

# The Goshawk Society

## *Flier*



Issue #20-2

May 2020

## *A Sixty Year Love Affair with Goshawk Cars ~ Part Two*

*Story and Photographs from Tom Murray*



*1930 Wraith H.J. Mulliner sedanca de ville WLB41 with stablemate 1935 20/25 Hooper allweather GPG70.*

Part One of this story closed in a state of Rolls-lessness, a condition that lasted five years. Still, it was not a time devoid of consolations. During that period there were some wonderful items on E-bay, among them pre-WW2 Rolls and Bentley Handbooks, which I began to collect in earnest. Many times a Handbook has gone astray from the car to which it once belonged, and on rare occasions amazing coincidences can occur, uniting book and car again. One day a handbook was listed with what appeared to be the chassis GED5 stamped on the inside cover. I say “appeared to be” because the image was unclear. GED5, a handsome Mann Egerton limousine, happens to belong to friends Richard and Jeanne Lorenzen in Lincoln, Nebraska. A few years back Richard even let me drive GED5 (aka “Petunia”). I forwarded the E-bay link to him, he did some optical wizardry on the image to confirm that the book did in fact belong to his

car, and entered what became a winning bid — this, when the car was nearly seventy-five years old!

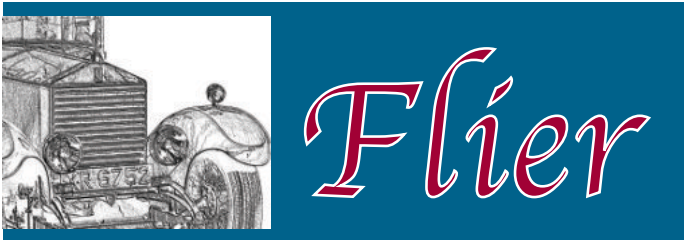
Though it sounds illogical now, the year after I parted with the Wraith I began going to RROC national meets again. The last one I had attended was fully sixteen years earlier — 1980 in Newport — to which I had driven WLB22. I just wanted to be around the cars. The greatest pleasure, however, proved to be meeting collectors and researchers who quickly became good friends — among them Tom Clarke, whose book about the 20/25 had been published in the Complete Classics series, Bryan and Cindy Jones, Paul and Nancy Teryl, John and Robin deCampi, Jack Triplett, David and Rachel Timmons. Many readers will know David’s spectacular Wraith WHC43, a Windovers limousine restored to

*Continued on page 5*

# The Goshawk Society of the Rolls-Royce Owners' Club

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The Goshawk Society *Flier* is the official publication of the Goshawk Society, an affiliate of the Rolls-Royce Owners Club, Inc. (RROC). The RROC is dedicated to the maintenance and preservation of Rolls-Royce and Bentley automobiles and its 9,000 members who own or admire the marques. Member submissions are welcomed.



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## Chairman's Message

I hope this note finds you well and safe.

My, how times have changed since my last Chairman's Note. At that time, I was saying how winter was half over and how we in Texas were getting our cars ready for touring. Since then, our country has suffered a pandemic that has kept us sheltered in our homes and away from your friends and family. As a result of this pandemic many of the RROC events were cancelled, including our Annual Meet and our Post-Meet Tour. By the time you are reading this I am hopeful that the pandemic has eased its grip on our communities, and we are able to return to our activities, albeit in a more restrictive and cautious way. As PMC owners, we are used to challenges and so, in immortal words of a famous Englishman, KBO!

If you are like me, you found yourself with quite a bit of free time. What better way to spend this newly acquired time-off than to take up those long-deferred maintenance items on the PMC – brake adjustments, lube all those Bijur fittings, now you have the time to track down each and every one of those buggers, perhaps this is a good time to drain out and clean the fuel tank, or maybe spruce up the interior. As you see, adversity makes way for opportunity!

Our next Annual Meet will be held in upstate New York. What a great place to have a tour. I will be working with Mary White, our trusted tour organizer, to plan a great Pre or Post Meet Tour. In the meantime, once we are able to get out on the road, I look forward to seeing each of you on the backroads of our wonderful America! See you in New York.

Cheers! Keep Motoring On!

Al Briseno II





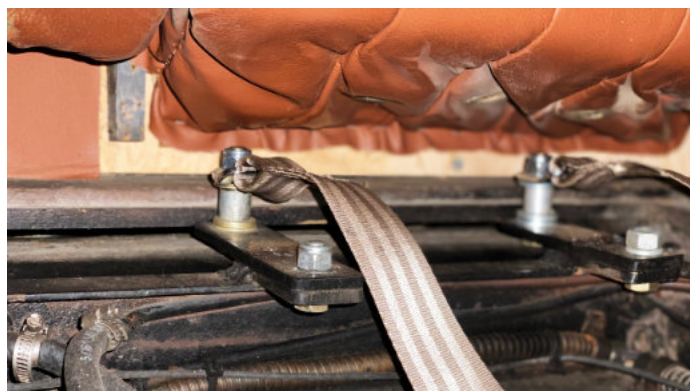
## Seat Belts in a 20/25

*Text and Photos by Doug White*

In the early days of automobile racing, drivers never wore seat belts. It was considered safer to jump out or be thrown clear of the vehicle in a crash, however in recent years data indicate that whether on a highway or a race track it is much safer to remain inside the vehicle in a crash. Seatbelt use in race cars was mandated by the SCCA in 1954 and by 1965 all US states required front seat belts in new cars. Automobiles produced prior to seat belt requirements are not required to have them retrofitted, however in addition to safety concerns, many drivers who have always used seatbelts in their daily drivers are uncomfortable driving without them. Also a driver who is belted in is less likely to slide around on the seat and can maintain better car control. For these reasons it is considered desirable by many of us to install safety belts in our vintage cars. Simple lap belts are easiest to install and may be used to secure child safety seats as well.

When installing belts it is necessary to locate or fabricate sturdy mounting points. Each situation requires creative thinking and ingenuity. In a car with a steel floor this is easily accomplished by drilling a bolt hole through the floor and reinforcing the hole with a heavy steel washer or plate on the back side. But with custom-bodied antique cars with wooden floors solid mounting points may be more difficult to locate. In some instances the frame to body mounting bolts are fortuitously located and can be replaced by longer bolts for mounting seat belt retaining hardware. At other times a heavy floor timber can be drilled and bolted similar to the steel floored cars.

For our 1935 20/25 I first needed to install a belt in the rear to secure a child safety car seat since we were touring for a day with our young granddaughter and her parents. In retrospect it was obvious that installation would have been much simpler before we reinstalled the seat back, so planning ahead is, as usual, a good idea. There was simply no way I was going to remove the seat back so it was necessary to work around it. The rear frame cross member was perfectly located for belt attachment. Rather than attempt to drill a hole in the frame member I elected to weld pre-drilled heavy steel metal tabs onto the top of the frame cross member and then because this was too far forward to mount the belt hardware, bolted steel plates extending rearward. Upward extensions for the mounting bolts were necessary to provide



*Brackets for rear seat belts welded to frame*



*Notches cut in under-seat panel*



*Under-seat panel installed*



*Rear seat belts*



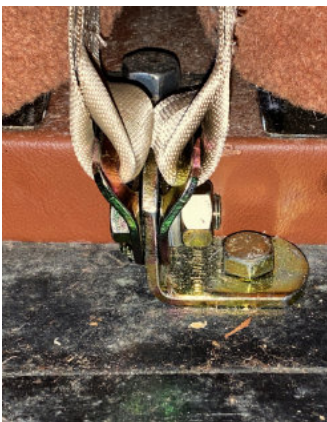
## Seat Belts in a 20/25 (continued)



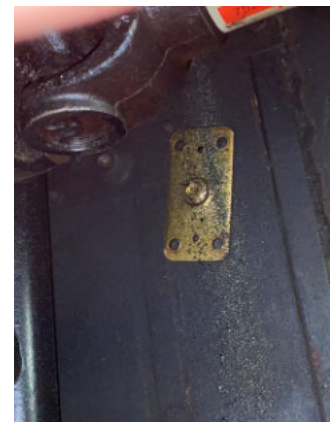
*Bracket for front seat belt, right side*



*Right front seat belt bolt, underneath, through existing support bracket*



*Front center seat belt bracket*



*Under car view of plate to which center bracket is bolted*



*Front seat belts*

clearance for the under-seat panel which was then notched for the extensions. The center two belts can be used to secure a central child seat or all four to secure two adults. Airplane passenger-style lift-buckle belts were used for ease of adjustment.<sup>4</sup>

For the front seats inertia reel lap belts were used. Each inertia reel was mounted at the base of the central "B" pillar with bolts through the substantial steel support brackets for the pillars. The center mounting point for both sets of belts was drilled through the heavy floor timber just behind the risers for the seat rails employing a threaded steel plate on the underside.

