INSIDE

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The Player's Guide to Ultimate Tone

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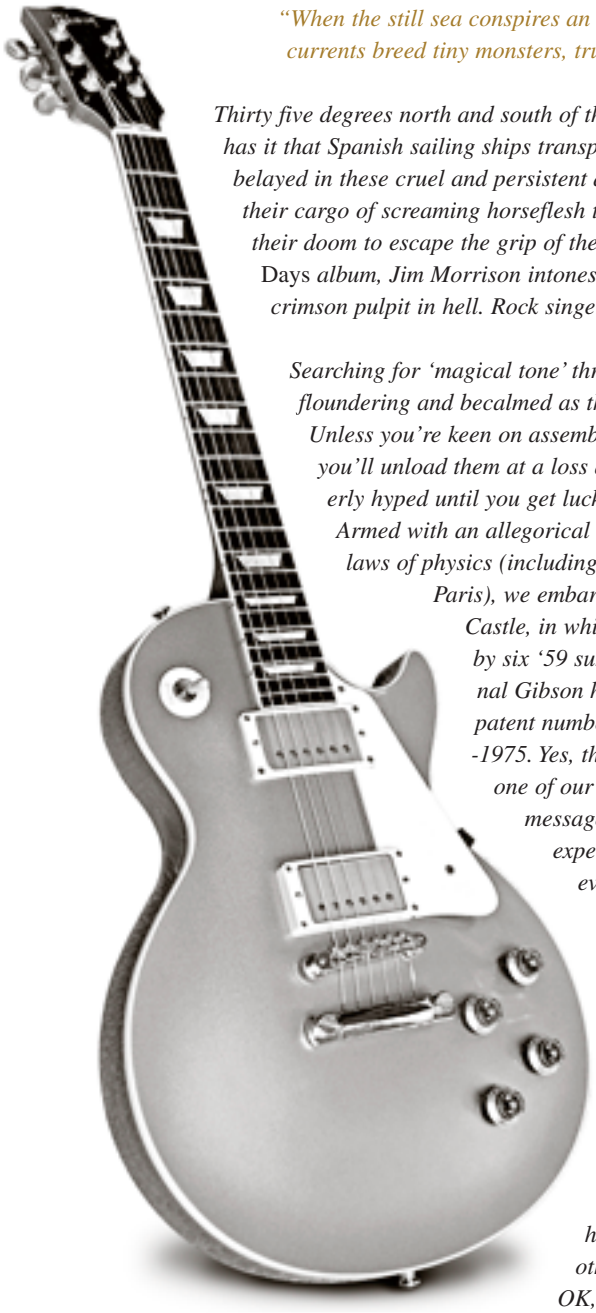
Horse Latitudes



"When the still sea conspires an armor, and her sullen and aborted currents breed tiny monsters, true sailing is dead." – Jim Morrison

Thirty five degrees north and south of the equator lie the horse latitudes. Legend has it that Spanish sailing ships transporting horses to the West Indies were often belayed in these cruel and persistent doldrums, forcing grim marineros to jettison their cargo of screaming horseflesh to the deep. Magellan sent 227 creatures to their doom to escape the grip of these still waters, and on the Doors Strange Days *album, Jim Morrison intones this very tale as if speaking from a gilded crimson pulpit in hell. Rock singers today got nuthin' on Big Jim...*

Searching for 'magical tone' through pickup swaps can also leave guitarists floundering and becalmed as they toss aside one set of pickups for another. Unless you're keen on assembling a collection of failed experiments, you'll unload them at a loss and gamble on still another set of coils cleverly hyped until you get lucky, lower your expectations, or tire of trying. Armed with an allegorical nod to man's futile quests to conquer the laws of physics (including Morrison's failed bathtub experiment in Paris), we embark on our follow up to the April '08 Spanish Castle, in which we explored the 'vintage tone' revealed by six '59 sunburst Les Pauls, and a collection of original Gibson humbucking pickups spanning the PAF, patent number sticker, and T-top models built from 1958 -1975. Yes, that issue created a bit of a stir, prompting one of our advisory board members to e-mail a cryptic message that read, "Are you OK?" Truthfully, after experiencing the six '59 bursts and repeatedly evaluating and documenting dozens of vintage Gibson humbuckers in both the neck and bridge positions, we were not 'OK.' In fact, we were more than a little disturbed by the obvious lack of success achieved by contemporary pickup winders in resurrecting the inspiring sound of the best PAFs we had heard (they are not all good, by the way, let alone great), while so many pickup companies and custom builders continue to claim that they alone have captured the magic of a true PAF and other examples of 'vintage tone.' We were not OK, because to put it bluntly, to varying degrees

these claims are largely unfulfilled, whether through indifference, complacency, greed or ignorance. Of course, money and reputations are made spinning tales of 'vintage tone,' and


Dickey & Duane Betts

like the latest, greatest distortion pedal of the week being hoisted as the grail in your favorite chat room, guitarists will continue to chase rumors of someone having miraculously deciphered Seth Lover's mysterious witch's brew that created 'vintage PAF tone.'

If it were only so simple… Merely attempting to define 'PAF tone' introduces enough false positives to render any one description of a specific PAF pickup useless, unless that pickup happens to be yours. Yes, there are great examples, but have you actually played one in a guitar lately? Have the companies and individuals claiming to have grasped the essence of 'vintage tone' worked carefully and thoughtfully with exceptional examples, vaguely referenced recorded sounds etched into acetate in the '60s and '70s, or just wound whatever they wished and called it 'vintage?' What is the definition of great 'PAF tone,' and according to whom? The majority of the many PAFs we have hand in our hands in the past year were not spectacular. Different, yes… clearer and brighter than most replica PAFs, usually, but would you pick them in a blind test? We wonder… Only a handful of the

PAFs and later patent number sticker pickups we evaluated really stood out as exceptional – mind-altering in their clarity, depth, tone, and the hardest bit to get right – an expressive vocal quality that mimics the sound of an alto sax, as if single notes are being blown rather than plucked, while individual strings inside chords remain vividly clear and vibrant, richly draped in harmonic overtones. Oh, and none of them were, by today's standards, remotely 'hot.' Far too many contemporary 'PAFs' made today seem too powerful, pushing an amp into distortion far too fast and leaving your rig sounding as if you've left a boost pedal on. It seems that amplifier distortion is being mistaken for pickup strength by people who have listened to more recordings than actual vintage pickups. Some would argue that what we're describing is what people want… Fine, just don't call it 'vintage.' It isn't. But we understand the appeal of distortion… For players of meager skill or experience, the revealing clarity of a true PAF would make a poor mistress – better to find comfort and confidence behind the veil of intense distortion.

