HUMAN POWER

Official IHPVA Newsletter VOL 1 NO 2 ; ISSUE 2 Winter, 1979 1978

NEXT YEAR'S RACE

P. VanValkenburgh

One of the most exciting moments of the speed championships — the running LeMans start of the 30 Km. road race.

Arrangements for the 1979 speed championships are proceeding well ahead of schedule. The race will again be held at Ontario Motor Speedway, just outside of Los Angeles, California, on May 5 and 6. Last year's event provided such successful advertising for TRI-FLON Co.Inc. our major sponsor, that they are likely to be behind the event again this year. However, there are a number of other potential sponsors waiting in the wings, as ad agencies and promoters who have seen our worldwide press coverage have been calling us with offers.

As attendance continues to grow we are considering including other events to help satisfy spectators' interest in the action. The Northrop tandem entrants agreed to delay their attempts to break the 55 mph barrier until the scheduled '79 Speed Championships. Last year they came within a few tenths of a mile per hour of reaching 55; however, they decided it was in everyone's best interest to delay the final assault until more spectators had an opportunity to witness the historic event.

The basic format of the event will be essentially the same as last year, with two days of racing, including a road race and a one-hour endurance event, but all of the racing will be speeded up considerably. The road race will be held on a shorter, tighter course so that the riders will be going past the start/finish line more frequently and the spectators will be able to see more of the action. It is hoped that we can have speed traps set up in two lanes so that we can have the straight-line record-setting machines also coming by more frequently. In addition, this would allow timing of multiple runs so that we could have head-to-head competition, and perhaps even acceleration runs. We are also working on the possibility of having some sort of spectator participation and possibly a bicycle swap meet in the infield area. However, this would require considerably more membership assistance than we have had in previous years. Therefore, if you have ideas or an opportunity to volunteer, please let us know. ***

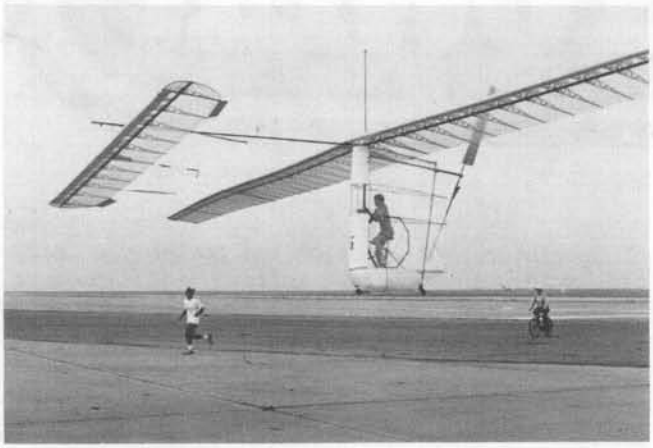
INTERNATIONAL HUMAN POWERED VEHICLE ASSOCIATION

Our sincere apologies are due for the delay in getting this issue of Human Power to you. The delay is primarily due to negotiations we have been having with major publishers for a commercial version of Human Power for national distribution. Several publishers have expressed an interest in the concept; however, the required lead time prevents any immediate action or the possibility of having such an issue out in time for next year's race. Our slick annual has been set back until after next year's race, and in the meantime we will produce two issues of the regular organization newsletter. The next one should be out in March, 1979, in time to provide plenty of pre-race information.

Notice, also, on the cover of this issue, our new organization logo which was designed by Dick Hargrave and selected from alternatives by the Board of Directors. We feel that this symbol adequately represents the directions, purposes, and scope of the organization in terms of human power and what it may mean in the years to come.

For those of you who are building or modifying machines for next year's race, I would appreciate your cooperation in providing me with some information on your activities in time for the next newsletter. Since anyone who is really serious about building a machine for the speed championships should be well into it by February or March, this should make it possible for us to provide up-to-date pre-race promotion on the items and personalities of interest. It would also be useful to send a couple of black and white photos for pre-race publicity.

FLYING MACHINES



The all-new state-of-the-art man-powered flying machine: the English Channel challenger Albatross on a development flight.