With use several problems emerged. The bulky inertia reels made it impossible to slide the seats fully rearward for ease of exit, particularly critical on the driver's side with the right sided gear shift and hand brake levers. The reels could not be moved back because then they would be imposing on the rear passenger entrance space. Also the belts tended to become twisted in the reel housings and belts needed to be returned to the fully retracted position in order to be extended further. This could only be accomplished by opening the front door and reaching back. The solution has been to replace the inertia reel belts with standard, non-retractable belts identical to those at the rear using the locating brackets from the inertial reel system.

I considered installing shoulder belts as well but that would involve constructing a reinforced mounting point on the B pillar which would involve modifying the newly installed upholstery. My approach would be to install a steel bracket along the length of the pillars held by screws into the wood, all of this then hidden by the leather covered trim pieces. On the passenger's side B pillar there is a light switch for the dome light which is just where the mounting point would be, so this switch would have to be moved lower, a relatively simple task if done pre reupholstering. The other issue is that the housings for the trafficators are mounted into the pillars. But the reinforcing strips could be ended just below them. So I haven't ruled out shoulder belts sometime in the future but for now we'll stick with lap belts alone.



perfection — the car consigned by the British government to be used by Field Marshal Bernard Montgomery in the last years of the Second World War. David has amassed amazing photographic documentation on the car, much from Pathé News footage, verifying that His Majesty George VI and Winston Churchill were passengers in the car.

The year 2000 marked the beginnings of a search for another Rolls. My sixtieth birthday was not far off, and there was a growing awareness that a time could come when I might not be able to “get out and get under”, at least not so easily. The occasional car came up for sale locally and any trip away for playing concerts set me poring through the *FL Bazaar* and *Hemmings* and spending an extra day in a distant city to check something out. “It doesn’t cost anything to look, does it”?

Then, in *The Flying Lady* (September/October, 2000) an advert for a 20/25 Hooper allweather GPG70, appeared — a four-door open car from the mid-1930s — translation: rare ! The fall term at Yale had just begun and, thinking that such an attractive car would surely have sold already, I did nothing. But then, in the March/April issue, the advert appeared again. There was no photo with the ad but there was one in Tom Clarke’s book. I determined to drive to Ocean City, Maryland to see it one weekend, casually mentioning in an e-message to Bernard King (of the *Complete Classics* series) that I was going to look over GPG70.

The car was a dream! Its owner, Edward “Scoop” Collins had been giving it excellent care. With regrets, he and his wife, then both in their eighties, had begun to part with their collection. Driving back to Connecticut I mentally rehearsed all the reasons why such a purchase was a foolish extravagance. Hadn’t I already had my fun with these machines? As it says in scripture: “To everything there is a season”. Maybe the season had passed.

Upon arriving home I collected e-messages, not with much enthusiasm, since we all know how unrelenting e-mail can be. But a surprise was waiting on the screen — a message which began: “News travels fast and Bernard has just rung me with the news that you are going to inspect GPG70 . . . the second of my grandfather’s Rolls-Royces” (!) The message was from William Morrison, keen Rolls and Bentley owner, scholar and author who for years did research for clients on ownership histories for their cars under the business name Motorhistorica. (He is currently



1935 20/25 Hooper allweather GPG70, four door open body styles are rare on this chassis.

completing *The Mulliner Project*, a forthcoming history of the several Mulliner coachbuilding firms).

As you now can guess, I acquired GPG70, which continues to bring the greatest pleasure. Will generously provided me with a history of the car, which was owned exclusively by two generations of the Morrison family in Scotland until coming to America. Thus, the history of GPG70 emerged, not through months of searching on my part but from someone who had unique, first-hand knowledge.

The car was bought new by William Morrison Sr. as a “retirement treat” when he stepped down from the board of the Distillers Company in Glasgow at age seventy. His younger son (also William) had a hand in the design and wanted rakish front wings without valences, “like the MGs used by the Glasgow Police”. The result was more conservative. Will says “possibly Grandpa put his foot down”! A native Highlander, Morrison used the car for fishing trips but did not drive it himself. When the car passed to his eldest son, Myles, the family continued to employ a chauffeur, but Myles loved to drive and care for the car himself. An avid life-long climber, Myles went off to Everest at the age of 68 and walked the base camps in his kilt!

In the late 1960s Myles met Ronald Henges from St. Louis at a vintage car rally. Mr. Henges admired the car and seven years later, when Myles was 71, they reached an agreement for purchase. GPG70 then came to join Henges’ Springfield P-I “Tilbury” in October of 1974.

A definitive history of this car in Scotland (and others owned by the Morrisons) appeared in an article written by Will in Number V of *The Roycean*. If you



*WLB 41 with Yale conducting students and Simon Carrington, acclaimed conductor and founding member of The Kings Singers.*



*1939 Wraith H.J. Mulliner sedan de ville on chassis WLB41*

consider yourself a serious student in matters Rolls-Royce, you owe it to yourself to acquire copies of this journal; get all five back issues if you can! Given the copious amount of information about GPG70 now available there for readers, I will refrain from elaborating further on its history. Please note the photo of Morrison Senior with the car when new, and also Hooper's elevation drawing. I wonder whether Brewster's "Newmarket" design had an influence on Hooper? The difference in wheelbase (129 inches for the 20/25 versus 144 inches for the Phantom) makes it necessary for a much larger "cut" in the rear doors on the shorter car, but the similarity is worth noting.

My firm resolve had always been to have only one "collector car" at a time. But there are circumstances when resolve weakens, when an opportunity arises and when the exceptional generosity of friends alters the normal course of events. In this instance, the musical "connections" referred to earlier play a part. Through David and Rachel Timmons I became acquainted with Russell and Marcia Herrold of Columbus, Ohio. Civic leader and senior partner in the largest law firm in Columbus, Russell was a trustee of CCCA, a past President of the CCCA Museum and served as what he liked to call "Meet-Head Judge" at CCCA Grand Classics.

The Herrolds and Timmons have also been pillars of Covenant Presbyterian Church in Upper Arlington, Ohio since its founding, and when their church sanctuary was being built in 1964, David and Russell insisted to the architect: "We want a genuine pipe organ, not an electronic imitation!" By 2004 the forty year-old instrument had begun to show its age. When asked, I happily offered some advice on a renovation proposal (which also included adding stops and pipes) and was subsequently invited to play an inaugural

concert on the organ. Marcia chaired the fund-raising committee and I recall being present when, with a flourish, she officially dissolved the committee upon the completion of its work!

Sadly, Russ passed away soon thereafter. At that time the engine of his 1939 Wraith was being rebuilt by Earl "Butch" Murphy in preparation for the Finger Lakes CCCA CARavan the following month. It would have been the Herrolds' thirty-sixth CARavan in the thirty-three years they were CCCA members. David Timmons writes: "Given the usual 1000-mile length I'd estimate they might well have done 40,000 miles in the Wraith alone on such tours. The only other CARavan they tried in another car was the 1995 coast-to-coast which they started from New York in their 1940 Buick Limited. We joined them in Northern Ohio when the Buick was having problems. After working all night during the layover it was determined that the Buick could go no further. We quickly put it in a trailer, ran it to Columbus, exchanged it for the Wraith, which successfully continued to California without any special preparation. That made believers out of a lot of people".

Nine years followed Russell's death before Marcia decided to pass their gorgeous Wraith H. J. Mulliner sedan de ville (WLB41) along to a new caretaker. David was there to help in the transition, most especially in trailering the car (and me) to Murphy's for inspection and new fluids (it had been off the road for several years) before we made a test drive. The Wraith had been in the Herrold family for forty years (1973 – 2013), by far the longest family ownership in its history, during which it won a number of CCCA senior awards.



WLB41 was originally ordered for showroom stock by Car Mart in London and sold in July of 1939 to James Herbert Crispe (1861–1942). (Gary Phipps' Wraith (WMB16) sold new to Mrs. Leslie Herbert Crispe, Leslie being James Crispe's son). As with other purchasers in the year when war in Europe erupted, there was little time to enjoy driving before petrol rationing intervened.

