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A Look into the French Corporate and Industrial World

Daniel J. Roethle

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By Daniel J Roethle

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Introduction

Today more than ever companies are striving for that competitive edge. Whoever doesn't stay on top of the competition might drown in the turbulant waters that many companies must venture across each and every day. Small companies are constantly being taken over by large corporations. Only the strong survive but size isn't the only determining factor of who will come out a winner in the profit gaining game.

There are numerous companies which produce high quality bicycle parts and components. One of these companies by the name of Mavic is what this paper will be focusing on because it represents the highest of quality in bicycle parts and components, excellent service, and is very internationally known since 70% of business is based on export. Mavic is a French company and some of the major exporting countries are the U.S.A., Germany, Switzerland, Holland, Belgium, Luxembourg, England, Spain, Taiwan, Italy, Japan, Austria, Denmark, Australia, Canada, Portugal, Sweden, South Africa and Columbia.

Mavic is a French Law Private Limited Company with an executive board. It has capital of 3,640,000 French Francs or $622,329.00 (based on April 11 exchange rate).The company headquarters and factory number 1 are situated in Saint-Trivier, France. factory number 2 is in Chavanod, France and factory number 3 is in Annecy, France. The three Mavic

subsidiaries are B.G.I. Innovations (Research and Design office) in Annecy, Catidom which is also in Annecy, and the U.S.subsidiary Mavic Inc. in West Chester, Pennsylvania. Mr. Art Wester is the Vice-President of the U.S. subsidiary and has been extremely helpful in providing important information for this thesis paper. The President of Mavic is Jean Ballansat. The Board of Directors consists of a chairman (Jean-Pierre LaCombe), a Marketing and Sales Director (Josette Paccard), an Administration and Finance Director (Monique Charcosset), and a Production Director (Denis Monnier).

The Administration Department and Sales and shipping Department can be found at St. Trivier. The factory operations that take place there are the manufacturing of sleeved rims, handlebars and carbone wheels. S.U.P.(Soude Usine, Process or in English, Welded, Machined Process) rims are manufactured in Annecy and the factory processes in Chavanod consist of components machining and components assembly.

The History of the Company

1890: Manufacturer of Articles Velocipede, Idoux, and Chanel (Mavic) was created. Idoux and Chanel were the two men who created the company. Mavic made mud guards and small pedal cars for children.

1920: Henri Gormand purchased Mavic and kept the name and continued to manufacture mud guards. He devoted his time to studying the aluminum rim.

1926: The first aluminum (dural) rim was made.

1931: Mavic started to equip riders in the Tour de France with dural rims which progressively replaced wooden rims.

1964: Bruno Gormand, who was a self educated businessman, took over for his father Henri and brought together a dynamique team around him.This team was motivated by Bruno's passion of innovation and performance.

1967: Mavic moved from Lyon to relocate in a new factory in Saint-Trivier.

1971: The famous SSC blue anodized rim appeared , which was reserved only for professional racers.

1973: A new program was created called Mavic Assistance. This program was an original and indispensable to all the great races.

1975: The first grey hard anodized SSC Paris Roubaix rim was created. It had the first ever application of a hard anodized coating on a bicycle rim. Since this innovation, a "high end" bicycle can't be considered complete unless it has hard anodized rims.

1977: The sealed cartridge bearing hub was perfected and the Mavic bottom bracket was created, which was the first monoblock bottom bracket in the world. A second

1,000 square meter factory was constructed. This second one was built adjacent to the first. The production area of the factory was more than 3,500 square meters. Mavic welcomes the Tour de France.

1978: Mavic begins production of bottom brackets, cranksets, handlebars and derailleurs which are completely servicable.

1979: A new concept called "All Mavic" makes its debut. Rims, which were always known as the Queen of Mavic products gained a lot of company with other products such as cranks, derailleurs and hubs. This group is called "All MAvic" and is used on high end and racing bicycles.

1980: The first professional team was equiped with "All Mavic" parts. The team was Boston Mavic.

1981: The size of the rim factory was increased from 3,500 square meters to 6,000 square meters. The beginning of commercialization of "All Mavic".

1982: COOP-MERCIER-MAVIC becomes the first French team equiped "All Mavic".