As most anyone knows who has picked up a magazine or a newspaper in the last year, our new president, Dr. Paul MacCready, is the designer/ builder of the world's most successful human-powered flying machine. The Gossamer Condor, which won the Kremer Prize, was sent to the Smithsonian Institution, where it is now reportedly hanging next to the original Wright brothers flyer. Dr. MacCready was quite willing to give it up under the circumstances, since it was obsolete at this stage and it had begun to look rather tatty after numerous crashes. MacCready has since constructed an all-new aircraft which is considerably lighter and technologically more sophisticated. Now that the basic design concept has been proven, it has been possible to go to such state of the art materials as carbon filaments and epoxy composites and high tensile strength Kevlar fibers. As before, the aerodynamic surfaces are made up of 1/8 inch thick urethane foam covered with mylar sheeting, and the structure is composed of lightweight tubing in compression, held with guy wires in tension. However, now the structural tubing is entirely non-metal. The tubes are constructed by winding monofilament carbon fibers around an aluminum tube on a mandrel and then baking the prepreg epoxy binder in a custom- built 24 feet long oven. The tubes are then taken to a chemical etching company and the aluminum core is dissolved out. The resulting tubes, which are 2 inches in diameter and 20 feet long, are so light and so stiff that they can be extended from one hand at arm's length with no noticeable deflection. The carbon filament composites are also used extensively in edge reinforcement of the urethane foam body surfaces. The guy wires are now made of Kevlar, which has a greater strength-to-weight ratio than the piano wire which was used previously. In addition, the Kevlar is considerably easier to work with than the piano wire was. The complete resultant aircraft, ready to fly, weighs less than 50 pounds, which is an incredible accomplishment for any structure capable of supporting its own weight a wingspan of over 100 feet -- not to mention the fact that it has to support the weight of its rider.

Another very important feature of this new aircraft is its modular construction. The fuselage and wings can be rapidly broken down for shipping or repair, or total replacement of damaged sections. This has already come in handy, as the craft recently crashed due to a broken control cable on a test flight. For his scheduled English Channel crossing attempt next spring, MacCready will have enough spare equipment to build a complete second aircraft. Based on his talents, his previous successes, and his rider, it appears he has a very good chance to attain this incredible feat. The accomplishment should be equal to Lindburgh's solo Atlantic flight, so the publicity may turn out to be worth many times more thann the $100,000 cash prize offered by Mr. Kremer. The publicity just might also spill over onto our 1979 IHPVA Speed Championships. For more details and photographs of Dr. MacCready's Gossamer Albatross, see the December, 1978, issues of Popular Science and Omni magazines. ***

OTHER WAYS

George Naoum

Paraplegic George Cunningham and friend in their arm-powered "wheel-chairs".

Two particular events in the past year should make us more aware that human power includes more than simply pedal cycles as they appear in the annual human-powered speed championships. The first event of note was the appearance of arm-powered wheelchairs in last year's speed event. These were custom-built tricycles in which the front wheel was powered by arm cranks. The reason that there were three wheels was because the people riding these machines were paraplegics. They did not have the use of their legs, and they could not have kept upright when stopped, so there had to be three wheels for balance. Also, neither machine was a streamlined vehicle. At this point, the builders

feel that streamlining isn't important, since with arm power they are only able to propel these vehicles up to about 20 mph. Technically, you might call these vehicles wheelchairs, but it is obvious that they are somewhat more advanced than the conventional wheelchair we are familiar with. It is quite possible that these modern hand-cranked three-wheelers could have an impact on the design of medical wheelchairs, which are quite limited in speed and distance. The two people that rode in this year's speed championships, in fact, regularly use these vehicles for both commuting and everyday local transportation -- something which is far beyond the range of a conventional wheelchair.

P. VanValkenburgh

60 m.p.h. downhill streamlined skateboard. Fully extended prone position allows for small frontal area. Inset shows to good advantage the excellent contour development and polished surface.