The second owner was Thomas Lilley of Lilley & Skinner shoe manufacturing. During the later ownership of Julius Turner the car won first prize at the 1949 Concours d'Elegance in Vichy, France, an event captured in a photo in Tom Clarke's Rolls-Royce Wraith. Owners in America followed — Dr. Frank Allan Stuart of the Mayo Clinic in Minnesota and Fred Brown of Portsmouth, Ohio, who sold the car to Russell Herrold.

H. J. Mulliner's razor-edge design was a great success. Examples exist with the "high-vision" feature, with and without division, with and without spats on the rear wings, with a vertical or sloping center post and in both sedan and saloon forms. This particular design was not used on the 25/30 but can be found on a few Phantom IIIs, where a ten-inch longer wheelbase easily permits folding seats.



*Father and son Peter and Stuart Brainerd, who keep my Goshawks in perfect health.*

So it is that these two small horsepower cars co-habit my carriage house. It remains to say that, without excellent mechanics nearby I would not have been able to enjoy these motorcars. I can do many of the maintenance tasks meant for a chauffeur, but I am no trained mechanic. Peter and Stuart Brainerd of Stony Creek, long-time Bentley and Rolls owners themselves, make it all possible. My philosophy over the years has been to (1) drive often, (2) never expose the cars to congested traffic, (3) never push them on speed, and (4) share them liberally with a younger generation. Without a younger generation to care for them, our treasures are at risk.

## 2020 EVENTS NOTICE & CALL FOR SUBMISSIONS

Unfortunately all of the events for 2020 have been cancelled due to COVID-19. But this doesn't mean that we can't enjoy our Goshawk cars at home or in our local environs.

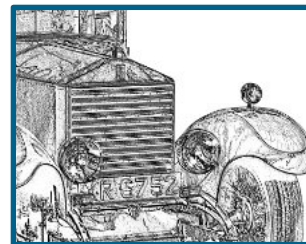
While you are following local "staying at home" orders, it's a good time to focus on your pre-war car. If you're in the middle of a total restoration, you now have fewer excuses that you have other things to do. If your car is already roadworthy, take time to make it better. Add a remote battery shut off, upgrade the rear lights, install seat belts, make a lap robe, etc.

When we get the all clear and can leave our homes for non-essential reasons, take short road trips. Find new back roads in your area on google maps or AAA.com, get out the picnic baskets and folding chairs/tables so you can have a roadside lunch. Maybe meet up with other enthusiasts (keeping your six foot distance). Learn to use your GPS. For Garmin's, you can use Trip-Planner to pre-program your routes.

Whatever you decide to do, send in photos and a paragraph or two (or an entire article) about your progress in the restoration on your car or about a mini-tour in your area.

## Wanted

### Your ads for:



The Goshawk car or parts you want to sell.

Search for parts needed or cars available

All free of charge for Goshawk members.

Send ad and photo to Mary White, editor:  
[mcwhite@triad.rr.com](mailto:mcwhite@triad.rr.com)

## *At Long Last...Authentic Tube Radio Music to My Ears*

*Story and Photographs from Steve Sherriff*

There is something about the sound of an old tube car radio which even musically challenged incompetents like me can appreciate. There is a distinctive mellow, warm sound which wafts from these contraptions. It is a bold and rich sound which subsequent transistors and modern electronics do not replicate. Even my untrained ear can instantly tell the difference. The character and quality of this unique sound is undoubtedly why musical amplifiers continue to be manufactured with tubes.

When initially turned on, the hum of the vibrator in such a radio creates a certain suspense until sound bursts forth about fifteen seconds later, just when you were ready to give up. Your patience is then rewarded. This suspense is just like starting a slow cranking six volt collector car which invariably starts just when hope is almost lost.

If your collector car originally had a vintage tube (British term is “valve”) radio, or a more modern, but still old radio, this article is intended to inspire you to get it operational and keep it operational, rather than replace its internals with solid state and other wizardry. Such a project can be easier and the result more durable than you may think. The antique and vintage radio hobby is alive and well. There is plenty of amateur and commercial advice and restoration assistance out there, radio hobby club support, and parts can surprisingly be readily found.

My razor edge 1937 Rolls-Royce 25/30 Sports Saloon (GHO-1) with coachwork by Hooper, is the only collector car I have ever owned which never had a radio installed from new. After owning this fine car since 1992, at long last I decided to rectify this situation. As this is a Concours car, for several years I searched in vain for an authentic radio. As you might expect, operational car radios from the thirties are by now quite rare. Car radios only made their debut in 1930. Indeed, very few Rolls - Royces of the thirties featured car radios when new. I knew I was jumping into the deep end, although not quite exploring the pyramids of Egypt. If you have a newer car, the mission will be correspondingly easier. Part of the fun and the challenge with older cars is to keep them authentic. In the process of finding and restoring a correct radio you become a mini historian. This process can feel like an archaeological dig for artifacts.



*“A superb fake” is how CCCA judges described the modified Crosley transistor radio mounted in the rear compartment of 1937 25/30 Hooper sports saloon GHO-1.*

My fairly thorough initial search was unsuccessful. Locating authentic radios for other cars will be much easier. In desperation, in around 2012, I installed a brand new Crosley “cathedral style” retro radio (still made by Crosley very close to the original style of their table top home radio) in the rear of my chariot. (picture above). I cut this inexpensive replica in two, reducing width to a reasonable size, and then trimmed with ebony veneer to exactly match my woodwork. A friend got rid of the 110 volt plug and powered this AM/FM transistor radio with a nine volt battery. It cost about seventy dollars all in, and performed and looked great. However, it was a fake in a car which was the real deal. The FM was great (FM was not developed until around 1938) but there was severe engine interference on AM. I had no metal radio antenna at that time, simply the tiny flexible FM antenna which comes with the Crosley unit.

However, my conscience began to get the better of me, especially when Classic Car of America (CCCA) judges at the Gilmore Museum in Hickory Corners Michigan in 2013, asked me if this rear mounted radio was real. I responded that I was a Canadian, but that I understood that anyone could “take the fifth” while in the USA and that I was taking the fifth. The judges thanked me for my candor and one added that it was a superb fake.



Indeed the quality of the fake caused a well intentioned novice Rolls-Royce Owners Club (RROC) interior judge to want to give me bonus points for the Crosley radio at an RROC Annual Meet until the Judging Team Captain politely set her straight.

My reformation started when I was back again seeking my CCCA Senior Award in 2014 at the fabulous Gilmore Museum in Hickory Corners Michigan. The same judge expressed his regret that they would have to deduct points once again since the radio was still there. I pretended to have ignored this issue, but by this time the radio was mounted with velcro. When this judge moved on to other inspections, I quickly removed the radio and put it in my cooler. When he returned and discussed the proposed radio deduction, I offered to give him some water to counter the effects of the very hot day since I now claimed there was no radio. To his surprise the radio had vanished. After some light heated banter, the judges agreed there would be no deduction if I revealed my secret which I did. The car duly received its CCCA Senior Award with a very high score.

But by now I was determined to do things right. I soon posted a parts wanted notice on the Rolls Royce Owners Club (RROC) website. At least three years later, after I had forgotten all about it, an RROC club member e-mailed me asking if I still wanted a period correct Rolls radio because he had one. My brief reply was "you won't have it for long." This fine gentleman struck a very fair deal with me, advising he didn't know whether the radio could operate, or even if it was all there internally, but that it was a correct 1934 Philco for a Roll-Royce. The photos looked promising. He told me that it used to be mounted in a 20/25 which had been restored by someone else, without putting the radio back in. It was simply unknown when it had last played. Having previously searched in vain, I did not hesitate, reasoning that a bird in the hand was worth a flock in the bush. Yes, it was a 1934 radio, but the original owner of my 1937 car had previously owned a new 1934 20/25. In any event, beggars cannot be choosers.

I thought it unlikely that a fair minded judge would punish me since it was a period correct Rolls-Royce radio which Hooper could readily have installed at my original owner's request in 1937. Was I going to wait until eternity for a 1937 radio or act now? I am glad I dove in. At the very fair price I had little to lose.

