

THE HOLLOW

WOODEN JAVELIN

Part I

by Bud Held

There were hollow javelins made of steel and aluminum prior to 1950, but none of these javelins achieved the status of the the solid wood Finish Karhu javelins. They vibrated too much and did not have a good feel for throwing. The Finns made the best javelins in the world and they made them out of the northern birch that grew only in Finland. Nearly all the best throws in the world prior to 1950 were made with Finnish Karhu javelins.

Finnish Karhu javelins, however, were hard to come by in the US in the 1940's. I did manage to get hold of a few of them. One day I noticed that one of my Karhu's seemed to fly better than the others. Most of the Karhu's when thrown over 200 ft. would have a noticeable point drop in the last part of the flight such that the aerodynamic lift would be lost. This one javelin seemed to hold its horizontal position better during the last portion of the flight. I was studying engineering at Stanford I decided that it was time for me to put my

engineering skills to use so I examined that javelin very carefully.

The first thing I noticed was that the javelin was made of two pieces of wood spliced together in the center as were many of the Karhu javelins. The second thing I noticed was that the front section seemed to be a little softer than the tail section. So far, that did not seem particularly significant, but then I noticed that the front section was a bit larger in diameter relative to the tail section. This could be a clue. Careful measurements of this javelin in comparison to other Karhu javelins confirmed that the front section of this one javelin was indeed slightly larger in diameter relative to the tail section. This appeared to have happened by accident in the Karhu factory as I found no other Karhu javelin with this aberration. As a result of this discovery, I began looking for northern birch to make my own javelins with lighter wood in the front section. I found northern birch in Canada, but it was not stiff enough and did not give the right feel to a javelin. Plus, I could not get any northern birch from Finland.

I then began gathering up as many pieces of old broken Karhu javelins as I could find. I sorted

the pieces by density and began splicing the lighter pieces into front sections and the heavier pieces into tail sections. The Karhu point was a problem because it was too long and too small at the opening. To solve this problem, I made a steel mandrel on a lathe. With a blow torch and a sledge hammer I expanded the open end of some old Finnish steel points enough to allow for a larger diameter shaft to fit into the point. I experimented with expanded point javelins in 1951 and 1952 while getting a master's degree in engineering at the University of California at Berkeley. While working of my BD degree in 1953, at San Francisco Theological Seminary at San Anselmo, I came up with the idea of making a hollow section in a wooden javelin as an alternative to the lower density wood in the front section. This way the whole javelin could be made of the same density wood but a larger front diameter could be achieved by hollowing the front section. This was the birth of the idea for the hollow wooden javelin.

My first production was a tedious handmade javelin made of four full length Karhu javelins. Each javelin was hand shaped into full length quarter round sections. One corner of each

quarter round section was beveled such that when the four pieces were put together, there would be a hollow space in the center running the length of the javelin, but with the largest hollow space in the front section. The four pieces were then glued lengthwise and hand planed to a perfectly round exterior shape. The javelin looked good, but never quite matched the solid wood javelins in performance. I experimented with numerous woods including ash, oak, hickory, maple and cedar. Most of these javelins were made by starting with a round dowel slightly larger than the finished javelin and ripping it into quarter round sections on a table saw. The 90 degree corner of each quarter round piece was then hand planed away so as to produce the needed hollow area when the pieces were glued together along the lines where they had been originally cut. At the time there were no rule restrictions on the diameter of the javelin shaft, and most of these javelins were somewhat larger in diameter than the Karhu. The larger diameter was necessary in order to get the needed stiffness out of the available wood. My most extravagant production was 4 inch diameter javelin using bulkheads and thin sheets of ash for skin, something on the order

of a model airplane body. I called it the blimp because it gave an impression of a blimp as it drifted down the field. It sailed pretty good, but was hard to throw and quite inconsistent in flight and It never matched the solid wood performances.

A problem began to develop as I put more and more bulk in the front section of the javelins. The javelin would sometimes hold its horizontal position too long and land flat or tail first. The rules demanded that the javelin land point first in order to get a mark. I realized that the javelin falling through the air had to produce enough rotation to cause the javelin to land point first, so I built a device to determine the center of air pressure on a javelin falling while in a horizontal position. The device worked fine when simply holding the javelin in the device into a crosswind. I was then able to locate the center of air pressure with respect to the center of gravity. It turned out that the center of gravity of the javelin needed to be about 3 cm. ahead of the center of air pressure in order to produce a good point first landing while still maintaining optimal horizontal position during the flight for throws approaching 80 meters.