The other event was somewhat more spectacular: a streamlined skateboard coasting event which has been held for the past three years in the Southern California area. This event began with skateboarders riding conventional flat-boarded skateboards down hills and through speed traps to establish their own speed records. It didn't take them long to discover that streamlining was a significant factor, as the current record is very close to 60 mph. The fastest of these streamlined skateboards now have completely enclosed streamlined shells very much like Human Powered Speed Championship shells. However, they probably have about one-half to one-third of the frontal area, since the riders can lie down in a perfectly extended prone position, and they don't need additional space for large diameter bicycle wheels or for knee action in pedaling. But the most notable feature of these prone streamlined skateboards is the incredibly fine workmanship of the bodywork and the framework on them. A number of these skateboards builders are former surfboard builders, and they have highly refined the art of producing fiberglass shells. The finish and the craftsmanship of some of these streamlined shells is really quite amazing compared to the average streamlined bicycle shell we have seen.

Something else that really became evident at this year's Signal Hill skateboard coastdown championship was the lessons that could be learned from their organization and the way they held the event. In the first place, the event certainly did not lack from adequate sponsorship or funding. This year's event was sponsored by Freeformer Skateboards, and an executive of the company indicated that it cost them something like $50,000 to put on the event. A very large share of that went into prize money. The first place in the unstreamlined, the streamlined, and the women's categories was $10,000. Of course, they did not have to rent the facility, as the hill was essentially donated by the city of Long Beach. But on the other hand, it was not possible to charge admission at the event, so there was not any gate receipts.

A few other points stood out at the Long Beach event. First was the lack of, or the impossibility of, crowd control. They had erected a chainlink fence down the hill for the most part of the course. Where they did not have the chainlink fence it was impossible to keep spectators from walking across the track in front of these 50-60 mph skateboards. We will have to give them credit for the large number of crowd control personnel they had, They weren't, however, able to keep the skateboards from going out of control and crashing into the crowd. In one instance a skateboard went out of control, flipped up on a curb, broadsided a pole, and broke the ribs of its rider, but not before a few spectators were injured also. The final point of interest about the event was the fact that the organizers of the race were able to sell film rights of the event to ABC Television, which presented it in an hour-long special.

The appearance of these two new types of human-powered vehicles should make us more aware that we cannot remain isolated with our own particular interests in human-powered vehicles, but should consider all types of human motive power. Skateboards and roller skates are probably the most popular and most obvious means of human propulsion that we should be aware of.

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Theory

A few of the more successful members of the Human Power Vehicle Association have an unfair advantage in their professional research facilities and libraries. As engineers they can keep up with the state of the art and theory and the research that is happening in the technology of human power and vehicles in general. This sort of research helps to keep them from making drastic mistakes in their design and, in addition, provides new ideas or new inventions that might improve the speed of human-powered vehicles. Such research facilities also permit these engineers to test their ideas before they are committed to a complete vehicle design. For example, last year's Northrop entry had the use of the extensive facilities of Northrop University including the wind tunnel there. Professor Chet Kyle, of course, is an engineering professor at Long Beach State University, where he has the use of an ergonometer, plus all the electronic equipment needed for aerodynamic drag coastdown tests. Paul Van Valkenburgh is a vehicle dynamics engineer working on federally financed projects in the dynamics of such vehicles as cars, trucks, motorcycles, and mopeds. Professor Paul MacCready is the president of his own engineering company, where he has the use of many spe-

cialists and facilities. Therefore, in the interests of equalizing competition, these engineers sometimes see an obligation to share recent technological research and research papers, and in a language that the layman can understand. While we are always able to observe everything about someone else's vehicle, sometimes the more subtle technological advantages may not be obvious. Therefore, we will summarize here a few of the more useful of the engineering papers that have recently promoted drastic increases in the speed of human powered vehicles.