1983: Mavic has a total of 26 international professional teams equiped worldwide.

1984: The Chavanod factory was constructed. This factory was where all components other than rims were produced. The first numerical command machine was put into use and the purchase of many other machines

soon followed. This year was the start of a great technical evolution at Mavic.

1985: 9 professional teams ride "All Mavic" and 27 professional teams on Mavic rims.
December 7- Bruno Gormand involved in an accidental death. Madame Cecile Gormand becomes PDG (President Director General).

1986: Mavic starts using the CAD (Computer Aided Design) System.

1987: An additional 1,000 square meters at Saint-Trivier is constructed. The total factory area increased to over 7,000 square meters.

1988: A new group of components for road and mountain bikes are introduced. This group consists of cranksets, headsets, pedals, bottom brackets, rims, and handlebars.

1989: Greg Lemond who was equiped with "All Mavic" consecutively won the Tour de France and the World Championships. This marked the international acknowledgement of Mavic for technical advances in materials, research, and production. There was a decision to incorporate S.P.C. (Statistical Process Control) to allow complete quality control to finished products with zero defects.

Since November 30, 1990 a management team has been in control of the company with the cooperation of

financial partners and with the direction of a holding company called Mavic Finances.

Mavic has gone through many changes over the years, starting with domestic production and sales of mud guards and small pedal cars. It later became internationally successful with production and sales of high quality bicycle components and support from world famous professional racers. The company was hit hard with the loss of Bruno Gormand but everyone adapted well to a change in leadership and continued to carry on the tradition of staying on top by believing in and using the same spirit and enthusiasm that Mr. Gormand had instilled. The company has been a forerunner in new ideas throughout its history. The company has been expanding at a steady pace, has been inducting state of the art equipment like the CAD System and has been hiring teammembers who are open minded and creative. Without these improvements and qualities even the biggest companies may run into problems.

Now let's take a look inside the Mavic Factories and find out a little more about the work and parts that are part of the manufacturing process. We will focus on temperature treatment, coating, welding, different types of materials put into Mavic products and other details about the process of making high quality bicycle components and parts.

The hard anodizing treatment process is a low temperature electrolytic process which is carried out in a sulpher bath. Parts are connected to an anode (+) pole, and

they are subjected to a voltage between 0 and 120 volts. The thickness of the anodizing and the alloy used is what determines how long the treatment will last. The grey color of the anodization results from aluminum transformed into aluminum oxide. The surface treatment is more than a coating because because it propagates 50% in the base metal and 50% in extra thickness. A big benefit of the hard-anodizing treatment is that there is an extremely hard outer surface produced which can attain a degree of hardness 10 times the hardness of the lightweight alloy normally used. The layer has high resistance to corrosion, it has enhanced rim rigidity and reduction in friction-generated heat: it acts as a thermal shield.

Ceramic coatings are very hard and they eliminate wear caused by friction when braking. They also protect rims from abrasive effects of sand trapped in the brakepads. The coefficient of friction that it has improves braking performance, especially on wet roads. The rims stay cool during prolonged braking and keep their new look.

The spraying technique used is a very high temperature gas which flares from a torch at a high speed forming a plasma jet. Ceramic powders of aluminum and titanium oxides are injected into the jet. These oxides melt and are then sprayed onto the sides of the rim.

Other world-famous Mavic inventions and innovations for rims include hook beaded rims for narrow tires, stainless steel eyelets and Welded, Machined Process (S.U.P).

The S.U.P. is a new generation of rims which reach the highest level of performance in quality and safety. After the roll bending process the rim is joined together by arc welding. The braking surfaces are then machined by using extremely high precision cutting tools which remove excess metal from the entire braking surface and in turn reduce the rim to an exact dimension. The result is a smooth, regular, flat braking surface with the precision of a disk brake. This new rim allows wheels to be built and trued (straightened) easier.

Composite wheels are being used more and more by racers for their light weight and aerodynamic features. There are three different kinds of materials used to manufacture these composite wheels. The hubs, a bit like axels on a car, are made from alluminum alloy which is finished on a numerically controlled milling machine. The tire mounting and the flanges are made from woven carbon fibre with a low density and high mechanical strength. The core is made out of rigid polymethacrylic foam. All of these components are bonded together for total rigidity during the injection molding process.