I made good throws with my revised Karhu

javelins and felt that my advantage was unfair to my competitions. I made four revised Karhu javelins while still in seminary and gave two each to my two major competitors, Bill Miller and Cy Young, I realized that as an amateur competitor I could not sell javelins and I could not afford to make them and give them away. At this point, I turned to my older brother Dick and said, "What do you think about the idea of making and selling javelins?" Dick took over from there and brought the concept of the hollow wooden javelin to full fruition.

Part II by

Dick Held

Immediately after returning from a visit with Bud in San Anselmo, I visited a man named Harry Drake who lived in Wildcat Canyon, not far from Lakeside.

Mr. Drake built bows and arrows with which his son had broken many arrow flight records. Mr. Drake often visited our hardware store where we discussed my brother's javelin throwing and his son's archery careers. The

similarity between arrow and javelin flights was part of many of these conversations. His son's arrows flew about 800 meters. Later I visited Mr. Drake's workshop in Wildcat Canyon and he showed me his arrow making machine. It became the basis for my wooden javelin cutting machine. The shape of his arrows and the type of wood used was the model for the design of the earliest Dick Held Javelins. The modern aerodynamic javelin owes a great deal to the shared secrets of this man.

The hollow idea came from my brother. It provided a simple way to control the flight characteristics of the javelin and also increase the surface area so as to get more lift. In 1954, the IAAF rules were quite simple. A javelin must be made of wood or other suitable material with a metal point. It must weigh over 800 grams, be at least 260 cm. long. The center of gravity had a fixed range, and a 16 cm. long whipcord grip covered the center of gravity. This gave me lots of room to play with shapes and diameters when trying to balance lift and drag. Hollowing out a section in front of the

grip was an easy way to shift the balance back.

I searched for and was able to find a small supply of Port Orford cedar in a nearby specialty lumberyard. Purchasing all that was suitable for javelins I began to produce the test javelins used in the spring of 1954. This material was used until new American rules were adopted prohibiting hollow wood implements. I then built solid javelins with lighter Sitka Spruce for the front section and heavier Douglas Fir tails for the U.S. market and continued making hollow fir javelins for the rest of the world.

During those early days the wooden implements were formed by ripping a strip of wood one and three eighths of an inch square and eight feet six inches long from a solid plank. This wood blank was then hand formed with a wood plane and sanded smooth. The first few months, I had no power equipment other than a table saw. The hollow javelins were built by ripping a blank in half, then using molding head on the table saw to cut various sizes of half round groves in the two pieces. The halves

were then glued back together and shaped into a round tapered shaft using the hand plane. The center of gravity and the center of cross sectional area were located. The distance between these two points was measured and recorded and a simple formula applied to determine the distance rating of each individual javelin. No two wood javelins were identical because of the differences in density of the individual pieces of wood. Each blank was planed to give a shaft weighing enough to produce an eight hundred gram javelin. Ideally, each javelin would land with the point slightly down when thrown the rated distance. The attempt to keep the landing attitude as close to flat as possible resulted in a great many flat landings, especially when competitor's insisted upon using a rating that was greater than the distance they were capable of throwing.

Many years later, I received a letter from an irate father. He had ordered a sixty meter javelin for his daughter but when she threw it, it only traveled forty meters. He threatened to sue me. I asked what his daughter's best throw

previous to receiving the Held javelin was and he said, "About 38 meters but this javelin says sixty meters on the shaft and it should fly sixty meters!"

By June of 1954 I was confident enough of the design to offer to supply six implements for use at the AAU National Championship meet. I did not charge for these and at that point had never sold an implement. A few were given to Bud, Cy Young and Bill Miller. The offer was accepted and I was in a race to make six shafts, hand forge six points and get the implements to the meet site in time. The deadline was just barely met but all the thrower's were happy with the new style javelins.

During the off season I found a small company in Los Angeles to make points of aluminum and I then machined steel tips to be screwed into these points to improve wear. When the 1955 season opened, a few javelins had already been sold. The market grew rapidly and I needed more production. I soon built an automatic cutting machine to round and taper

the shafts. The cutting machine was so noisy I had to build a small concrete block room to house it. It worked well though, and with the noise contained, I was truly in business making hollow wooden javelins.