For but a few, pickups today are simply a commodity to be sold at a profit. The difference is, the people that make Wonder bread would never stoop to calling it an "artisan loaf" any more than the folks that make Spam would pass those greasy goods off as goose liver paté. Only in the music business will people pay $5,000 for a flamey but otherwise unremarkable guitar, or $300 for a woefully vanilla, faux 'PAF' set and be happy about it. When it comes to pickups new or old, the potential for disappointment is great, yet everyone wants 'the best.' They may not know what 'the best' is with sufficient clarity to describe in words, but they'll know

it when they hear it… Yes, of course you'd like to discover the builder who has captured the true sound of a truly bitchin' $7,000 pair of double cream 1959 PAFs… Who wouldn't? But it seems that rather than teasing you with giddy descriptions of a couple of ridiculously expensive PAFs you'll never hear, we could all benefit from a better practical understanding of just what makes a great-sounding pickup sound good. We've recruited some help in that endeavor – two veterans with stellar reputations, and three comparative newcomers whose passion for pickups jumps off the page. Don't worry, we'll also give you solid insights on new pickups, but first, we invite you to consider the thoughts of Tom Holmes, Lindy Fralin, Roy Bowen at RS Guitarworks, Rod McQueen (Slider) from Sydney, Australia, and Will Boggs, founder of WB Pickups…

TOM HOLMES

TQR: You must be the only pickup builder who makes your own bobbins.

I might be. I use an injection mold that I had made to my specification that molds a better looking PAF bobbin than the original Gibson PAF bobbin. This was done to enable me to offer an open coil version with better cosmetics. The original PAF bobbin was always used in a covered pickup so there was never a concern over cosmetics. I have heard that double

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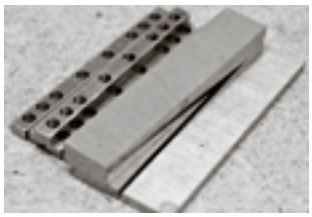
Tom Holmes

blacks, zebra and double cream PAF pickups command different prices in the used pickup market, with some professing that one combination sounds better than another. I have found that the durometer (hardness) of the cream bobbin seems a little higher than the black. Since ABS plastic is a neutral color, colorants must be added to obtain the cream or black color. This small change in chemistry might be enough to make small resonance differences which could alter the harmonics slightly. When I first started making pickups, I used wood, phenolic and brass to make the bobbins. Being very structurally different, these materials changed the characteristics of the pickups considerably. So I suppose a small change in plastic chemistry could have small tonal effects.

TQR: Where do you get your Alnico magnets?



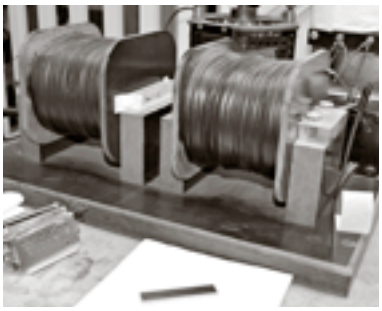
Arnold Engineering in Marengo, Illinois. I bought Alnico IV from Thomas & Skinner in Indianapolis, Indiana in the '70s, but since the mid '90s, I've been using Arnold.

TQR: I see that some of these wound coils on your bench are marked 'potted' and others 'unpotted.' So you do both by request?

Yes. Even though this enamel wire is #42 gauge, it is never completely consistent. It can start out fat at the beginning of the spool, get thinner in the middle and go back to fat again. Someone is evidently making adjustments to the dies as the wire is being pulled through and it must be a little difficult to control perfectly. I get this wire made to my specification, but I still wind up with a slight difference within the spool, as well as from spool to spool. I keep records on diameters and resistances of each spool. This helps me better produce coils

of specific resistance, potted or unpotted. I first started using enamel wire produced by the Viking Wire Company. Later, the Viking Wire Company went out of business and I was told that the enamel wire line was bought by the American Wire Company. I used the wire produced by them for years and even turned Gibson on to their product, but as time went on their product became too inconsistent to use. Currently, I use enamel wire manufactured by the Rea Wire Company.

TQR: It looks as if you are charging your own magnets…



I get Alnico magnets not magnetized and magnetize them myself. I built the magnetizer and beside it is a setup to *demagnetize* the magnets. There was a time when it was thought that one of the reasons PAF pickups sound so good was that the magnets had slightly demagnetized over time. I believe one pickup producer even advertised this theory and sold pickups with aged magnets. I experimented with this idea but could never control the demagnetizing process accurately enough to market a pickup with aged magnets. I fully charge all my magnets.

