

THE American Surveyor

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With a bolt bag on the belt and an S-wrench in hand, the construction methods for building the Bilby tower remain unchanged, even since 1927. Reliving lives of old, veterans of our National Survey had this one up in two days, most likely the last Bilby tower that will ever be built.





Russ Arnold (retired NGS and NOAA) enjoys the topping of the tower, spending a relaxing moment or two on the observation deck. Looking out over the flat Indiana terrain of Jasper Bilby's childhood, it's easy to imagine why Bilby appreciated and developed the elevated tripod.



As illustrated in this old USC&GS photograph, building a tower back then was no different than the true reenactment of tower building in 2013. The design of a tower proved so successful, it underwent very few changes in its nearly 60 years of service.



It looked like a great place to sit down and take in the situation. Atop the tower on the light plate, the author enjoys one of the most exhilarating experiences in his surveying career.

A Journey's End

Families and the Osgood, Indiana Bilby

“G od bless Jasper.” Said more with wistful sincerity than humor, Russell Arnold was reflecting on his time on the survey. The evening was a reunion of some gentlemen all proud to have had the honor of spending careers on the National Geodetic Survey.

Another reunion of sorts would begin the next morning. These folks had gathered in the small town of Osgood, Indiana to help bring to an end, the long journey of a Bilby steel tower. You see, Osgood was the home of its inventor, Jasper Sherman Bilby and this tower, following a long career in any number of locations, will be permanently erected nearly within sight of Mr. Bilby's home to serve as a memorial to that man.

Russell (retired NGS/NOAA) was joined by fellow USC&GS/NGS retirees Joe Lindsay and Ullis Jones and current NGS employees, Dennis Hoar and David Rigney. Enjoying some fellowship at Pollard's Bowl and Po's in Versailles, right up the road from Osgood, Robert Cagle, along with me and my wife, Beth were joined by local County (Ripley) Surveyor Jeff French and his wife, Sue, our hosts. We were hearing first hand, tales of old about life on a tower crew, building and observing, about working hard and playing hard and about dreams of building this last tower.

The story of the known portion of this tower's history was related in *American Surveyor* magazine in Volume 8, Issue 4 “Mr. Bilby's Elegant Assembly” and in Volume 9, Issue 7 “The Last Tower

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Joe Lindsay and Ulis Jones (retired USC&GS/NGS), both experienced tower builders and observers correct the alignment of the base. By sighting through the intersection of the diagonals (the midpoint of the horizontal ties) up through the tower, the foreman would direct the crew members to adjust the alignments of the inner (red) and outer (blue) towers.

Standing.” To recap though, the Surveyors Historical Society, with a lead from NGS, located and secured a standing Bilby tower on an island in a swamp south of New Orleans. SHS arranged and funded the dismantling of the tower in April, 2012. Upon its landing on the shore, the tower was turned over to the Reynolds’ Foundation, a local Osgood non-profit. The tower was sandblasted and re-galvanized, through funding of the Foundation. Many of the former tower guys followed the news of these developments.

Much discussion ensued about how the tower would be reassembled. Should lifts be used and modern construction methods applied? Lindsay, Jones and others convinced the Osgood group that the

Jones, on the ground supervised the order of parts going aloft. Once the tower got so high, hand-wincing parts became the only practical way of getting them to the builders. Here Rich Leu (Chair of Surveyors Historical Society), Jeff French (local land surveyor and organizer of the event) and David Rigney (current NGS) haul a load aloft.



The alignment was accomplished through scooting the legs and anchors using steel pry bars. “Setting the base” was very important before the towers had reached heights of 74 or 87 feet and often more. The Indiana Bilby was set in concrete. In normal tower construction, the anchors were buried in dirt. In some cases, all that secured the anchors to terra firma were sand bags.

proper way to rebuild this tower was through the experience of the only remaining professionals in the country. USC&GS and NGS veterans would build the tower and do it as though it was a true re-enactment of history. It would be built as Bilby’s always were.

The next morning, my new found friend Ulis and I got up long before the others and headed for breakfast. A hard frost had set in and was thick on the truck windshield. Every knob on the dash board remained in the exact position they were on the previous bright sunny afternoon. So, here we go through the dark streets of Versailles, Indiana, running a stop sign or two with Jim Reeves loudly crooning “I’ll

Fly Away.” A very spry, agile and lucid Ulis Jones turned 89 the following week.

Having survived Iwo Jima, Ulis turned 21 on the boat back. Crossing the International Date Line, his 21st birthday lasted 47 hours. Immediately upon his return in 1946, he joined the survey. Jones remained with the survey until 1979, a time that spanned some of the greatest advancements in survey technology and techniques. In 1974 along with Joe Lindsay and others in Senegal, Africa, they constructed, at 156 feet, the tallest Bilby tower ever built. Ulis’ main purpose in life over these two days was to be the one to secure the last bolt in the last Bilby tower built.