The good news was that when it arrived, it was indeed the correct Rolls Royce model, a twelve volt 1934 Philco Transitone Model 10 T, with an internal

step down transformer reducing the voltage to six volts so that Philco could use the same tubes etc. in twelve volt Europe, as they did in six volt North America. The 'T' was the designation for the Rolls - Royce model. American made Philco and Motorola were the principal Rolls-Royce radios in the thirties. They were the primary manufacturers for many cars in the era. They had remotely mounted cable driven tuners with a dial. This handsome looking tuner was connected to the bulky case via rather long cables. When it arrived, this heavy unit looked complete and very fine externally.

I read a fair bit in *Valve Radio and Audio Repair Handbook*, (Chas. E. Miller, 2003, Newnes, available from Amazon), easily obtained a schematic from an online source, and importuned a knowledgeable friend who brought his other knowledgeable friends to this archival event. They knew electronics, but not thirties radios. I knew nothing. We opened the case, and lo and behold everything appeared intact. Gradually feeding up to six volts, but not daring twelve volts, we got many tubes (sometimes called "valves" or "heaters") to light up, but it remained as quiet as a tomb with no signs that appropriate power existed to motivate the relic.

I resigned myself that easy success was not to be, and buttoned it up but at least mounted it in the car. I continued with my fake Crosley in the rear which I now called a speaker (it sure looked the part) and installed a proper 1935 Motorola tuner on the face of this fake rear speaker. I hooked the transistor power from the replica Crosley in the rear to the Philco radio in the front and it played well through the original front Philco speaker and / or the rear Crosley speaker. In fact the authentic Philco actually has authentic internal provision for a rear speaker with a switch.

However, I remained guilty as charged since the original Philco radio could not play. All the sound was coming from the rear Crosley transistor radio. Although almost any judge would be deceived by the sound coming from the front Philco speaker which is part of the original radio, I refused to lie if asked any direct questions. In the end, I was not asked by any judges to turn the radio on.

This story of deception and treachery would have ended there, until another friend advised that his brother in law knew vintage radios. Sure enough this superb gentleman got the Philco to play after several hours of diligent analysis. The first tune was appropriately from a fifties soap box opera. This guru dismantled and repaired the vibrator (apparently vibrators do require service over time) and I was in



*The correct model radio for Rolls-Royce of the thirties: A 1934 Philco Transitone Model 10 T. This model featured an internal step-down transformer to make the radio compatible with the 12 volt electrical system without using different internal parts from the American 6 volt model.*

business. The least I could do, and did, was to take this fine gentleman and his wife out to lunch in the Rolls together with my friend and our wives.

Now I was getting greedy, and wanted a correct antenna. I was about to throw out the somewhat unusual looking telescopic antenna which arrived with the Philco, until I learned in *Roberts' Book of Firsts* that Philco invented the telescopic antenna in 1934. To my surprise, I was looking at the correct antenna. Moreover, the antenna worked after I installed and wired it, enclosing the cable in conduit pretending to be a Hooper craftsman. I am aware that some period antennas of the early thirties are elaborate structures with long metal rods mounted under the car. However, this correct antenna nicely tucks between the side mount and the bonnet looking like it has been there forever.

However, I still feared engine interference, and was not keen on installing all manner of capacitors and resistors on and around my pristine engine. However, by this time I was plugged into multiple gurus. No problem they said. Take your twelve volt power directly from the battery under the rear seat via a fusible link. In the result, all my connections went nowhere near the bonnet.

To my relief, this worked. Now there was no engine interference at all. The only fault was that the Philco tuner was nowhere near the correct frequency. To my utter amazement this changed over time as if by

magic. The more I played the radio, the better the sound, and the more precise the tuner. Soon the mechanical tuner was bang on frequency. This remains a miracle to me, although I am sure there is a mechanical explanation. Indeed the whole escapade remains miraculous.

Moreover, the sound was high quality with very good volume. I have no musical aptitude whatsoever, but it does sound pleasantly mellow. There is only a very faint inoffensive vibrator hum which is the way they were when new. You don't notice this. It takes about fifteen seconds to start playing. Now, at last, I have a radio functioning as new for the past six months with no sign of looming peril. In fact, it sounds better to me than a modern car on AM radio.

The experts scoffed at my last remaining fear - replacing the tubes. One of these experts has 10,000 tubes. Another knows where there are 150,000 tubes locally in Ontario Canada let alone in North America. I checked and you can buy these numbered tubes on e-Bay. Since they are vacuum packed, tubes don't deteriorate from sitting.

It turns out that restoring old radios is a popular hobby, with vintage car radios a smaller, but not insignificant segment. There will be commercial vintage car radio restorers near you who are fairly easy to find. Their prices are likely to be reasonable since they will not be the only show. You can ship these radios if necessary.



## Is your Head Screwed On Right? A Beginners Guide to fitting a Cylinder Head ~ Part 3

*R. Pierce Reid, The Vintage Garage, Stowe, Vermont, USA*

When we last left our intrepHEAD cylinder head fitters, we had gone through the steps that help you determine whether you need a new head. And through the steps you should take so that your shiny (and expensive) new head does not end up on an engine that is unworthy of the head.

As we have had several weeks to get all that work done... and we will assume that you now have a nice new cylinder head on your workbench, perhaps even still in a crate proudly marked "Product of Great Britain..."

### **Christmas in April!**

The first step with your new head is the obvious one, which is to unpack it. As heads are expensive and, really, somewhat fragile, before opening the crate, examine it for any damage. Does it look like the crate's been dropped? Crushed? Folded, spindled or mutilated? If so... take pictures and call your head manufacturer!! In doing this for decades, we have NEVER had a head come across the pond with damage to either the crate or the head. But there is a first for everything. So use some caution in unpacking.

As you open the package, you will note that there is usually a sheet that reminds buyers that their head will require some skilled fitting... and this is not there just to take up space. It will. Read it! And, based on this and earlier installments, make sure that you feel confident and qualified to fit the head to your engine. Because just 'bolting it up' is a good way to take two steps back after your one great leap forward in acquiring a head.

Once it's out of the packaging, place it on a surface that protects the gasket face! A sheet of clean cardboard is ideal. The aluminum gasket face is very soft! It can get scratched, marred, dinged, etc. very easily and then you will a) Have a burr that may not let the head gasket seat. b) Have a gash that will not let the head gasket seal! Protect that gasket face throughout the entire process!

Give the head a close up inspection. When we order our heads at The Vintage Garage, we specifically request that they not be painted. This is not because

we don't like British paint, but because we typically use Imron on blocks and we want the head to match the blocks. As the paints are not compatible, we simply ask for the heads to be shipped 'in the white' as it were. This has an added bonus of letting us inspect the casting and the head closely. Look at faces where the head nuts will go (with washers under them...) and make sure they are flat and true. (We had a head where it appeared that the milling operation on these surfaces left a 'crown' that had to be milled off.) Check that all the stud holes are tapped. And look at the Temperature Gauge Bulb holder, as not all are compatible with whatever your temp gauge is, was or might have been. Now is the time to handle any machine work or adapter making... not when the head is in the car!

### **The Real Work Begins**

As the manufacturer pointed out in their missive you removed from the crate there is some skilled fitting that is going to be involved. Generally, one can assume that it will take anywhere from 20 - 40 hours to assemble and fit a new head to an engine! And that does not include the work you already did to get your engine 'ready' for the new head!

The first thing you will do is break out your valve tools and, after numbering the valves with an electric pencil (if I catch you using a punch, I will come over to your house and confiscate your hammers...) remove all the valves, springs, etc. from the head and store them in order. The reason for this is that you not only have cleaning to do, but also studs to install, threads to chase, etc. And you don't want that debris to get into your nice new valve train! Make yourself a valve holder from cardboard... or buy one of the plastic trays that companies like Summit sell to help organize valve parts. Treat your valves with greatest care! If you drop one on its head and/or ding the sealing surface, you will be doing your first valve job/ grinding before the head even goes on.

With the valves carefully set aside, you will give the head its first (possibly of several) pressure washes and hot water washes. The head was carefully cleaned and prepped before it left the UK. However, we have found that on occasion there are small pockets of

casting sand or bits of aluminum that may not have come out during initial cleaning(s) and a bumpy air flight can dislodge debris you don't want circulating through your new engine. If you don't have a pressure washer... the local carwash will do. Use the high-pressure soap and rinse. Don't skimp on the quarters.

Put some WD40 in the valve guides (temporarily) and then inspect the head through the ends. Sometimes there will be bits of aluminum slag or pieces of metal that may be occluding water flow. These can be broken off carefully with needle-nose pliers or a small chisel. You are only trying to remove visible bits... and can only see 'so far' into the head. So do what you can. If nothing needs attention, you are ready for the next step, which is to begin fitting the studs.