The Finished Product

The Mavic Hub Cartridge is easy to adjust, runs smooth, and has a high reliability rating. It has a lightweight anodized alloy body, lightweight anodized spindle and needles or adjustable sealed ball bearings.

The Mavic headset is extremely reliable. The Mavic Attachment System locks the set in place, eliminating the

need for conventional lock nuts and washers. This attachment system allows extremely simple assembly: the bearings are adjusted manually and the top portion is fixed in position with the 2.5 allen key which is supplied with the set. The system consists of a light anodized race housing and adjuster nut, stainless steel races and ball bearings, stainless steel lock bolt and sealed upper o-ring and lower mechanical seal.

Mavic hubs guarentee smooth running and easy adjustment. A flange on the non-gear side of the 501 and 531 models of hubs is offset to allow nearly identical spoke tensioning on both sides of the wheel. The hub body is of forged, anodized lightweight alloy. On the side is an anodized lightweght alloy spindle and inside the hub there are high precision special sealed bearings.

The integrated free-wheel hub represents the highest in quality mechanical engineering. It is a fully-integrated smooth running easily adjustable 8-speed hub. The freewheel assembly is easy to fit and remove. There are seven independent patented Mavic CB Mavic profile gear cogs which fit into a lightweight alloy body. A cog is circular with metal teeth all around the outside portion. Between each cog is a spacer and the cogs are locked into place with a single threaded cog. A couple unique features of the freewheel are its hardened , tempered steel pawl ratchet and its trued, chromium-plated hardened and tempered steel.

Single, double and triple chain rings can be used with the same crank set. Mavic cranksets are made out of heavy duty 2014 alloy. Each set is individually drop forged to high performance. After high precision milling at a tool center all the sets are hand polished and anodized.

Mavic lightweight 7075 alloy chain rings are also individually finished at a tool center and then anodized. The inner chain ring fits snugly around a bottom bracket and prevents the chain from jamming if it should derail.

Mavic has had a great amount of leadership success in state-of-the-art technology. Some innovations that this company is responsable for in the area of wheel technology are the first hard anodized rim, the first unit single bottom bracket, the first adjustable sealed bearing hubs, the SUP process rims, the 3G wheels and the ceramic coated rims.

There is a product called the ZMS (Zap Mavic System) which is the world's first computer-controlled rear derailleur. It is of course a Mavic product and its revolutionary design shows high standards of electronic and micro-mechanical engineering. The reason one would want to be the owner of a ZAP is because of how easy it is to work through the gears without hands ever leaving their most comfortable and efficient position; the handlebars. By pressing one of two sets of controls on the handlebars the micro-computer transmits a shift command to the rear derailleur. Main features of this ZAP System are that it instantaneously changes gears whenever the rider wants, it gives an instant response, it allows

enhanced security and comfort by a gentle touch on the controls, and it has a precise gear selection.

Mavic's ZMS 8000 ZAP electronic shifting system was, in December of 1993, named the year's most innovative product by Bicycling Magazine. It's easy to see why this product is so special the more one learns about it. By tapping a pressure- sensitive button on one of the shifter switches the rear derailleur will downshift or upshift one cog. If the button is held down for more than two seconds the derailleur will sweep across cogs to the smallest or largest gear. When a cyclist is coasting into a corner he or she could pre-select shifts by depressing a button. The derailleur won't move into a new gear until pedaling is resumed and there is a two second window from the time the button is pressed until the time pedaling is resumed. Otherwise a gear change will not take place if the rider waits more than two seconds to resume pedaling. If the battery dies the derailleur will remain in its last gear so this is why it's a good idea for the rider to carry an extra battery along. The strain on the battery is so small that it can last about 10,000 shifts or the number a rider might use in the Tour de France.

A drawback of the ZAP System is that there is no electronic device up front. Instead there is a conventional down-tube shift lever and stock derailleur for the chainrings. Although some cyclists find a partial remedy by installing a Campagnolo or Shimano brake/shift lever and front derailleur (Campagnolo and Shimano happen to be Italian and

Japanese bicycle and component giants which plan to introduce electronic shifters in the near future). One comment from a ZAP owner is the following: "The shifting is quick! If only they'd do something about the front".