An hour or so after sunup folks began gathering at the tower site. Charlie and Edna Geoghegan, both longtime NGS veterans





and their son, Kevin joined in the reunion. French and Jones had done the initial steel sorting the week before, a job made slightly more difficult due to the recent sand blasting and galvanizing obliterating all traces of the tell-tale red and blue paint (inside and outside towers respectively).

After a short period of time, with minimal consultation, the tower pros each expertly settled into duties learned long ago and repeated many times over their years. Rope had to be spliced and rigging made, bolt holes required opening because of zinc buildup, anchors (donated by NGS veteran, Charles Glover) had to be assembled and hardware inventoried.

Finally, with the anchors set, tower building began in earnest. Each person attending (including height challenged) was given the opportunity to join in building the initial section. Lindsay took the ladder leg with C. Geoghegan and Hoar as the 2 and 3 men. Kevin Geoghegan and Dave Rigney worked as utility men. By evening, 2 sections were up and most of the kinks of mobilization had been resolved.

The day wasn't over. Everyone was invited by the ladies in the community over to the Osgood United Methodist Church for a hearty home cooked mid-western meal, no limit on seconds. Swiss steak, potatoes

and gravy, refrigerator slaw, corn, green beans and enough desserts it seemed to satisfy every citizen in southern Indiana.

Following dinner, each person in the room was invited to say and tell anything they wished. Don't you just love the mid-west? Two of the wonderful ladies, Carole Michel and Jenny Schwipps (sisters) are great-granddaughters of Jasper Sherman (J.S. or Papa) and Luella (Mamma) Bilby. "Papa was gone a lot. Always wore a special Italian leather shoe, very narrow." One of his son's was William Hayford Bilby. The fellow that secured the title of "Chief Signalman" for Bilby was John F. Hayford (Hayford's 1924 ellipsoid).

Jeff French remembered while growing up, there were approximately 20 geodetic surveyors living in the Osgood area, many recruited by Bilby himself. The last one passed away about 4 years ago.

Representing the Reynolds' Foundation was Doug Thayer. The original endowment for the foundation was \$21 million, with Doug and others being the stewards to perpetuate the memory of Osgood and its citizens. "The Tower will always be here."

Most important though, the stories turned to a very tight, close-knit family. That would be the family of the geodetic survey during the years of the Bilby (1927-1986). That evening (and later) it became apparent just

Just a small portion of the many that helped: (1st row, left to right) Sue French, photos and host; Mike Fowler, tower collimator; Jeraldine Humphrey, her past husband was one of the last of the many USC&GS surveyors from Osgood, Indiana; Ulis Jones; George Leigh, retired NGS and learned historian of NGS past; Roger Woodfill, Administrator for SHS; (2nd row) J.D. Rigney, retired USC&GS builder and observer; Doug Thayer, Reynolds Foundation; the author; Rich Leu, Chair-SHS; Dennis Hoar-current NGS, principal builder; Steve Okuley-, BoD-SHS; David Rigney, NGS; Russ Arnold, principal builder; Jeff French, organizer of event and our host; Robert "Windy" Cagle, SHS and ground crew; (on the tower) Joe Lindsay, ladder leg man, principal builder; Kevin (son) and Charlie Geoghegan (father), principal builder. Charlie's father was there the first day. Charlie was on the crew that built the last Bilby.

how close all of "these tower people" are to one another. The epicenter of their lives past was usually a trailer park. The guys traveled as a group (G-18, G-23 etc.), the survey party. Their families came with them.

Russ Arnold recalled in 1968 about 20 families moved into a Vermont mobile home park. About that time Russ joined the survey. In Russ' words "Us locals quickly became fast friends with the "Gypsies." Weekend softball games ensued; picnics. We chased the girls and I caught one! The



The blue (outer tower) pieces on the ground that will be assembled to become the observation platform and the light tower above. The many, many pieces of the tower were organized and assembled with no directions or guide, but only through the memories of this remarkable gathering of geodetic surveyors.

Mississippi. They moved the following week. Moving north in the summer and south in the winter, there was always confusion on when to say sir and ma'am. That's not always expected nor appreciated in the north. By the time Edna graduated, she had attended 21 different schools. Her father Vernon "Willie" Wilson was a head observer. Her mother, a nurse, always made sure the single guys had a place for a decent Thanksgiving dinner – 15 men plus the family in an 8'x46' travel trailer, in the kitchen, in the living room and in the bed rooms. Though her mother wouldn't let her date the builders because "most of them drank a lot and some were rather wild", she was allowed to see Charlie. He was industrious, building in the day and learning observing at night from Willie. Willie would tell the Princess about a little black box being built that was going to come and take away their jobs. As a child, it was a thought filled with fear. The box did come and it was called GPS. Ironically, in 1986, Charlie (still with NGS) was the last building foreman on the last NGS tower ever built, over Station "Bilby" near New Haven, Connecticut.