When I first got into pickup making in the early 70's, I visited Thomas & Skinner. I explained to them that I wanted to recreate the old guitar sounds of the '50s. They were very helpful and showed me purchase orders from the '50s for Alnico IV bars. Thomas & Skinner hadn't made Alnico IV for a long time, but if I was willing to purchase a full melt (full pot of metal), they would again produce it. I think I paid $2,500 for 2,000 magnets. A BH curve is a graph showing

performance features of the different magnets, and the BH curve for Alnico V would look quite different than a BH curve for Alnico IV. After production, I was given a BH curve graph for the Alnico IV they produced and it looked very close to the classical BH curve for Alnico IV. All my first humbucking pickups used in my early guitars contained this magnet. When I was researching pickup materials, I sent old PAF screws and slugs off to have them analyzed and I included one of these Thomas & Skinner Alnico IV reproduction magnets. The report came back as unknown Alnico magnet, which basically meant that the percentage of all the main

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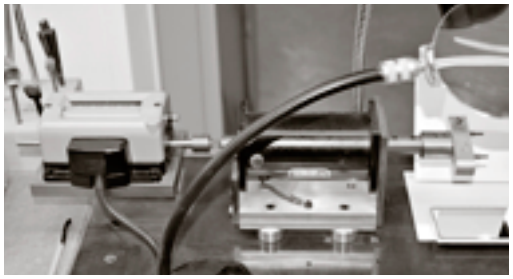
constituents (iron, nickel, cobalt and aluminum) were not at the percentages of a known Alnico magnet. It was a hybrid, but it worked fine. I looked into this matter further and was told that trying to get all these elements with different melting temperatures mixed together in the same pot was rather tricky and could end up being a real witch's brew. I also discovered that various production routines used in the manufacturing of Alnico magnets can differ considerably.

TQR: How important do you feel 'scatterwinding' is in the sound of a pickup?



I have a really nice $6,000 automatic winding machine that has never been used. I think most of us started out scatterwinding because we couldn't afford an automatic machine. I built the winding machine I use for less than $1,000 and it's all I have ever used. Most of my customers want their pickups scatterwound. I'm not sure if it makes a big difference in tone, but it likely does something.

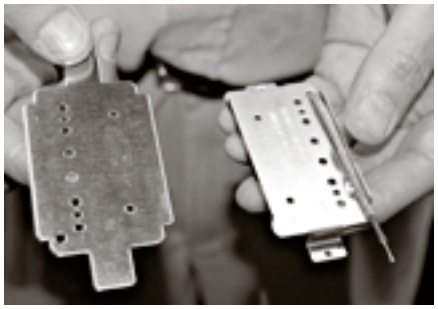
TQR: What about winding tension?

That is something the hand-winder can control. When I designed the fixtures that hold the bobbins in the Gibson winding machines, four to six bobbins were wound at a time. Each bobbin required its own spool of wire and tensioning device, and it was hard to get all the tension devices to be equal, producing coils with equal tension. There seemed to be a tendency to wind the bobbins with firm tension, which produced neater looking coils which could contain more winds with less rejects. Holding the wire in your hand lets you control the wire tension consistently in the coil from start to finish. If you wind a coil too tight, it causes the end of the bobbin to flare out. Every time I wind a coil, I use a caliper to check for this flared condition. When I first start winding, it usually takes a few coils to get the right wire tension and then I can usually wind pretty consistently for the rest of the day. I suppose in a small way this difference in tension would change the pickups natural resonance, which would in turn alter the sound a little.

TQR: Do you have any theories about why new pickups don't sound like the old ones?

We have already talked about a few of the materials available today that differ from the materials available in the '50s. One item was the plain enamel wire. The coating used on the wire is not the same formula that was used in the '50s, and certain chemicals used in the making the coatings have been banned by the EPA. The newer magnets can have slightly different magnetic and chemical properties. Production methods, personnel, and routines used to make the older Alnico magnets can change over the years. The plastic used to mold the original PAF bobbin isn't exactly the same as the plastic available today. Alloys for the base plate, cover, screws and slugs are available and my studies have shown that no considerable differences exist. With a few minor material differences that might alter the sound slightly, it comes down to manufacturing all the parts and putting them together properly. I believe if the newer PAF reproduction pickups are not sounding similar to the old PAFs, it has more to do with the way new pickups are being built than the materials they are made out of. The materials available today are pretty close to being the same.

TQR: Why do you bother making so many of your own parts?



It began out of necessity. When I first started, I tried to work with tool and die companies, but my projects were pretty insignificant compared to the type of projects most of the companies were working on. I was directed to small job shops which made some tools and dies for me, and for the most part they didn't work. If I was going to make a PAF reproduction, I would have to learn to be a tool and die maker. All my stamping, piercing, extruding and draw dies I made in my shop. The detail comes from being a guitar maker. The skills necessary to produce guitars, learning to be a good craftsman, were basically the same skills necessary to become a good tool and die maker. Form grinding a piece of steel on a surface grinder takes about the same amount of patience as sawing out the name 'Albert King' and inlaying into a fingerboard.

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TQR: Judging by the vats of chemicals in here, it appears that you are a chemist as well…

I was a pre-med student in college and had three semesters of inorganic chemistry. The theory of electroplating was easy, but getting the proper result is an art which takes years to master.

TQR: So you stamp the covers on that press we saw out of flat sheets of nickel silver and plate your own covers with pure nickel…

The nickel silver actually comes in a large coil. I put it on the dereeler and run it through the press. The original PAF covers were also made from nickel silver.

TQR: Why are your edges so clean and sharp?

PAF covers

I wanted my covers to look like the original covers. George Gruhn was always telling me that the new pickups didn't sound like the original PAFs, and I could tell that the new pickups didn't look like the old pickups. I remember a calendar that was advertised and for each month there was a picture of a different old Les Paul guitar. The pickups appeared to have a flatter, more squared look as compared to the newer humbuckers. Doing most of George's electrical repair at the time, I had access to lots of PAF pickups. Having to rewind them gave me a chance to physically study the PAF cover along with counting windings and just having the opportunity to see how things were put together. There was no doubt that the older pickup cover looked different than the newer pickup covers. To verify George's belief that there was a difference in tone, I traveled to Geneva, Illinois to visit the Riverbank Laboratories. They specialized in making tuning forks for the medical industry and did acoustic research on engineering structures. One of the physicists was my scoutmaster from high school and he agreed to run a few graphs of the harmonic content coming from an old PAF and a new humbucker. The graphs showed a definite difference in harmonic content. I had proof to back up George's feelings about tone and my own knowledge of the physical differences, so I was ready to try and make a pickup that would look and sound like an old PAF.