Fortunately the ZAP System is receiving a lot of positive feedback. For example one rider stated "I borrowed a ZAP-equipped Pinarello (bicycle) and raced it in 3 crits. I absolutely loved it. Smooth, precise, and it worked every time".

The only thing electrical current is needed for is to transmit shift signals and drive the cylindrical, one-inch-diameter servo motors. The motors which don't have rotating parts, extend or retract a pin on command.

The way that this whole system works is , first of all, an upper pulley is attached to a cam which converts the chain's rotary motion into linear motion used to power a pair of sliding arms. When the rider pedals, the arms slide back and forth in opposition just like hands rubbing together. When a shift is signaled, the appropriate servo motor (either for the downshifts or for the upshifts) plunges a pin into the teeth to catch one of the arms. The arm pushes (for a downshift) or pulls (for an upshift) the lower derailleur. The pin retracts once the change is completed. And for multiple shifts the pin plunges back down for the number of additional cog changes commanded. Sensors on the detents transmit information about the new psition back to the microprocessor. Believe it on not this whole shifting process takes about 0.1 second.

Even though constant-motion arms add friction to the drivetrain, Mavic's exceptional bearings and careful design reduce drag to an extremely small amount.

Forevery problem there seems to be a solution and the problems surrounding the ZAP System are not exceptions to the rule. One problem that a rider might encounter with the system is "ghost" shifting on bumpy roads. The solution is the use of titanium solenoid pins. Insufficient chain tension might pose another problem. The solution is a stronger wrap spring. Problem number three is a loose cable connector at the derailleur which can be remedied by a new plug design. Assorted shifting problems can be solved by better weatherproofing. Broken wires can be upgraded with stronger wires and junctions. To remedy a short battery life there is a new battery isolation circuit. And finally if the spool for excess cable doesn't fit oversize frame tubes there are new spool sizes available. Good news is that the upgrades and solutions are available free to ZAP owners through dealers.

There are other Mavic parts but hopefully the aforementioned descriptions give a good idea of what goes into a Mavic product. Different types of alloy are used in different parts but the same high standards are used for all parts. Next we will be looking at teams, individual racers and races.

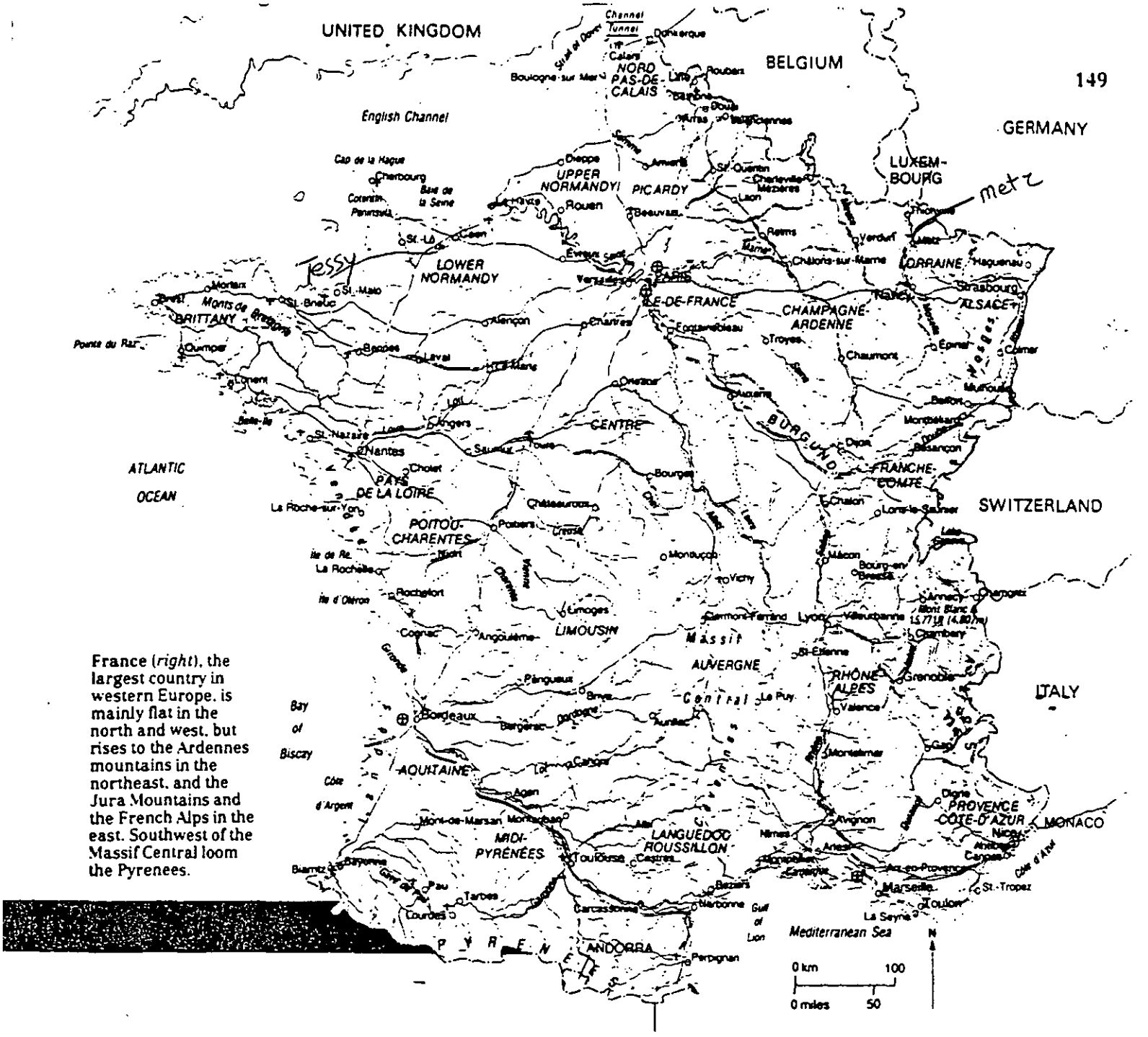
A few amateur teams that are equipped "All Mavic" are Federation Francaise, the Canadien Federation and the U.S.