Joe Lindsay. Joe's not the type to toot his own horn. Joe worked mostly with the survey from 1967 until his retirement in 2005. He served on the International Boundary Commission in 1981 (grizzly confrontation). Joe is held in the highest esteem by all of his colleagues. As one of the fellows put it "Joe is probably the common thread among the participants and the main reason that most of us will be there." Joe's help was invaluable in preparing this article.

There is a very good contemporary story, "The Life of the Party" in the April, 1971

Arnold, Hoar, Lindsay and Jones. Perhaps 4 of the most experienced men living (with a small few others) that understand and recall the years of our National Survey utilizing the remarkable tower designed by Osgood, Indiana native Jasper Sherman Bilby. This tower "will always be here" in this Osgood park standing in memory of Papa.

survey folks exuded an aura of one big family. A great summer for me, a typical summer for them." Russ' wife, Donna is the daughter of Hubert Sulfridge, tower building foreman. Russ dedicates his contributions in this effort to the memory of Mr. Sulfridge.

Dennis Hoar was with the Maine DOT when "they came to town." Denny was assigned to co-work with NGS, where he was taught the building of Bilby towers and

performing EDM observations and reductions. He's been 38 years on the survey.

Dave Rigney began on a triangulation party. He currently is assigned by NGS as a geodetic advisor to the State of Michigan. Dave's father, John D. was running EDMs as far back as 1967.

Edna Geoghegan, Charlie's wife and Kevin's mother, the "Princess" was born on the survey, Party G-18, in Yazoo City,



This 1931 photo depicts a fellow collimating a tower using an old K&E collimating instrument. The Indiana Bilby was collimated in the exact same manner but with a newer style instrument by Mike Fowler. Both the instrument mount on the top of the red (inner tower) and the light plate high above [74 feet] were aligned with the station on the ground.

issue of NOAA recounting the lifestyles of this family of nomadic surveyors (<http://docs.lib.noaa.gov/rescue/journals/noaa/QC851U461971apr.pdf>)

Breakfast the next morning in Osgood. Good rib-sticking chow, a perfect choice for putting up a Bilby tower. With the preliminaries out of the way and the concrete now poured over the anchors (not done ordinarily, this was a permanent build), some serious tower building commenced.

I had spent the previous day staying out of peoples' way, yet helping where I could. Territories and hierarchies needed to be established. What eventually evolved crew wise: Ulis Jones deftly handled the ground crew, with Robert "Windy" Cagle and Roger Woodfill as assistants. Up on the tower, Joe, Charlie, Russ and Dennis pretty much ran things jointly. Again, Dave and Kevin were acting as utility men. Kevin worked as though he had built towers all his life. All had superior supervisory experience so it was a matter of fluid motion, a ballet of steel, nuts, bolts and rope, S-wrenches spinning. I scampered up immediately to the third level. I did what



Manpower was specified and economical on the original tower crews. This ingenious method was designed to winch the heavy steel and other parts to the higher sections of the tower. Later designs of this method included a throttle within the rear fender of the haul truck so the rigger could control the speed of the payload on its way up.

I could do and with time, was given more responsibilities. It all became somewhat of a routine, handing up legs, ties and diagonals.

I get the feeling that handling the ladder leg is a matter of pride to these guys. Ulis climbed up the second day and insisted he attach a ladder leg by himself. At 88 and with some effort, he did it. The tower was evacuated except for the main builders while the upper portion was built and the platform boards were laid. Ulis went up twice and I believe he did secure the very last bolt.

It is an exhilarating experience to walk on the observation platform of a Bilby tower. We were joined by Rich Leu, SHS Chair and Director Steve Okuley. While up there, I thought why not go on up to 74 feet, up to the light plate. It looked like an ideal place to sit down and take in the situation. Retired NGS tower collimator, Mike Fowler showed up, set up his instrument and allowed me to center the light plate.

Kevin and I lingered on the platform for a while after everyone had left, independent

thoughts of Mr. Bilby's elegant assembly playing in our heads. I deferred to Kevin and started on down. He was most certainly reflecting on his wonderful father and mother and the extraordinary family of old that was, the survey.

There was a true spirit of accomplishment and celebration. Many dreams were realized and many memories were both relived and made that day. It's like the chicken and the egg. Which came first? Hard work or hard play? God bless Jasper. ■

Bart Crattie is a land surveyor. Apologies are extended to anyone whose contributions were excluded in this story. Pictures came from many sources. There was a remarkable gathering of remarkable people over that weekend. There will be a formal dedication (and somewhat of a reunion) of the tower in Osgood in June, 2014. Please join us all. Follow details as they develop on surveyorshistoricalsociety.com.



The Osgood Grub Co. Fried chicken buffet. The folks of the town of Osgood were so hospitable, welcoming this group of volunteers, all eager to erect this monument to J.S. Bilby. Arnold, Cagle, Lindsay, Hoar, Jones, Crattie, Rigney, Charlie G., Kevin G. and right there in the middle, the princess: Edna (Wilson) Geoghegan, Leigh and French.