TQR: Whatever data you were looking at, the differences were stark?

Extremely so. In my shop, I completed the necessary draw dies and stamped out my first PAF reproduction covers. At this same time, I was working at Gibson as a consultant. I worked on problems in production by building tooling and helping Bill Lawrence get the new Gibson circuit board pickup into production. Bill Lawrence and Jim Hutchins (head of Gibson Archtops) used me for various other projects. Along, with my 42 gauge enamel wire, I took my new reproduction covers to Gibson where the first PAF prototypes were assembled. This was the birth of the 57 Classic. The pickups made the guitar look like an old Les Paul and from what I was told, it sounded a lot like one. I believe there were about five of these early pickup prototypes made, four went into guitars and I have the fifth one in my collection.

TQR: Pickup covers add capacitance, and the material they are made from seems to make a difference.

I'm sure it does. Everything makes a difference, but how much of a difference? I don't know. You mentioned that my covers are lighter than other covers. This is by design. Covers are typically stamped, buffed, and plated with nickel. If you let the nickel plate build up too thick, the cover gets heavy and the tone is compromised. Sometimes nickel is plated thick to cover up flaws in buffing. Since I do my own buffing and plating, I can control this process. I buff to a very fine mirror finish and plate a thin coat of nickel.

TQR: You make your own backplates, as well…

Yes, I made the tooling here in the shop and stamp them out with the press. I wanted to make all the parts so I could control the quality. I stamp my name and logo on the backside of the back plate, then using an electric engraving pencil write either H450 or H455 and then sign my name. TQ

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LINDY FRALIN

By doing rewinds, I had peeled old coils and I noticed that they were very randomly layered. That intrigued me, because by the late '50s Fender could have had a mechanical winding machine if they thought they were better than handwinding coils. There had to be a reason for them handwinding until 1964. Through trial and error, I learned what winding too sloppy sounded like and what winding too neatly sounded like. Gibson PAFs weren't scatterwound – they used an automatic traverse – but I have also seen PAFs where the wire was wound around the bigger plastic insulated lead wire, so you were winding around a lumpy surface. Sometimes that black plastic lead wire would be half way into the coil, which would definitely leave some air and space in it. It's funny… winding a Fender pickup too neatly doesn't work. Although PAFs were never scatterwound, we have experimented with scatterwinding humbuckers… Scatterwinding is an art, and if you were to scatterwind a humbucker there would be people who thought it sounded better, no doubt. But if there is a 'magic' in PAFs, it isn't scatterwinding. Some were super bright, some were super clear, some super muddy, others were *very* loud, others on the weaker side, but it still comes down to the three things that shape the sound of any coil: number of turns, capacitance and inductance (which are controlled by your choice of wire and how it's layered and the tension), and the last thing is magnet strength. Those three things are what we tweak for a PAF to give people the tone they are looking for. We pick the right type of wire, we layer it according to what we're supposed to be building historically, we definitely count turns, which is the single most important thing to control output power, and then the last thing is to use the right magnet. While some guys like these hugely powerful pickups that are above 9K, three out of four of the people I deal with want something right around 8K. So you give them a pretty bright pickup, tame it with a weaker magnet and they are as happy as they can be.

Fralin humbucker

I have also found old PAF magnets that appeared to be cut out of the block 90 degrees off the axis at which they were cast. Alnico is cast while in a field, which gives it a direction of orientation. Once it's cast, you can charge it, discharge it, or change north to south, but that line of orientation cannot be changed. So if you tried to magnetize it sideways or at a diagonal, it wouldn't charge properly. If they had a block of material and cut it 90 degrees off axis, these magnets would want to be charged on the 2 1/2 inch dimension, and they will only take perhaps a 20% charge in the wrong direction. I had one of those old PAF magnets and it had been that way since it was cast. So perhaps Gibson was buying cheaper magnets from time to time. Or the Alnico materials were mixed improperly… Who knows? Someone once told me that the half life of Alnico is 300,000 years. Inside a humbucker, it would be kind of hard to be exposed to a field strong enough to de-mag a pickup in your guitar. And we haven't even talked about the coil aging… The insulation on the wire shrinks over time, so you're getting more air space in there, and if the pickup was used a lot producing squealy feedback, the coils can vibrate against one another and rub some of the finish off. If you have 100 turns shorted out in a coil with 5,000 turns, it would be like turning your guitar down to 9, and it would darken the tone. I know that I've seen vintage P90s that were so dark sounding that they must have had shorted turns in them. I also had a customer who said his old Tele bridge pickup was the best one he had ever heard – it was loud but not too bright and piercing. It died the next weekend, and he sent it to us to repair. The inside of that coil near the high E polepiece was encrusted with green copper corrosion. That made the pickup sound very dark and a little weaker, which would be hard to duplicate in a new pickup. We also know that wire is made differently today… the copper core is different, and the enamel no longer has lead in it. Today, copper has less impurities in it, which is good for hi-fi systems and burglar alarms, but it might be giving pickups more high end. And all paint, including the enamel they were putting on the wire, had lead in it until around 1964.

TQR: What kinds of work did you do with Roy at RS Guitarworks on the coils?

He went to the trouble of having us wind something like 16 different slug and screw coils wound with different numbers of turns and ohm readings, and then he experimented with mixing the various coils with different resistance readings to find the

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combination he liked best for the neck and bridge. As you know, old PAFs were built with randomly mis-matched coils. They had turn counters that ran off of a rubber band, but the machine didn't stop when it got to zero, so if someone wasn't watching, they would just keep going. Consequently, a lot of the PAFs had higher output.

TQR: How much do mismatched coils factor into the sound?