### Studley Do-Right!

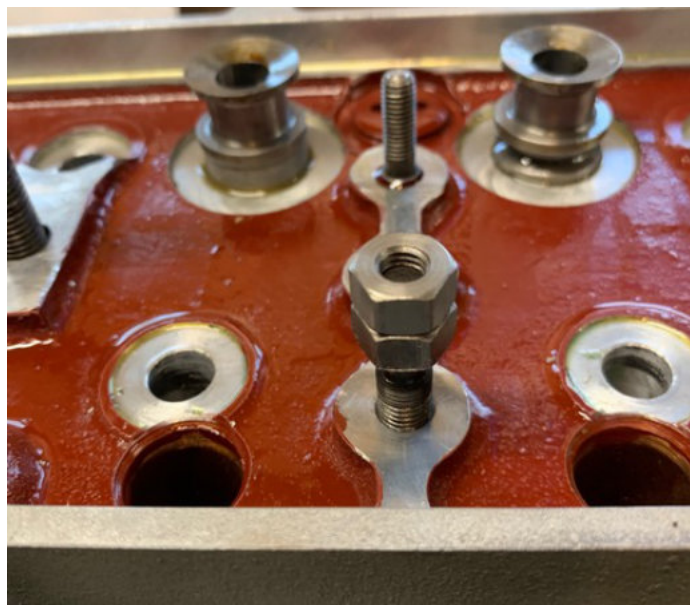
Unless you have specifically requested your head supplier to fit all studs to the head, you now have the task ahead of fitting the studs. In fact, we don't recommend you have your head supplier fit the studs... as there are so many variations in everything from manifold configurations to linkage studs, etc. that you really need your old head as a reference.

We do recommend, however, that you order a complete stud kit with your engine. These will serve two purposes. First, the odds that a head that needed replacement in the first place will give up its studs with a fight is wishful thinking. Many times, the studs are completely corroded in place and, often, at least a few are bent, incorrect, cut off or simply stripped. The best purpose that the old studs can serve is often that of pattern. Second, a new stud kit will ensure that you are putting nice, fresh, clean, un-corroded, straight studs into the new head. This will pay off in spades later!

Fitting the studs is also not as straightforward as just screwing them in. For one, even new production studs often have micro-burrs on the threads from manufacturing. In addition, the threaded stud holes in the head may also have some small amount of burring from manufacture. If you thread a steel stud into an aluminum head and 'lock it up' or "Squeak it" as we sometimes call it, you will destroy the female thread as a hard, galled bit of aluminum stuck in the steel stud chews its way out of your expensive new head. So for every stud hole... you should run two taps down them to chase them. A starting tap and a bottoming tap, being VERY careful not to accidentally hit one of the copper tubes or cast aluminum at the bottom of the threaded hole. If you spin a tap in too far and puncture a copper tube (and some of them are



*This is a collet-style stud puller/fitter. Hard to find and expensive on places like eBay, it is worth its weight in gold when fitting studs in a new head. Or removing them...*



*Double nuts are a proven way to tighten a stud into a casting. DO NOT use the 'cam grip' type stud removers/installers from Sears and the like. You do not want to mar the stud or twist it. Ideally, you are only final tightening your stud as it turns in with little more than finger pressure.*

right at the end of the stud hole), you are in a world of hurt unless you know how to swage in head tubes. Do not run your tap in dry, either. Kerosene is one of the best tapping fluids for aluminum. Lamp oil works well, too. The tapping will clean up the thread hole.

To clean up the threads on the stud (and do this to both ends), run the threads on a wire brush set up on a



## Is Your Head Screwed On Right? (Continued)

bench grinder. Wire brush the threads both directions... clockwise and counterclockwise, which will burnish the threads and 'lay down' any micro burrs.

Next, measure the stud threads and make sure they will not protrude deep enough into the head to puncture a copper tube. On occasion, we have to set the stud in a lathe and cut off a thread or two to make sure that it shoulders properly (seats fully) without bottoming on a feature inside the head.

When you put the stud in, use your fingers! Do not just 'double nut' it and go to town with a couple of wrenches. Screw it in smoothly with your fingers. And for the love of all things Holy, do NOT use one of those 'stud screwing' tools that mar the surface or Vice Grips. If I catch you using Vice Grips, I will come to your house and take away your Vice Grips along with your hammer. If the studs don't thread in smoothly and easily, lap them in. This can be time-consuming. But the alternative is a stuck stud... galled threads and, possibly, a trip to the machine shop to fit new threads or helicoils to a new head. Don't be that guy.

As each stud goes in, check its length not just against the old head, but against the part that it will be holding. Manifolds, linkage brackets, rocker towers, etc. all require different length studs. A 20/25 engine alone has at least a dozen different studs (length, diameter and configuration) on the head alone. You will know that the stud is the right length when the component fits, with its nut (and washer) and 1.5 – 2 threads protrude from the nut. Adjust stud lengths accordingly.

When you know you have the length right and the correct stud in the correct place, clean the stud and the stud hole spotless with lacquer thinner. You do not want any lapping compound, oil, chips, etc. in it. Blow out with compressed air. Apply a couple of drops of Red Loctite on the stud, double nut it and turn it in place using a pair of wrenches. The pair of wrenches balances the force and so you won't bend a stud or get it cross-threaded. Do not force anything. Steel studs in an aluminum head require the most delicate touch and proper preparation. If you rush or force things, you can easily destroy a \$10,000 cylinder head! Don't be that guy, either.

At The Vintage Garage, we recently installed studs in a new Phantom 1 aluminum head and it required 16 hours to chase, lap, fit-to-length, cut, etc. the studs. Two days of work. But this bench work now will save you massive amounts of time, money and angst



*Head with all studs ready to fit. Note that they are threaded in only as far as they will go with 'finger pressure.' In other words... they need some fitting by chasing both male and female threads. Studs should screw in basically with finger pressure before final tightening.*



*Using a tap to clean up the threads in the casting. Be very cautious here. Use new, sharp taps. Use kerosene or Tap Magic (Aluminum) for lubrication. Do not do this dry. Each hole should be carefully chased. Beware copper tubes behind the stud holes!*



*Using a die to clean up the threads. Even new manufacture parts, made to 0.0005" tolerance... may have burrs or small discrepancies. If they gall an aluminum casting, these discrepancies will cause time-consuming (and therefore expensive) issues!*



*Stud ready to fit. Chased, machined and burnished so it is smooth.*



*Stud on the bottom is 'as taken from the parts bin.' On the top is after chasing, wire brushing and some lathe work to clean up a gap under the step. This ensures the stud seats fully and cleanly at exactly the right depth. It's more than just screwing things in!*



## Is Your Head Screwed On Right? (Continued)



*Stud that has been chased on both ends and is ready for fitting. This has Red Loctite on it and is about to get threaded into the head. Using either a collet driver or double nuts, this should be screwed in steadily and smoothly until it bottoms BEFORE the Loctite sets up. This is about one drop of Loctite, spread over the thread. Plenty!*



*Stud bottomed out and final fitted. Note small bead of Loctite around it. The red Glyptal paint comes from the factory and is good on new castings. We are cautious about using it on 'old' castings as getting the metal clean enough to adhere is VERY difficult. And if the metal is not perfect, the Glyptal will lift and wreak havoc with your new engine. Be cautious.*

later... and the alternatives are very expensive! Mocking up the entire head on your bench (from manifolds and linkage mounts, to rocker towers and end plates...) will make the final assembly and installation a piece of cake!

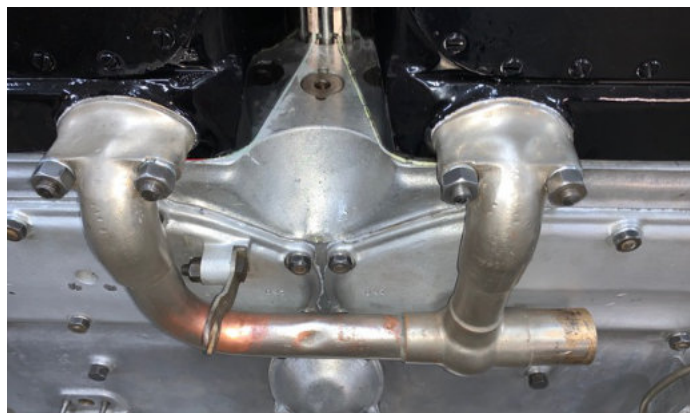
### Coming to the End(s)

If you thought by the section title that you are almost done... I have some bad news. But if all your studs are in place, it's time now to fit the end covers. This includes the rear cover and the front radiator water outlet.