Federation. Some professional triathletes who carry out the bike portion of the race while equipped "All Mavic" are Rob Barel, the 1991 European Champion from the Netherlands, Jean Luc Capogna, the 5th place finisher in the 1993 World Cup from France and Susan Nielsen, the 1992 European Champion from Denmark. Some of the races where Mavic is well noticed are the Tour de France, Tour du Pont, U.S. Corestates Race in Philadelphia, U.S. Professional Championships, Iron Triathlon Alpe d'Huez and The Indoor Triathlon de Bercy.

Mavic provides a very special service to all racers called Neutral Technical Support. Equipment that this Assistance team uses consists of cars, motorcycles and radios. The team provides anything from tires all the way up to new bicycles. For certain races Mavic equips the vehicles of race organizers, directors, journalists, doctors and guests with VHF radios to keep them informed with every detail of the race. The number of people and amount of equipment provided would depend on the size of the race. The major goal of the Neutral Technical Support Team is to make the race between people and not machine.

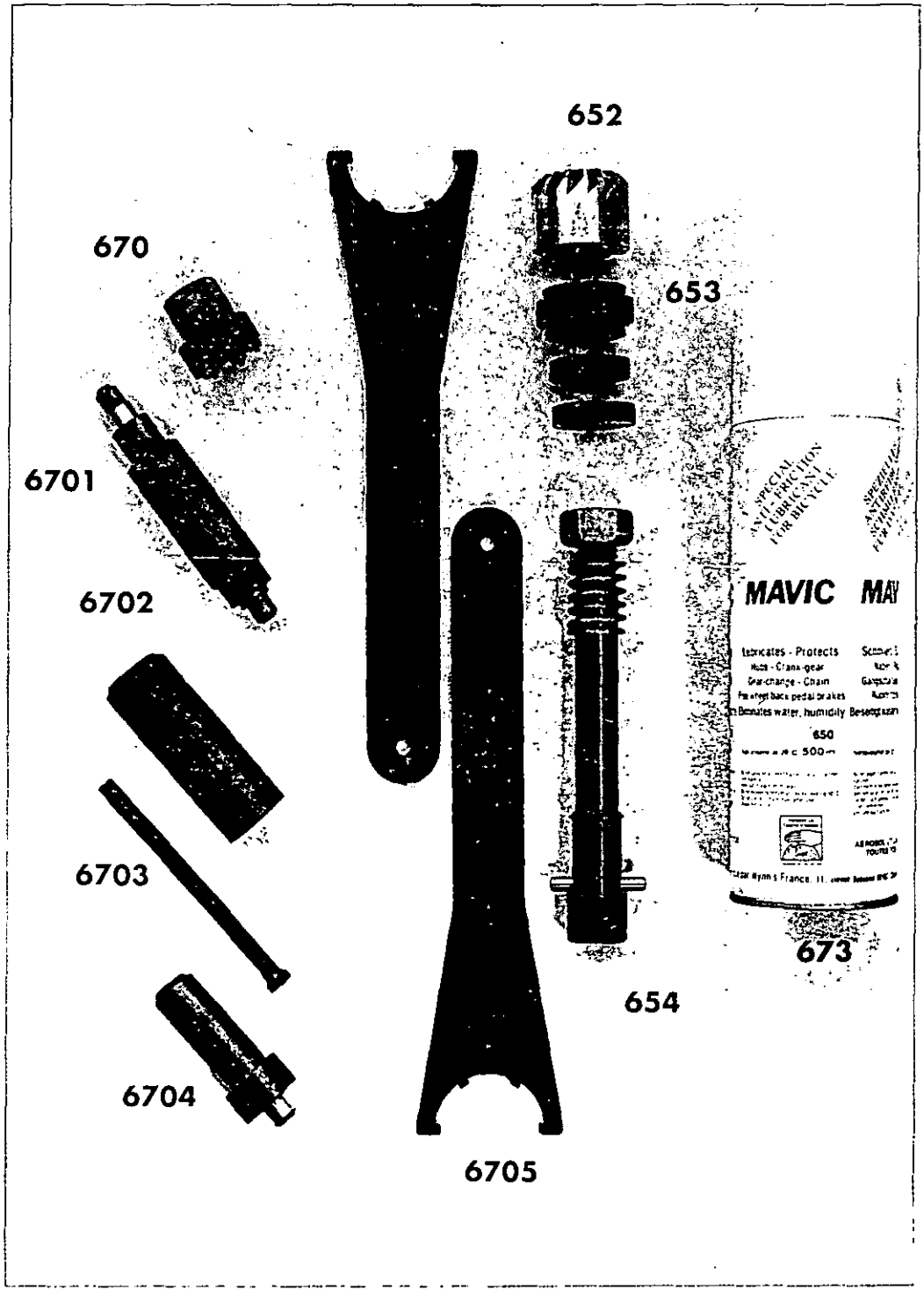
We have looked at the history of a French company and its present organizational structure. We have learned certain details about the manufacturing process and the finished products that are ready to be put to use. The ZAP System gives us an idea of what role French innovation plays in the world market. Even though Mavic is considered to be a small

company it makes a giant statement by equipping winners like Greg Lemond in the Tour de France and Rob Barel in major triathlon events. The Neutral Technical Suopport that Mavic provides should win the respect of all racers since any individual racer might be in need of such support. I would like to stress that I don't want to sterotype and give the impression that all French companies are like Mavic. I would imagine that similarities to Mavic and differences of Mavic can be pointed out with each company that is looked at. Finally I would like to sum my paper up by stating that Mavic is a French bicycle parts and components company, dealing with international sales and distribution and striving to be the best in everything that it does.



France (*right*), the largest country in western Europe, is mainly flat in the north and west, but rises to the Ardennes mountains in the northeast, and the Jura Mountains and the French Alps in the east. Southwest of the Massif Central loom the Pyrenees.