Professor Chet Kyle, of California State University, Long Beach, has done a significant amount of research in human-powered vehicles, and has presented his findings at various conferences around the world. Some of his earliest and most useful information was published in Bicycle Magazine in July and August of 1974. Anyone interested in reducing the drag of pedal-power vehicles would find his story a good starting point. His most recent work is a published paper presented at a conference on human power in Germany. In this paper he reviews the major points of his research over the last five years. He begins by demonstrating the technique of measuring the rolling resistance and air drag of lightweight, streamlined vehicles by the use of the coastdown technique. This can be as simple as using a stopwatch over a given distance, or a carefully calibrated speedometer and a stopwatch; or it can be as sophisticated as Professor Kyle's use of electronic timing traps and a perfectly smooth, flat indoor hallway where there are no wind effects. In Professor Kyle's latest paper he presents the results of measuring rolling resistance and air drag on such diverse vehicles as an unstreamlined bicycle, partially faired bicycles, two of his fully streamlined standard bicycles, Paul Van Valkenburgh's Aeroshell models, Van Valkenburgh's fully recumbent record-setting streamlined Quadricycle, Mario Palombo's three-wheeler, and Bill Watson's recumbent two-wheeler. Nowhere else in the world is there so much information available on so many different and successful streamlined human powered vehicles. Another feature of Professor Kyle's paper is his explanation of the use of the ergonometer in measuring typical and high-performance human power output in many different configurations of machinery. He has measured human power output in the standard pedaling position, prone position, supine position, and the measurement of human power using both arms and legs, arms only, and legs only. He has also measured human power output over various lengths of time to determine the optimum acceleration rate to reach maximum terminal speed. For copies, contact Professor Kyle.

Cornell University has produced the only known research involving streamlined human-powered vehicles in engineering wind tunnel tests. The work was done by Stephen Fugikawa and John Olson of the Sibley School of Mechanical and Aerospace Engineering in May, 1977. The paper is based on an attempt to design the theoretically optimum streamlined vehiicle for the Human Powered Speed Championships. However, the authors soon discovered that aerodynamics is the primary consideration, and the majority of the paper covers their wind tunnel experiments. The work was primarily done on a 1/6 scale model of an NACA 0024 airfoil section. The majority of their work was concentrated on determining the optimum airfoil/ground interface. They concluded the ideal situation is for the airfoil to butt up to the ground as closely as possible, with the minimum gap required for banking and steering control. In addition, they developed a computer program to predict optimum acceleration and top speed. Based on various runs with this computer program, they also came to the conclusion that minimizing weight was highly important, and there seemed to be no upper limit to the improvement of speed with the number of riders.

"Theory of Wing Sections," by Abbott and Von Doenhoff, is the bible of every serious aerodynamicist, and no human-powered vehicle designer should be without it. It is a 600-page paperback currently selling for about $5.00 at better aerodynamics or airplane supply houses. The first half of the book is a serious textbook which goes into great scientific detail on the development and selection of airfoils, and provides information for both the beginning scientist and the advanced engineer with calculus. The more useful sections in this part of the book are subchapters concerning aerodynamic drag on airfoil shapes broken down into shape drag and skin friction drag. It also goes into detail describing the numbering system for airfoils and how to select airfoils based on the characteristics given in the last half of the book. This section presents such airfoil characteristics as the precise shape designation, giving dimensional coordinates for use in laying up your own airfoil profile. Also presented are the aerodynamic drag and lift characteristics of each one of these airfoils, with different surface roughnesses and at different angles of attack. It is worth noting that the first place single and the first place multiple machines from last year's event both used airfoils selected from this book. Van Valkenburgh's single machine utilized the 66021 profile, and the multiple Northrop entry utilized a 66012 profile. It may not be coincidental that they both independently selected almost identical shapes. However, be forewarned that this airfoil shape is known as a "laminar flow airfoil," in which the surface finish is incredibly critical. That is, absolutely no waviness or surface roughness can be tolerated. ***

MACHINE TECHNOLOGY

The large number and wide variety of vehicles that turn out for the annual speed championships are so radical and so unique that it is hardly possible for a person to study each one in one short weekend.Since each team and machine is a major story in itself we can't really do it

justice here, but we will try to do a rapid condensation of the most useful ideas, to serve as a guide for other constructors. It is possible that if someone put all the best ideas together and all the best construction techniques, he could make an absolutely unbeatable machine. The following vehicle analyses are presented in roughly their order of success.

VanValkenburgh

Northrop University's world record setting tandem has a number of unique features. Most notable is its brilliant execution of a laminar flow airfoil covering the entire vehicle. This airfoil shape was selected from standard NACA data, but only after extensive wind tunnel tests in the Northrop laboratory. The final full-scale body was made up of modern aerospace materials such as nomex honeycomb core laid up with faces of lightweight fiberglass cloth pre-impregnated with polyester resin and heat cured in a 20 ft long oven. The mold for the top section was made up of a carefully smoothed 2000 lb plaster male plug. With few other improvements to their previous year's basic design, this new body increased their speed by at least 5 mph.