I think it does affect things to a subtle degree, and it has a downside, too. The more mismatched the coils are, the more hum you bring back. I think if the screw coil is stronger, you get more of the sound of a true neck or bridge, and if the slug coils are stronger, it gives the pickup more of a midrangey sound. That's just logic. I haven't experimented with it, but I have listened to the individual coils in a humbucker, and I long ago gave up on the sound of a coil-tapped humbucker. I'd rather just pick up a Tele. I think I have had people request specific resistance readings for each coil because they thought that's where the magic was, and in my opinion that's *not* where the magic is. To make anyone completely happy, you have to work, again, on the three fundamentals – the right power (turns), the right brightness against that midrange grind, which is capacitance and inductance, and the right magnet strength, which sometimes is just luck, giving the pickup not too much or too little treble.

TQR: And you can manipulate treble with magnet strength?

Oh, absolutely. That's how you soften treble, by weakening or using weaker magnets. The effect is that it sounds as if you have more midrange with weaker magnets, but the pickup doesn't really sound weaker in terms of output.

TQR: So these variations that we hear between the old PAFs and even new production pickups…

Oh, yeah. The current guys that wind pickups are using the same parts and still getting different sounds by the choices they are making. You can read the resistance readings and be within 5% certainty of the number of turns on the coil, yet resistance is the least important number in the entire equation. It's also not an accurate way to gauge the number of turns, because the wire diameter constantly changes. Capacitance and inductance working together are the most important.

TQR: Can you actually measure the capacitance of a pickup?

You really kinda can't… You can only do it with very expensive equipment, and it's still just a calculation rather than an actual measurement.

TQR: But there are inductance meters… Fender is the only company we have ever seen publish inductance numbers.

Inductance is related to the number of turns, what the material is in the core – Alnico rods or steel, and how thick the copper wire is that was used to make the turns. But all that has to balance with *capacitance* to get a good tone.

TQR: Would you agree that PAFs are the most mysterious and misunderstood of all vintage pickups?

PAFs *and* Tele bridge pickups are both shrouded in mystery. They are both so all over the place in terms of measurable specs and sound, and everybody has their favorite version.

TQR: Was there as much variance in old P90s?

Quite a bit of it. Turns weren't carefully counted, and there was a lot of variation in magnet strength. I have a friend who had a '53 ES295 and his old P90s were as bright as a Telecaster, and I've heard 11K P90s that sounded just huge – like Leslie West on the old Mountain records.

TQR: And once again, this comes down to those three, fundamental things…

The same things… How many turns, how you control capaci-

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tance and inductance through winding pattern, turns per layer, tension, wire type, potted or unpotted… and then magnet strength is the last thing, which is independent of all the other factors. Think about that, and you'll understand that the combined variations of those three factors are nearly infinite. And shorted turns in an old pickup will also affect what you're hearing. It's impossible to determine what extent shorted turns might be playing in the sound of a specific old pickup, but there is no doubt that it is a factor. On one level, I don't see why you couldn't reproduce the sound of an old PAF, but on the other hand, to get the exact sound of a specific old PAF, you'd have to duplicate all of these variables I've described at the same time and guess right on all of them. And you *are* guessing… TQ

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ROY BOWEN – RS GUITARWORKS


Roy & Scott

When RS first started work on our Stepside guitars, we did a lot of testing to find the electronics and pickups that would give them the classic tones and function that my partner Scott Leedy and I wanted to hear, and from the very start it was obvious that those tones were not found in any of the pickups being made at that time (1999). We were very lucky to deal with people like J.M. Rolph and Peter Florance very early on when we realized they were already working to find out what made vintage guitars tick. For years we felt we had gotten very close until one day in 2002, when I acquired a set of 1960 long magnet PAFs from a customer. After we installed them it was obvious that while the tone of the pickups we were using was great and far better than typical production pickups, they just did not sound close enough to the 3D tone the PAFs had.We tried working with several makers to capture lightning in a jar, but in the end, only Lindy Fralin was willing to deal with our continued critiquing and revisions. Our goal was always simple – don't make a generic PAF pickup, because there is no such thing as a *single* PAF tone. Rather, we wanted to focus on reproducing the tone of one specific set until they were as good as they could be, and that led to the True 60®. Some time later we started working with Greg Martin to do the same thing with his pickups in his vintage '58 Les Paul, and that led to the Psychebilly Blues set. I think that simply listening to recordings of people playing PAFs is not going to get you there on a copy, because you are hearing the tone of the wood of the guitar, the type of amp being used, and even how the recording was made. It just makes sense to copy the pickup itself, and that way the copy can get closer to any tone the real pickup could create.


Greg Martin

Trying to find the tone of vintage pickups and guitars has been a long road, because many of the parts are simply not being made the same way they used to be, so when we first started we had to test and modify what we could get. Being a small company and a newcomer to the business, we didn't have any pull with anyone, but as the years have rolled by and the company has grown, we have been able to influence how parts are made to replicate the old ones again. So with all of our parts like our Super-Pots®, GuitarCaps®, and our pickups from Lindy Fralin, they get better every time we make a new run because we are always pushing the envelope to *make* them better. We are very lucky now to have teamed up with companies who are as driven as we are and are willing to listen to what we want to change or redesign.

Dealing with Lindy Fralin has been a dream come true for us, because no matter how picky we get or how many strange ideas we have, he never says no and is always willing to try whatever we want (sometimes it falls on its face, but other times we hit a home run that pushes everyone to work harder). In the case of the True 60® and Psychebilly sets, we called Lindy and gave him as many specs as we could about the coils resistance and capacitance, as well as trying to give him a general idea of the tone the pickup had. With others like our RS/Fralin pickup and Big Block, I simply called with an idea of general specs and a tone I would like to hear and then tweaked the original prototype that Lindy made.

The greatest misconception to me about PAFs is that many people seem to believe there is just one classic PAF tone and that all PAFs are better than anything being made today. In

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fact, nothing could be farther from the truth. No two PAFs sound the same, and their tone is all over the board, as is the resistance and the magnets that were used, so while some of them are magic, others are simply average pickups. I have had several guitars in the shop with real PAFs and more than a few of them were not as representative of a classic PAF sound as our new pickups. We attended a guitar show in Nashville and took two Historic R8s that acoustically sound almost the same – one with my real PAFs and the other with True 60s. I let people try them back-to-back and I was amazed by how many people picked the wrong pickup as the PAF. And the funny thing is that after that test, we sold every pickup we took to the show.