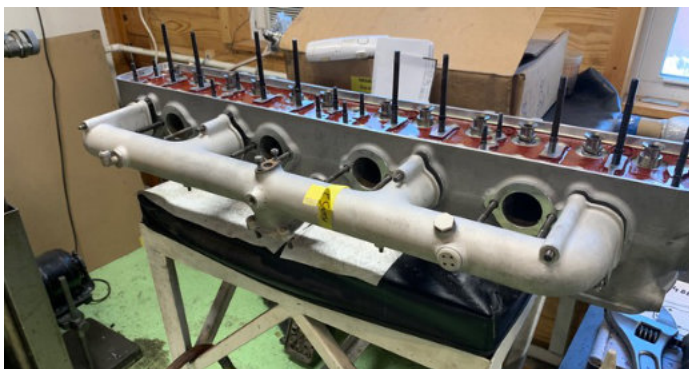
These parts, we mentioned in earlier installments, can often be badly corroded from the inside and should be replaced if there is any question. Even a hole the size of a pinhead can empty a car of water in minutes. The Small Horsepower, PII and Derby Bentley cars also have a 'nozzle' held on by a castellated nut and these can be a bear to dismantle. Heat, good fixturing and proper hook spanner are your friends. In extreme cases, new nuts are available and are cheaper than the casting... so cut the nut off and



*Intake and exhaust studs fitted. The steps are below the surface of the gasket. In several cases, a couple of threads have been added to the outside to get the nuts in the right place. Note that the chasing has removed the blackening in some places.*



*These are studs on a block, but they show the two threads protruding from the nut. This is what you want to see. Not flush... not 5 - 6 threads. Nice neat 1.5 - 2 threads protruding.*



*Fitting the intake manifold to make sure the stud lengths are right. Adjust stud as necessary, so that roughly two threads protrude from the nut after it is fitted. The Manifold will later be polished.*



*Exhaust manifolds being test fitted. These are later fettled and painted in high temp black. And they have been flat-plated so that they are a perfect fit on the gasket surfaces BEFORE gaskets are fitted.*



## Is Your Head Screwed On Right? (Continued)



*Upon inspecting the head, we found some pieces of casting flash... the 'shelves' sticking out from the casting. These are broken off and cleaned up where they can be reached.*



*Another example of studs before and after chasing. Note stud on left is burnished, chamfered and has a clean groove under its shoulder. The right one is "out of the bin."*



*Front studs being fitted. Because the front cover has recesses for the stud shoulders (which align the cover), they protrude slightly. The excess Loctite will be cleaned off before fitting cover.*



*Front cover temporarily fitted. Make sure gasket faces are clean and at gasket with sealant. We use a non-silicone sealant here because the head is unpainted. If we used a silicone sealant, the paint would be a mess!*

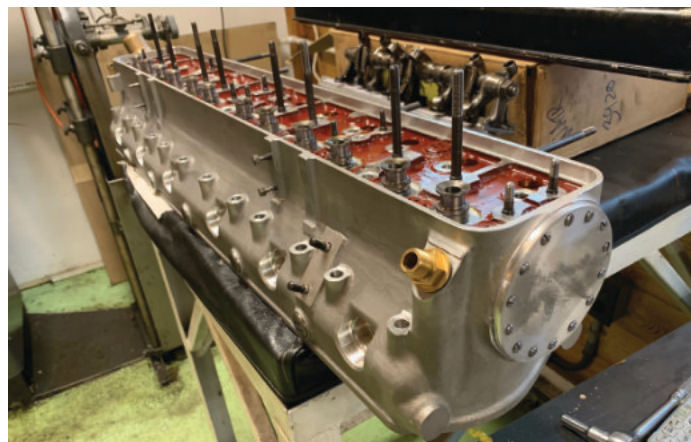
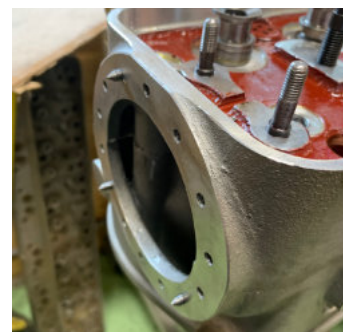
replace if needed. Also as we mentioned in earlier installments, make sure the plates are flat and free of pits and corrosion that could cause leaks. Smooth on sandpaper with a flat backing, as needed, to ensure the surfaces match.

Both front and rear cover should be fitted with a gasket. We fit before painting the heads, so use a non-silicone gasket adhesive and a Karropak paper gasket. But various other sealants and gasket materials are acceptable. Note that on the Small HP Rolls-Royce and the Derby Bentley, the screws that hold the covers on are tapered at a 60 degree angle. They are not standard taper screws! So procure new screws if your originals did not survive. They are offered by Ristes and Fiennes, the makers of cylinder heads in the UK. Fit with a proper hollow-ground screwdriver as well. Not something from "wood shop." If I catch you using non-hollow-ground screw drivers on your new head, I will come over to your garage and take your screwdrivers away.

### Test Fitting

With the end covers on and the studs in place there are two more tests you want to make. First is to ensure that your rocker shaft fits properly on the studs. Fit the rocker towers and shaft (with no rockers on it)

*As we had to make a new rear cover from aluminum plate. They can be bought, but through an oversight, we had not bought one. Rather than wait we simply used the lathe and made one. These little 'transfer punch pointers' help locate the holes we needed to drill in the new cover accurately.*



*The brass temperature bulb holder should be pre-fitted and checked with your temp gauge. The UK and Springfield units are different, including different male threads on both ends. Now is the time to make sure it all fits! Don't forget to test your temp gauge before fitting. Note rear cover with countersunk screws. Countersinks are often a special angle. Make sure you have the right screws.*

down onto the studs, making sure that it seats fully with light hand pressure or maybe a palm thump. I know you won't use hammers, because I probably already took them away. You want to make sure that the bases of the towers sit on the studs with no interference.

The next part of test fitting will be to place the head on the engine for the first time and make sure that it drops **CLEANLY** onto the spigots at the front and rear of the block (or in the case of an Iron Head P1, over all the water passage spigots.) This should be done with a head gasket in place temporarily. It is generally a good idea to have assistance when fitting the head over the studs as there are 26 (or more) of them to line up. Bouncing the head around on steel studs does not fall under the category of 'protecting the gasket face at all costs,' so having one or two people lower the head while someone underneath tweaks long head/block studs or guides the head is a good plan.

The head, at this stage, must sit down clean on the head gasket and not hang up on the alignment dowels/spigots. Note that it is **NOT UNUSUAL** for some filing to be needed at this stage to make sure everything fits. The alignment dowels/spigots may be burred or the holes, drilled to print on the new head and the old blocks, were drilled 75 years apart. And even a few thousandths of an inch of interference can be catastrophic later. Make sure the head seats cleanly with only gravity pulling down on it. If it does not sit down or the spigots are not aligned, put a bit of masking tape on the gasket face of the head and use that to cipher out where you need to relieve the head.

If the head sits down nicely at this stage, look at the top of it where the head studs are protruding. Are any noticeably bent? Not sticking out far enough? Sticking out too far? Stripped? Galled? Now is the time to deal with that. Because you don't want to deal with it later.

Last, fit the chamfered washers under each nut and put each head nut on using only finger pressure. If some are tight or locking up, remember our earlier admonition that you have to have the head nuts turning smoothly or they will throw off the torque values. In addition, the washers you use must be the original RR-Style thick chamfered washers, not flimsy hardware store zinc-plated junk. There are many tons of force on the head studs and, by extension, on the face of the head where the nuts sit. The washers have to be strong enough to spread the

load of the nut without bending or cupping which will damage the new head!

If everything fits, take the head back off, knowing that you are almost there!

### **Under Pressure**

At this stage, the head should be assembled and you know everything that goes on the head will fit and that your head fits your engine! So it's time for final tests and assembly before fitting on the car.

The last major test is a pressure check. This ensures that, once you fill it with water, it's not going to leak. For this check, you need to plug up all the water passages in the head and then fit an air fitting to the water inlet (or the temp gauge fitting) so that you can put 15 pounds of compressed air into the head and test it for leaks.