George Naoum

Van Valkenburgh and Therrio's hand and foot powered prone quadricycle has held the singles record for two years now, with essentially no basic changes. In its most recent configuration it also utilized the laminar flow airfoil, although a crash on its first run destroyed any aerodynamic advantages over the previous year. However, the efficient utilization of hand and foot power made it possible to retain first place even though its speed was slower than the previous year. Ergonometer tests have indicated that the utilization of hand power can increase power output by as much as thirty percent for very limited distances. However, it is very difficult to control a vehicle while it is being hand cranked at these speeds, as witnessed by the fact that this vehicle has crashed at least three times at over 40 mph.

George Naoum

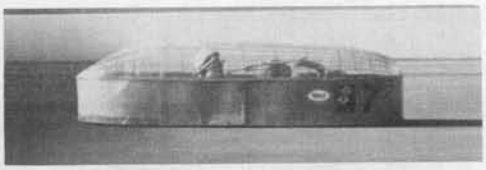
The Norton tandem is an attempt to combine multiple riders with hand and foot power, but it avoids the problem of steering control by having only the second rider hand cranking. The front rider merely pedals with his feet and steers with his hands. This is essentially a four-wheeled vehicle, but unique in that it has three rear wheels and one front steering wheel. At the rear are two 18 inch trainer wheels to the side of the main driving wheel. Given a more refined body, it could be a serious challenger to the Northrop machine.

George Naoum

Allen Abbott's previous record holding streamliner was not run the past year, but it remains a benchmark in human-powered streamlining. It still may have the lowest air drag of any human-powered vehicle run, as it probably has the lowest frontal area and, although the aerodynamic shape was not a standard NACA airfoil, its surface development and finish were of the highest quality. Its primary disadvantage was that in packing the rider into such a small space it was made very difficult to control, and no one but Dr. Abbott was ever allowed to risk crashing it.

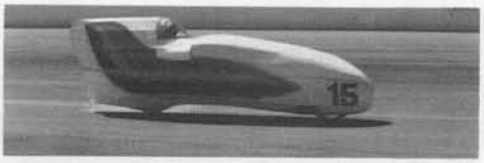
George Naoum

Gardner Martin's prone bicycle uses basically the same layout as Abbott's and after three years of development and racing it is now the second fastest single. Stability still remains a problem. However, in this case the streamlined body is not rolled under on the bottom (fully enclosing the rider), but is open at the bottom allowing the rider some contact with the ground for starting and stopping. Another advantage with this design is that it is considerably shorter than Abbott's vehicle, reducing the amount of aerodynamic skin friction.


George Naoum

Mario Palombo has produced some very technologically advanced tricycles in the past three years. His most recent design was a unique adaptation of hand and foot power in which the feet crank normally, while the hands pump in a reciprocating manner, with rods connected to a counter-rotating gear. Ergonometer tests have shown this propulsion system to produce at least a 20 percent power gain over the use of legs only. Another unique feature of this vehicle is the fact that it is steered by head action. That is, the rider's head rests in a yoke connected to the rear wheel steering, and by tilt-

ing his head one way or another the rider controls the direction of the machine. Mario's machines are always a masterpiece of craftsmanship, usually being constructed entirely of heliarced aluminum tubing.



George Naoum

Bill Watson is also a master craftsman, having built the current road race championship machine. Although not following currently accepted sophisticated aerodynamic airfoil practice, Watson's machine is extremely esthetically pleasing. In addition, it incorporates such unique features as retractable stability gear for starting and stopping, using a skateboard wheel on a retractable arm, and his frame is a welded-up steel tube space frame. Although this frame is perhaps heavier than it needs to be, it is a work of art.