TQR: What is the current status of your related research with pots and tone caps?

Working with CTS has been great, but also a bit funny. Six years ago I called them with a list of specs I wanted for pots and I was was told some of the specs could not be done and others would require retooling that they simply did not want to undertake. Having sold well over 30,000 pots since then, we have gotten every spec we originally asked for and a few that have been requested since then. We have set a goal to redesign each part every time we reorder for the year, and so far we have been able to do just that. Recently we got a call from Matthew Larrivee at Larrivee guitars saying he had called Ron Kahler, head designer at CTS, to get "the best pots they could make," and was told they are already being made for us. Now all Larrivee guitars use our Super-Pots®. As good as we think the Super-Pot is, it was designed to be a voltage divider to be used for a guitar volume, so it made a poor tone control, and we used stock CTS Audio taper pots. One day I got a phone call from my friend Larry Davis at WD Music saying they were going to start stocking CTS pots and he wanted us to help him plot the curve of the vintage Centralab 'A' curve for his WD pots. We now use them for our tone pots and as the only pots for the Reissue series kits. We are also now having our Modern GuitarCaps made just for us right here in the US, and we couldn't be happier with with the final product. Our Vintage GuitarCap® made by Jensen is a great paper in oil cap, and lately we have started selling reproduction caps by Luxe – their tone is great and they have the classic vintage looks our customers love. We have even started doing aged reissue kits so they look at home in vintage guitars. TQ

www.rsguitarworks.net, 859-737-5300

SLIDER

TQR: How and when did your initial interest in guitars and pickups develop?

Like a lot of kids, my parents gave me a little acoustic 6 string for Christmas in about 1970. Back then I was lucky to see a Mel Bay book and instruction consisted of "Home on the Range" and "Row, Row, Row Your Boat." Needless to say, I didn't get far, but the seed was planted. Since then I have always loved guitars, and I could never get that "guitar shop smell" out of my head!

On leaving school I joined the Army and did a stint as a radio operator in our Leopard tanks. Back then there were three old radios per vehicle, all Vietnam era, as well as all the associated harnesses and intercom relays throughout the vehicle. This environment was hell on the old equipment – dust, water, vibration – you name it, but it was my job to keep it all working. Repairs were constant and always done under "tactical" conditions, on the move, boss yelling, confined spaces and usually no lights or red light at best. I learned a lot of valuable lessons early on. The one lesson I strongly subscribe to still is, if you want it done right, do it yourself.

My interest in guitar parts and pickups specifically began with the desire to get improved tone and hear what all the vintage fuss was about. I remember getting my first 'real' USA Strat, after bothering shop owners and saving up my meager late '80s pay, I laid down my hard earned on a Dakota Red USA standard. I figured I now had the pinnacle of authenticity and could relax in the knowledge that I was in a different league to all my CIJ, MIM and Squire playing mates (whom I now didn't even talk to). Imagine my disappointment when I first pulled the back plate off and spied the tremolo ground wire, and it was *plastic*. From there my disappointments with standard products only grew, but my quest for vintage authenticity and quality and tone was born.

I started by offering aged, plastic parts for Strats,

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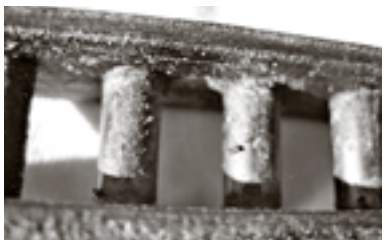
pickup cover sets, volume and tone knobs and pickguards. There was this illogical progression in wanting 'vintage correct' pickups to go with the relic sets. I didn't like what was commercially available, so I began researching and developing the potential for building my own pickups. I needed to have total vintage authenticity, both sonically and visually, so for me the only way to get it exactly right was to start making things for myself. I researched and built myself a pickup winder and counter. There are many variations of winders and I hit on a really simple and practical solution that still forms the basis of my current machine. The turn counter is the tricky bit to get right as well as having good lighting and a contrasting background to view the pickup bobbin accurately as you build up the coil. I still work against the best background available, an old AC/DC "Back in Black" LP cover!

My first pickups were built from modern materials like polysol coated wire and kits like those available from Stew-Mac, which are fine and sound great when correctly built. Early feedback was very positive and lots of support and information began to roll in, people would send me ideas and pictures of their 'real' vintage pickups with suggestions for improvements in accuracy and vintage authenticity. In response to this I began sourcing different materials to better replicate what was going on 50+ years ago, and in the process met some very interesting characters in the old electrical businesses. Some of these guys are in their '80s and love to talk about the early days, most are doing engine rewinds and larger work, but they are a wealth of information on coil winding, solidification, lacquering techniques and vintage capacitors, etc.



There are a few basics that can't be argued between vintage and new pickups. The big one is manufacturing consistency and material composition. The electrical and engineering industries we draw our raw materials from have been constantly improving their products, and today the accuracy and tolerances provided by computer controlled machines is many times what was available during the '50s and '60s. Material composition has also changed, and AlNiCo is a good example. In the '50s at the height of the Atomic Testing Era and the Cold War, cobalt, the 'Co' bit in AlNiCo was in high demand, so the AlNiCo that was available was significantly less powerful and consistent than the current AlNiCo blends.

The coil is a big contributor to a pickup's output and tone. The coil wire – the coated copper electrical wire we use to wind a pickup is very fine, generally .056mm-.063mm (.0022"-.0025") very much like human hair and many miles long. In the '50s this wire had thousands of tiny variations in diameter over that distance as well as impurities and inaccuracies in its alloys and coating material – things not found in today's accurate and pure wire types. So today we are basically building things from materials that are very much better in terms of consistency and purity, and it is this very consistency that can actually *detract* from producing a great sounding vintage pickup. I keep this in mind with all my vintage replications.

