness in road manners. I have to admit zipping in and out of places that are completely inaccessible with my LWB put a very large grin on my face.

The A.T.P. R-20's base price is $1350. Framesets are $850. Our test bike outfitted with fenders and a Blackburn rack retails for $1455 + shipping. The bike is sold through dealers or direct from the manufacturer. For more information, send $2 to: A.T.P., 550-3rd Ave. N., Edmonds, WA 98020, or call (206)771-3719.