Probably, you did this test as you were determining that your old head was a boat-anchor, so I won't go into too much detail. But you will need to spray the head with soapy water and look for any bubbles that indicate leaks. These will most often occur around screws on the covers. If you have a leak at either a core plug or a copper tube... call your head manufacturer as this should not be occurring now. They can advise on repairing. Rectify any leaks now!

Clean the soapy water off and give the head one more good bath/pressure wash. You are going to put the valves in next, so you will want to make sure the guides are spotless!

### **All Aboard the Valve Train!!**

With the head now clean, assembled and all your parts pre-fitted, it's time to put the valves back in. Though there are some assembly lubricants available for engines, and we use them in many situations, when assembling the valves, we use a good coat of motor oil on the stem and in the guide. It will smoke a bit when you first start the engine, but it lubricates better in this high-stress location than most of the assembly lubes out there. Also, soak the valve stem seals in motor oil overnight before assembling. Even new ones.

On the Derby Bentley's and 25/30's don't forget the little circlips on the valve!

Now, with the valves in place, the last 'fitting' item (if you put in a new rocker shaft and bushes) will be to ensure that each rocker pad is centered

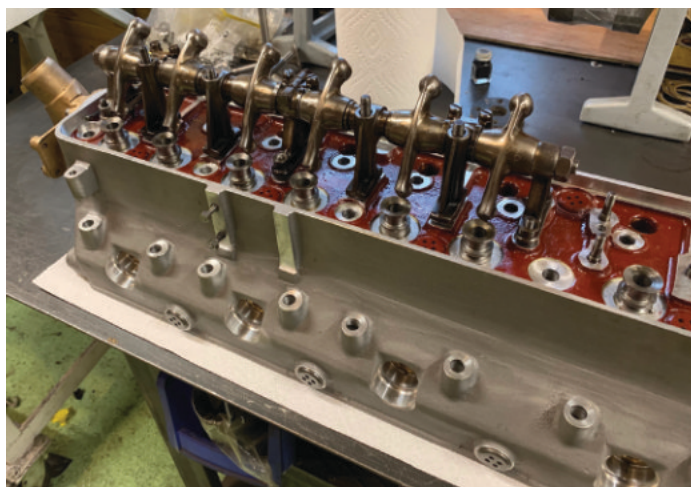


## Is Your Head Screwed On Right? (Continued)

on its valve and that the flanges clear the rocker towers/posts and spacers. The new rocker bushes you fitted, especially the flanged ones, will be over-wide and will require fitting or the rockers simply will not fit between the towers on the shaft. These can be cut with a lathe and collets, but to know which side to cut, you will need to assemble the rockers, a pair at a time, on the shaft and see how they meet the valve stem. You want them centered as best you can. Again, this is best done on a bench, because it is a royal pain to do it leaning over a fender! As mentioned in an earlier installment, ensure that the rocker pads are dressed and smooth or they will never bed into the new valves properly.



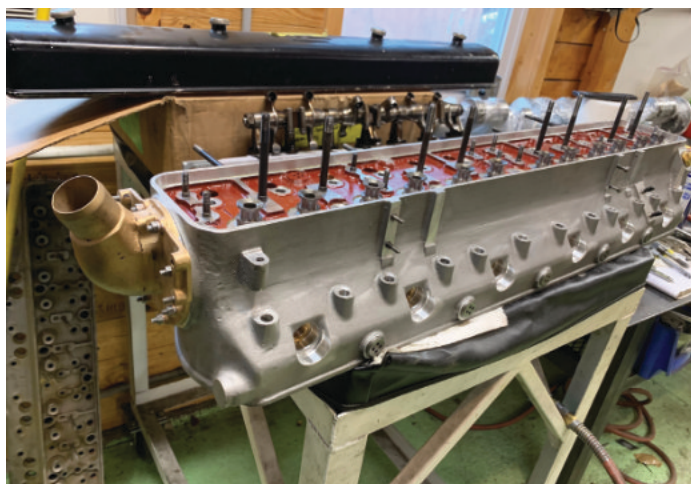
*Head painted and ready for final fitting. We paint them in-house to match... ordering them from the UK unpainted. All studs in place, all parts test-fitted. You can now fit your head with confidence.*



*Test fitting the rocker assemblies. Before the head goes on the engine, we want to make sure the rockers fit. There may be some fettle work and, of course, stud fitting for the rocker pedestals.*



*Head ready to go on. De-burred, painted, with valves in place and all studs fitted. Note how the face has been protected and is free of scratches, nicks or burrs.*



*Studs all fitted and getting close to paint!*



*Just before fitting, we ran our fingers over the casting and found a few wire-edges on the edges of the combustion chamber. Your fingers are more sensitive than your eyes when it comes to finding burrs and anomalies. A fine Swiss File cleaned up the burrs.*



### The Moment of Truth.

With everything now cleaned, assembled, tested, cleaned again, fitted and lubricated, it is time to put the head on the engine!

It goes without saying that you will be fitting a new head gasket. Inspect it carefully for folds, tears, damage, etc. Clean it and the faces of your head and block spotless with lacquer thinner and inspect again for burrs or damage. Rectify as needed.

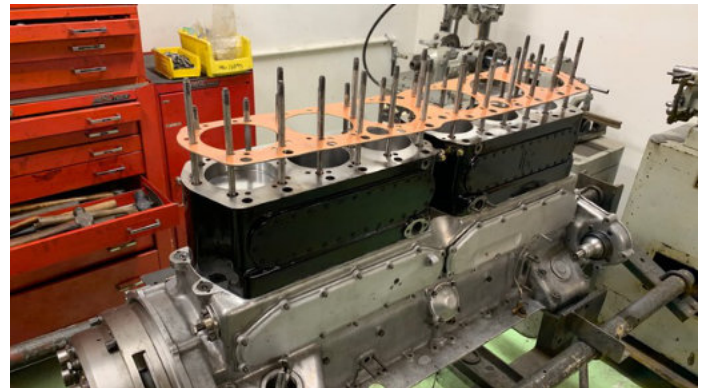
There is an ongoing debate about whether to fit dry, with some oil, with sealant, etc...and there are good and bad reasons for everything. Our practice at The Vintage Garage is to give both sides of the head gasket a light coating of copper aerosol gasket adhesive. Place the head gasket on the block, and with one person guiding and one or two people carrying the weight, carefully lower the head onto the head studs. Make sure the head seats firmly against the head gasket.

Now, install the washers and head nuts and torque to recommended settings. I am not going to print here because we are covering virtually all the pre-war models and each is different. So LOOK IT UP in your technical manuals. You will find that the number is exceedingly light in an era of Torque-to-Yield 100 Ft. LB head bolts holding the grenades on top of little Honda Buzz Bombs. But that is by design and keep in mind that you are dealing with studs that are long, thin and anchored in aluminum. It is VERY easy to stretch the studs, break them and, in extreme cases (and we have seen people do this) tear them out of the aluminum crankcase. Do not over torque them! If you do, I will come to your house and take away your wrenches.

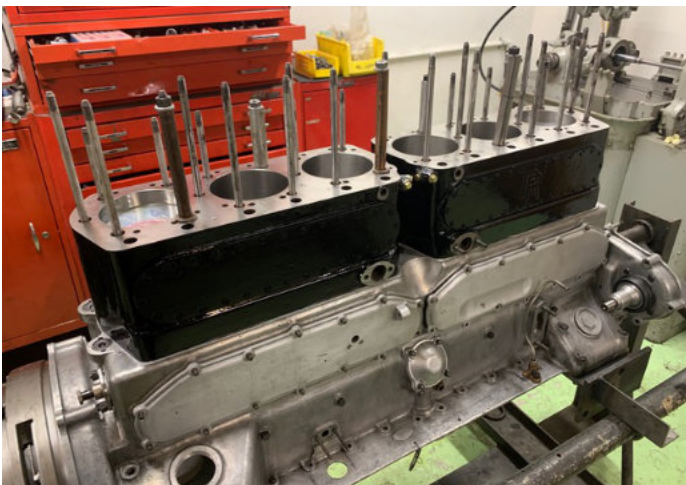
Torque in a circular pattern, starting with the middle studs, working to full torque in increments. Let the head sit overnight and re-torque.