A modern machine-wound pickup is like all things modern, very consistent and even in its production. Machine coil layering is very parallel and wire tension is exactly maintained. This is fine, but it's not how the original scatterwound vintage Fender pickups were built. It is the irregularities in tension and overlaps that a good handwound pickup has within its coil that I believe produce the warmth of tone and individuality that is most sought after. I enhance this scatterwinding characteristic by recreating the inconsistency of the 1950s wire through varying the tension throughout the many thousands of windings. This gentle pulling and releasing gives back some of the diameter variations through stretching and relaxing the super-fine copper wire. Combine this with my 'twine ball' winding pattern, similar to the effect you had when a kite string is wound up on a keeper, and you get that great interplay of electrical eddy currents within the coil. It's this internal complexity that gives warmth, power and removes any sterile or ice-pick sounds sometimes associated with single coils, and especially Strats and Teles.

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TQR: Working in Australia, where do you source the parts you use?

Once again, the global marketplace and the Internet have removed any barriers as far as sourcing parts. I get my materials from the same suppliers as all the big names and boutique builders, both in the USA and elsewhere. I have found some really good local sources for parts and also get special high tolerance production runs commissioned for items such as AlNiCo 2 and 5 rods. Sometimes being tucked away on the other side of the world has its benefits. For example, some time ago, while at one of my suppliers chatting to the manager of an old, family owned electrical wire company about vintage wire and such, he says to the storeman, "Go and grab those old wooden spools of really fine stuff in the box out back… Suffice to say I am now in possession a very limited quantity of real 52 year old "NOS" Jan 1956 dated Formvar.

Today's materials are very consistent, however things can vary significantly between batches and suppliers. Because I build all my pickups as a set from start to finish, any given set will come from the same materials, spool or batch. Also, handmade vintage replication pickups are individual by their very nature and as such I am never trying to reproduce a set to be identical to a previous set, so this insulates me from most consistency issues. It's like your favorite restaurant – you go there for the chef's great interpretation on different dishes. They use the finest fresh ingredients and add their special skill, individuality and knowledge to create a dish, but each time it will be a little different. It has to be… You still love it, it's still readily identifiable as 'that dish,' but a little different – not better or worse, just different. Same applies to my pickups. You can hear all the things that make a great vintage pickup – power, clarity, warmth, and that special airiness of tone, but with a little different flavor. It's that special individual flavor that people really can make a musical statement with.

TQR: What are the advantages in charging your own magnets?

Here's where you can make some big inroads to a great sounding pickup. Understanding the magnetic effects generating the flux pool in which the strings move and ensuring consistency with magnetic power and polarity are key to an authentic, powerful and well-voiced pickup. If a pickup is built with randomly charged magnets or worse – with Ferris pole slugs that only act as magnets when a cheap ceramic bar magnet is slapped on their base, you can get a pickup that has unbalanced or over and under-voiced strings. It's like building a car with parts from different suppliers but stipulating that all the panels are light blue, put it together and see how well the blues match. I fully build my pickups with dead or uncharged Alnico – it's only when everything is in place that I individually hand-charge the poles with rare earth neo-dymium boride polarizing magnets. This pulls the uncharged AlNiCo into its magnetic orientation as a permanent magnet. Because they are done as a set, I get great power matching across the strings as well as between pickups within a set. This gives great individual string voicing and clarity as well as ensuring neck, middle and bridge pickups are well balanced.

As a builder I understand that tone is the sum result of all the parts. My customers, like your readers, are not first time buyers, nor the uneducated, but rather very engaged musicians looking for a key element that's elusive or missing from their current situation, and I am very serious and proud of my contribution to that quest. I have noticed that many of the original vintage pickups I have rebuilt/rewound have died as a result of internal corrosion at the coil wire/pole interface or damage to the delicate lead/tail wire from the coil to the bobbin eyelet's. To prevent this I always double lacquer my bobbins to insulate and solidify them prior to winding. After wax potting to reduce any possible microphonics, I wax paint down the lead/tail wires for their added protection.

I have customers replacing dead or missing pickups in their valuable vintage instruments, so it's fine to make a great sounding pickup, but it's also important to have it visually correct. I ensure my pickups look the part, too. I hand bevel my poles and acid etch them for a vintage correct burnished patina as well as relic the bobbins and vintage pushback connection wires. I also include '50s rounded Bakelite style covers in NOS or relic condition, so even at a glance, everyone knows there's somethin' special under the hood! TQ

www.myspace.com/slidersvintagepickups
eBay user ID: rodalanmac

BOGGS

I was inspired to start winding my own pickups in the early 1980s by an interview with Eddie Van Halen in *Guitar* magazine. I'd been playing guitar for a few years at this point, but wasn't very happy with my tone. In the article, Eddie revealed he had personally rewound an original Gibson PAF pickup for his famous "Frankenstrat." Given my own interest in electronics, this sounded like a great idea – if only I could get my hands on an old pickup. As luck would have it, my stepfather had grown disenchanted with the PAFs in his 1958 Les Paul. The bridge pickup was shorting out and the neck pickup was not really to his liking, so after a call to Seymour Duncan for some new pickups, I set out to rewind his original pickups.

Back then, there weren't a lot of readily available resources on pickup winding, so I went to Radio Shack, bought some 42 AWG wire and just started experimenting. I had no idea what I was doing, and I remember my first attempts were 'wound' with a cheap power drill with a plate attached to it. The drill was going full speed and I couldn't guide the wire correctly, so it was nearly impossible to get the wire wound around the bobbin more than a hundred times, let alone several thousand! After burning through a lot of wire with nothing to show for it, I started calling Seymour Duncan for advice, and he was incredibly encouraging and generous with his time on the phone. I absorbed everything he said like a sponge, though I must have bugged the crap out of him with all those questions, and he eventually stopped taking my calls. One of the most important things he ever told me was to keep winding… and keep listening. The pickups will tell you if you're on to something or not.