LES OUTILS
TOOLS

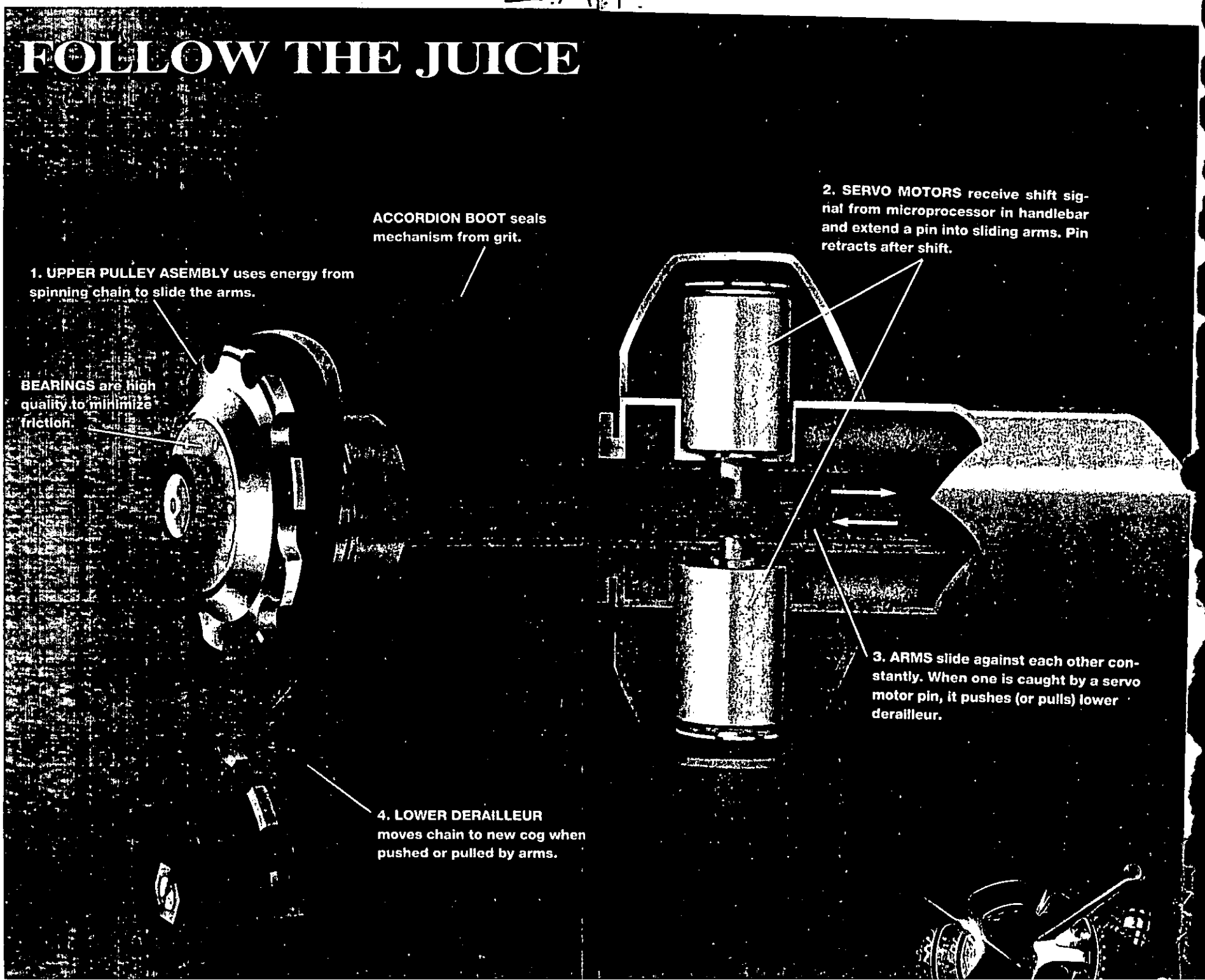


652
Fraise pour boîtier de pédalier
653
Centreur de fraisage
654
Porte-fraise
670
Clé pour rondelles d'appui des roulements
673
Bombe d'huile lubrifiante
6701
Jet de montage des roulements de pédales
6702
Jet de montage des roulements boîtier de pédalier
6703
Jet de démontage des roulements moyeux et pédales
6704
Jet de montage des roulements moyeux
6705
Clé de serrage boîtier de pédalier.

652
Bottom bracket cutter
653
Cutter centering pieces
654
Cutting handle
670
Pin tool
673
Lubricant
6701
Pedal bearing mounting tool
6702
Bottom bracket bearing mounting tool
6703
Bearing removal tool for pedals and hubs
6704
Mounting tool for hub bearings
6705
Bottom bracket mounting ring spanners.

ZAP

FOLLOW THE JUICE



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