George Naoum

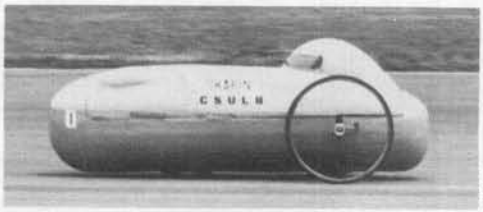
Paul Van Valkenburgh has also produced a number of streamlined shells for standard upright bicycles, known as the Aeroshell. The most obvious innovation about these shells is that they are vacuum formed out of thermoplastic material over plaster molds. One of the shells, in fact, was vacuum formed out of translucent Butyrate and is essentially transparent. The advantage of producing fairings in this manner is that the rider has unlimited visibility in most directions, and this type of fairing construction lends itself to inexpensive mass production. The other unique and patentable feature of these upright Aeroshells is that they are aerodynamically stable in crosswinds. The front section of the bicycle-mounted shell is mounted to the steering axis so the vehicle is steered downwind from any lateral gusts. This design has been tested in 35 mph crosswinds, and while it does displace the vehicle a great deal the bicycle is not literally blown on its side.

George Naoum

Alec Brooks of Caltech has produced two radically different and innovative machines in the past three years. His familiar No. 13 is built around a monocoque sheet aluminum frame. While the frame is somewhat heavier than the average human-powered vehicle, that is merely because it is grossly overstressed for the purpose. This type of construction could become more practical in the future when it is less conservatively designed.

IHPVA

Brooks' other machine, the wildly unique "stilts" bicycle, has been slightly less successful. While the body on this machine is a beautifully constructed fiberglass shell over a hollowed out foam core, it perhaps has a great deal of drag due to the two fully exposed wheels and drive mechanism. A non-obvious feature of this vehicle is the fact that it uses linear pedal motion, which contributes to the reduced frontal area of the body. This is perhaps the fastest vehicle to use the linear pedal motion concept, which usually prevents the rider from utilizing other muscles in his leg on the upstroke fore and aft stroke.


IHPVA

Mario Palombo also designed an earlier tricycle which should be mentioned because of its unique steering arrangement. It was the first known tricycle to have front-wheel drive and rear-wheel steering. In theory, rear-wheel steering, whether on a bicycle or a tricycle, is essentially an unstable configuration. However, by limiting the amount of steering available, it has been possible to ride such a vehicle in essentially a straight line at high speed. It is reportedly very difficult to control in any sort of cornering maneuver.

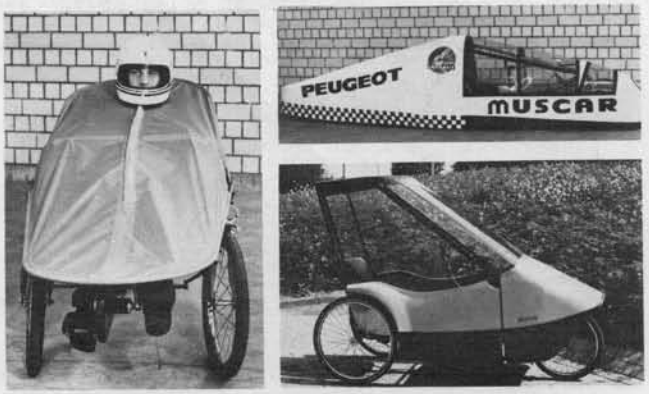

George Naoum

Ted Ancona returned with a unique, if unsuccessful, rowing mechanism for propulsion. The theory is based on the fact that rowers operating on an ergonometer can frequently generate more net power output than riders pedaling on an ergonometer. However, this appears to be due to the fact that they are able to store their return motion energy in a flywheel (which can be recovered on an ergometer). A flywheel mounted in a human-powered vehicle would be so heavy as to reduce acceleration an undesirable degree. Another unusual feature about Ancona's machine is that it is steered with the feet. While the hands are propelling the vehicle in a rowing manner, the feet are pivoted on pedestals to turn the front steering wheels.

As you can see, almost every vehicle en-

tered in the human-powered speed championships has some radically unique or esthetic feature. Put all of these features together in one place, and if you don't have the world's fastest vehicle you will at least have the most fascinating collection of advanced vehicles ever seen. ***

IHPVA AROUND THE WORLD



The European members of IHPVA have begun development of streamlined human-powered vehicles to go for the American-dominated speed records.