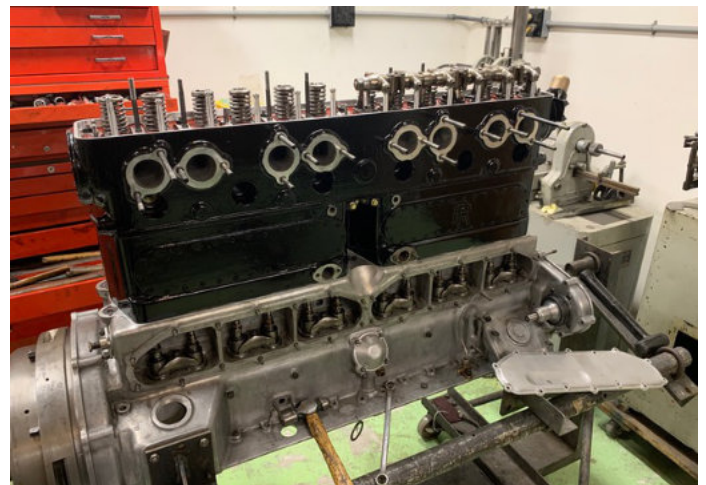
*Block surfaces before fitting. Note that water passages have been bushed and that the blocks are being held in place with spacers to protect the base gaskets.*



*Head gasket on the top of the blocks just before fitting cylinder head. There is a thin coat of aerosol copper adhesive applied to both sides of the head gasket.*



*Though this is a Phantom 1 with a pair of blocks, the principles are the same for the small HP. Everything must be restored and spotlessly clean before a new head goes on.*



*Cylinder head in place and ready to torque down.*



## Assembly and re-torque and startup

With the head now on the car, you can reassemble the ancillaries and get ready to start/run the car. Assemble linkages, rocker shaft, manifolds, etc. When fitting the exhaust manifold/down-pipe make sure the whole system is properly aligned (if not a new system... but that's another article) so you do not stress the exhaust manifold!

It goes without saying that you should use new gaskets everywhere and apply sealant.

Fill with water, adjust valves, etc. and start and run the car long enough to get the head hot then shut down and allow the engine to cool. Remove the rocker shaft and any ancillaries needed to get to the head nuts and re-torque, following the same circular pattern. At this stage, the car can be started and driven, gently, for about 100 miles. At which point, you will torque the head again. And one more time at 500 – 1000 miles. These re-torquings are critical for an aluminum head as its first few heat/cool cycles will cause the head gasket to compress and the head to seat in against the blocks. Failure to repeat the torques can result in head gasket failure and loss of coolant or introduction of coolant into the combustion chamber or sump... with disastrous results.

Finally, you will want to torque the head again every 2 – 3 years, regardless of miles as the head gasket compresses. About every 12 – 15 years, regardless of mileage, you should replace your head gasket. These are not modern engines... nor are they modern steel head gaskets! Just because your BMW or Cummins Diesel won't need a head gasket for 400k miles has no relevance to the head on your pre-war Rolls-Royce or Bentley.

If you follow these steps... and there are a lot of them... you should have a modern alloy head that will last far longer than the originals, most of which have managed to survive 70 - 100 years! A lot longer than they probably intended at Derby!

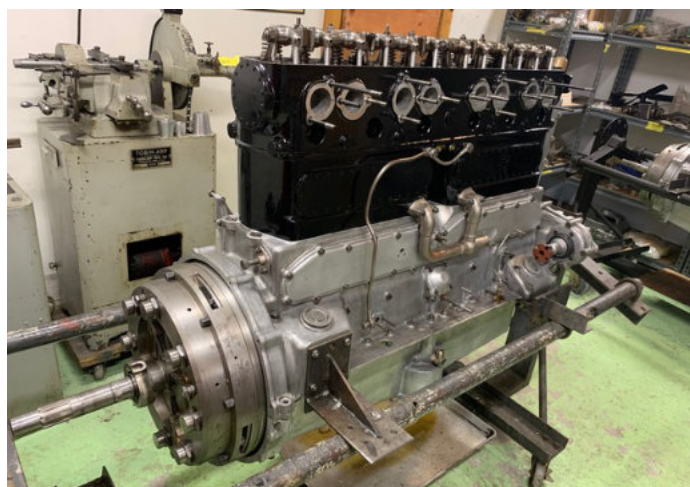
As you can see, the process is not a simple one and yet it is. The simple part is that you take care and give the head the attention to detail it deserves and it goes right on. Try and cut corners, force it or think "I'm smarter than the average bear," you may end up with two boat anchors on your hands.

Last, this article would not be complete without thanking the engineers, machinists, designers, CNC programmers, swagers, painters and even the crate builders at companies like Fiennes Restoration, Ristes motors and, if still around, Shaw's! These folks have undertaken massive and expensive projects to get us

heads to keep cars on the road. Often at considerable risk and great expense for a product that has almost no profit margin (we know, at The Vintage Garage, we were the first company outside RR to cast heads and blocks!).

All the work above is not to compensate for an inferior product... in fact, the above fitting is what was required at the factory when the cars were first assembled! Due to the precision and repeatability of modern CNC machines the new heads are dimensionally and tolerance-wise... more perfectly matched to the original prints than the originals were. But the fact remains that while modern parts-makers are producing their parts to a tolerance of one tenth of a thousandth... we are putting them on cars that were originally assembled with files.

So take your time... don't force things. Use common sense and remember this above all... Henry Royce is always watching!



*Engine with head fitted and torqued, getting ready for the chassis.*

## A Note about Pushrods

For those fitting the new cast-in-aluminum Iron heads to Iron Head P1 engines, we discovered a challenge the first time we fitted one... and that is the coefficient of expansion of the pushrods... and it is something that has to be taken into account.

Some background for those not familiar with the breed... the early Phantom 1 (New Phantom) engine used a cast iron head. The later Phantom 1, along with the P2, used an aluminum head. This is the big difference between early and late P1's.

Because of the difficulty of pouring cast iron (the original scrap rate at RR for cast iron heads and blocks was 80 percent!!!), modern suppliers now make the iron-pattern head in a modern aluminum alloy. In

fact, the companies making reproduction Small HP heads also make the new heads in cast aluminum.

When Rolls-Royce switched from the iron head to the aluminum head, they also switched from a steel pushrod to an aluminum-bodied pushrod. They did this because the coefficient of expansion of aluminum is roughly 5x that of cast iron or other ferrous metal. So when the Aluminum head P1 heated up and 'grew' slightly, steel pushrods would become very loose in their tolerance. We measured this at The Vintage Garage the first time we fitted a new "Iron Pattern" aluminum head to a P1. And tappet clearance went to  $> .012$ " which made the hot engine sound like a steel drum full of cats rolling through a rock quarry into a Bhutanese livestock auction. Not acceptable. Thus Rolls-Royce change.

Our answer with the iron head cars was to make new pushrods that were sized for iron head P1's... but had an aluminum shaft. So far, these have worked perfectly. We now supply these to all buyers of the new Ristes heads.

This, of course, begs the question about the small HP cars? Do these not have the same problem?

The answer is yes! When the original iron heads are replaced, the valve noise increases because the aluminum is expanding more than the steel rods. This may be part of the reason for the myth (is it?) that aluminum heads are louder than iron ones. It comes down to valve clearance increasing.

Because there is no room in the small HP engine for an aluminum pushrod that will match the expansion, our solution to this, in consultation with Will Fiennes, has been to cold set the valves much tighter than factory settings WHEN ATTEMPTING TO ACHIEVE MAXIMUM SILENCE. This means a clearance of  $.001 - .002$ ... knowing that the valve clearances will open up in running, but will retain acceptable clearance when hot.

However, this advice must be taken with some caution as you must be excruciatingly careful in setting valves to clearances that tight. Any wear on rocker pads, valve tips, etc. can throw off such a tight measurement. You must also re-check the clearances far more regularly. As the head gasket compresses, the clearance gets tighter and, as a result, the  $.001$  can suddenly become  $-.001$  with bad consequences of burned valves, loss of compression, etc. It's a balancing act. And if you go too tight (or the engine itself closes up the clearances as you run it in, you can cause expensive damage.

The best advice is to accept a little more noise on cars that are used for touring, hot weather running etc. And for shows and concours, understand that there is an option to quiet valves down on the small HP motors with aluminum heads by temporarily taking up some of the running clearance.

Above all use common sense. Or should I say "Use your Head?" I crack myself up.



*And here is what it's all about... an assembled long-block in its chassis and ready for final fitting of its ancillaries.*