The International Human Powered Vehicle Association is having a rapidly expanding effect on bicycling activities in various countries of the world. In the six months since the last human-powered speed event, a number of things have happened in Europe that are worthy of note. Wolfgang Gronen enlisted the help of Professor Paul Schonendorf and Cycles Peugeot to build a supine tricycle called a Muscabrio, which is streamlined with an aluminum shell. In a time trial at an air station in Dusseldorf the vehicle went about 36 mph. This vehicle was later put on display at the huge International Cycle Show in Koln on September 23. In addition, IHPVA photos were exhibited at the Peugeot booth at this event. Another booth at the show was presented by the Technical University of Koln and included all-weather, pedal-powered commuting vehicles built by Professor Schonendorf and his students.

Professor Schonendorf also organized a conference on human power at which Professor Kyle was a featured speaker. Among the topics presented by other speakers were the human physiology of cycling, a history of cycling, aerodynamics, human power vehicle performance, all-weather vehicles, etc. Later, all the papers presented at this show will be made available to IHPVA members. Professor Kyle's paper is available now.

In South Africa, John Stegman and Jasper Siebrite have organized a local chapter and are planning to hold a competition in April 1979. Hopefully, they will be able to send the winner to the International races in Ontario, California, next year. Incidentally, they have uncovered some historic photos of an early 1935 streamlined bicycle from South Africa in which Sid Rose, a professional racer, broke the world cycling record for 1000 meters set by Faure of France in his recumbent Velocar. Stegman has recently used partial fairings to pedal 100 miles into a headwind. He claims that he has saved at least an hour using these devices.

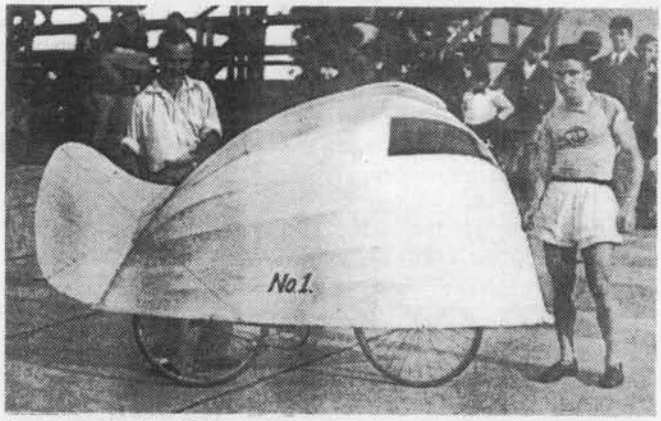
Members in both England and Australia have expressed an interest in organizing chapters of the IHPVA and holding competitions in these countries. We have also had a request from Hong Kong for information on how to organize a local chapter. It is becoming more and more obvious that we are in the forefront of an internationally accepted concept whose time has come. ***

SUPER CYCLE CONTEST IN JAPAN

The recent Japanese IHPVA Speed Championships showed many successful vehicles, some of which may be sent to the 1979 races in Ontario, California.

The IHPVA has now organized its first streamlined vehicle competition outside the United States. This one was held on November 3, 1978, at the IZY Cycle Sports Center about 150 km from Tokyo. IHPVA Director Shinichi Toriyama organized this event in just 40 days after it was first announced, and still they had 22 entrants. Dr. Toriyama stirred up all of this interest with a 40 minute film which featured our 1978 Human Powered Speed Championships; this was shown on Japanese television. The winners were from the Nippon University, and were the same group of students involved with a human-powered aircraft. They went 68.44 km/h (42.53 mph), which was excellent considering they only had a 450 m straight stretch on which to hold the contest. They caught the machines at the end with a tennis net held by seven assistants. Second was the Musashi Mechanical University entry at 67.87 km/h (42.17 mph), third was a Matsushita Company entry at 67.16 km/h (41.73 mph), and fourth was a high school entry at 67.04 km/h (41.66 mph). All of the winners were standard or modified streamlined racing bicycles. Many recumbents were entered but did not place in the top four. The event resulted in coverage on four television programs, and many magazine articles. Congratulations are due to Dr. Toriyama, and much thanks for his hard work. ***

STREAMLINED PIONEER DISCOVERED IN SOUTHERN AFRICA



Len Kerby (left) and Sid Rose (right) at Westburne Oval, P.E., 17 April, 1935.

In 1934, Sid Rose of Capetown, South Africa, read of the achievements of the Frenchmen Marcel Berthet and Francis Faure, who had used streamlined shells to break existing cycle records. Sid was an engineer, and along with a friend, Len Kerby, they decided to break Faure's record of 2 minutes, 31 seconds for 2000 meters from a standing start (set with a streamlined recumbent machine called a Velocar). They built a streamlined racing bicycle (resembling the modern day Orion built for the 1976 IHPSC by Kurt Zickerman), and succeeded in decisively breaking Faure's free cycle record with a clocking of 2 minutes, 23.5 seconds. Unfortunately, the French rejected this record and others set by Rose on technicalities, so the machine was scrapped and all but forgotten until recently. In June 1978, when John Stegmann and Jasper Siebrits of Capetown organized the Human Powered Vehicle Association of Southern Africa, Sid Rose read of the Association, and contacted Stegmann. Mr. Rose was made an honorary life member of the Association as one of the true pioneers of the sport and one of the few people alive who have witnessed streamlined vehicle competition before WW II. The Association plans to hold a contest similar to the IHPSC in April 1979. ***

Elections were held in September, resulting in the following group of eminently qualified professionals for our 1978-79 IHPVA officers:

PRESIDENT – Dr. Paul MacCready. Winner of the Kremer Prize for human-powered flight; aerodynamics consultant, Pasadena, CA; timer at all four Speed Championships. Dr. MacCready is currently working on a human-powered aircraft to attempt an English Channel crossing.

EXECUTIVE VICE PRESIDENT – Bill Watson. Pattern maker, Van Nuys, CA. Participated in '76, '77, '78 Speed Championships, taking 6th, 7th in 200 meters ('76, '77) and 1st and 2nd in one hour and 30 kilometer road race in '78. (Bryan Allen rode Bill's vehicle in '78.) Bill is now working with Dr. Paul MacReady on a human-powered aircraft to attempt an English Channel crossing.

VICE PRESIDENT (LAND VEHICLES) – Glen Brown. Aerodynamics consultant, Pasadena, CA. Glen has participated in all four Speed Championships, is a charter member of IHPVA, a former member of the Race Committee ('76). Glen manufactures the Zipper mini-fairing for road bicycles.

VICE PRESIDENT (WATER VEHICLES) – Bruce Carmichael. Consulting aerodynamicist; author of many published articles on aerodynamics.

VICE PRESIDENT (AIR VEHICLES) – Alec Brooks. Student, Cal Tech, Pasadena, CA. Alec is a charter member of IHPVA, a former Vice President ('76), and has participated in all four Speed Championships.

EXECUTIVE SECRETARY – Dick Hargrave. Graphic designer, Van Nuys, CA. Charter member of IHPVA, current Executive Secretary of IHPVA, designed and helped build fairings for '75 and '77 races. Dick designed and arranged for production of the posters and T-shirts for the '76, '77, and '78 Speed Championships. In addition, he designed and produced Human Power, Vol. 1, No. 1.

TREASURER – Peter Boor. Partner and manager of Bud's Bike Shop, Alta Loma, CA. Present Treasurer of IHPVA; graduate physicist and mathematician; charter member IHPVA; active veteran bicycle racer.

PUBLICITY DIRECTOR – Paul VanValkenburgh. Engineer, Long Beach, CA. Photographed '75 Speed Championships; designed and built fairing for 2nd place single rider vehicle ('76); designed and built winning single rider vehicle ('77 and '78), setting a world record of 49.38 mph in '77; edited Human Power, Vol. 1, No. 1.

HISTORIAN – Chet Kyle. Professor of Mechanical Engineering at California State University, Long Beach, CA. Founder of IHPVA; staged '75 and '76 Speed Championships; present President of IHPVA; former Executive Secretary of IHPVA ('77). Dr. Kyle built and tested some of the first streamlined bicycles in the USA. The Kyle Streamliner (powered by Ron Skarin)

HUMAN POWER

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