I was fortunate to find a supply of vintage pickups to fuel my newfound passion for pickup winding. I used to hang out at The Starving Musician, a local music store in Santa Clara, California that did a lot of guitar repairs. They usually had a box full of discarded single coils, T-Tops, Patent Numbers and PAFs from various guitar repairs and 'upgrades.' I'd wander in and buy the whole box for a couple hundred bucks, which usually worked out to about $20 per pickup. It was cheap to buy old pickups back then, so it wasn't a big deal to take them apart to study them. You'd never be able to get that kind of education today, given the prices vintage originals command now. I'd install and listen to each pickup, make notes, and then carefully dissect them to figure out what made it sound that way. I took ohm readings off each bobbin and measured wire thickness, tension and winding pattern. I kept all that data in a notebook, which I studied religiously. There were usually a few broken pickups in the box, so I got to practice repairing those as well. My dad's bridge PAF suffered from what I discovered to be a very common ailment in PAFs – a wire break on the inside slug coil. The wire had a lot of oxidation from moisture and humidity, which compounded the problem. The screw coil still read, but that wire was fairly oxidized as well.

As I got more familiar with the winding patterns in those old Gibson and Fender pickups, and as my own winding technique improved, I learned to appreciate how stretching and twisting the wire in certain ways changed the bass, treble and mid frequencies. The tension on the wire and the layering pattern define the voice of the pickup, so I would manipulate those variables and study the results. I'd wind two pickups to the exact same number of turns and ohms, varying either the tension or pattern, and then compare their tone. Truth be told, most of my initial efforts sounded dreadful, but I never got discouraged as long as I learned something from each attempt. If I happened upon a wind that sounded cool, I immediately reverse engineered it and made five more, just to confirm I could duplicate it and to ensure I understood why it sounded the way it did. After several years of experimenting and testing my designs live on stage with my band, I finally felt like I might be on to something. I rewound my stepfather's PAFs one more time and gave them back to him as a gift. He reinstalled the PAFs, played them… and left them in. That was a big thrill for me.

Some vintage pickups can sound magical. But then again, so can properly wound modern pickups. In my experience, the 'magic' is all in the interaction of the wire, how it's wound on the coil, and magnet strength. I don't honestly think vintage pickups are the secret weapon people think they are, because not *all* vintage pickups sounded good. Sure, I've been lucky enough to play lots of great sounding examples over the years, but for every pickup that sounded rich and

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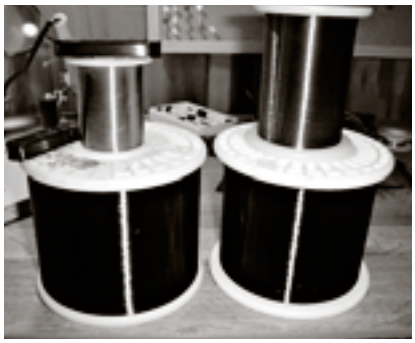

harmonically complex, there are plenty of dull and lifeless examples floating around. To be fair, we need to remember that pickup winding was still in its infancy back in the '50s. Winding was a factory job, done by employees with minimal experience or training. They didn't always get it right, so not every pickup sounded magical, as some would like to believe. Vintage Fender single coils, for example, were all over the map in terms of output and frequency response. I've heard plenty of great examples, both underwound and overwound, but there are also plenty of uneven, unflattering pickups. I'd never say Fender had consistency nailed back then, but I suppose that's all part of the allure of the vintage hunt – finding *the one*.

The one factor that did work in their favor was the wire itself. Gibson and Fender both used pure enamel wire. This was before everyone got all freaked out about benzene content and wire manufacturers changed their wire formulations. In my experience, that original vintage enamel wire has more natural "air" than its modern counterpart. It gave up the goods a lot easier. Vintage enamel wire, when wound correctly, made the special examples truly exemplary, and still worth chasing today. I don't believe that pickups 'improve' with age. The 'great' pickups sounded great when they were brand new. Think about all the classic tones on our favorite records, they were achieved with new guitars, new pickups and fully charged magnets. I consider myself fortunate to have heard a few well-preserved specimens that retained that original magic, as most vintage pickups have changed with the passage of time, and not for the better, in my opinion.
I've seen vintage pickups come in with their original magnets nearly drained, and that's not 'negligible.' Weakened magnets do indeed yield an overall darker, smoother, compressed tone, and if that's your sound, go for it! But please, let's stop mistaking that for the sound of a great PAF.

I use pure enamel wire, like they did back in the '50s. Poly-coated wire is the industry standard now, but I don't like working with it, and I don't like the way it sounds. Modern enamel is formulated slightly differently than vintage wire was back in the day, but it's really great wire that can yield the same wonderful results. Pickups wound with modern enamel wire can and will produce all the same air, clarity, dynamic response and rich musicality as the best examples of original PAFs, if you understand how to coax it out of the wire. Using several well-preserved original PAFs as my tone target, I developed my own layering and tensioning scheme that yields those same rich, musical tones from modern enamel.

My magnets are standard Alnico V and IIs, however, I charge each one to my own personal specs to achieve a desired response from the wire and the particular wind. The rest of the materials are all the best I can buy – pure steel slugs and screws, raw nickel covers that patina incredibly nicely. I refuse to use the cheap nickel-plated brass parts you see floating around. But that's all secondary to how the wire gets wound around the bobbin. For those who haven't had the pleasure of playing a set of well-preserved PAFs, they should have a clear bell-like treble response that's initially surprising, given all our preconceived notions about humbuckers. A good PAF is versatile, equally at home in a wide range of musical styles. Working all four knobs is critical with genuine PAFs, and the same holds true with my VTPs. Leaving all the knobs on 10 yields a bright tone that cuts through like a great Telecaster. Backing off both volume and tone a bit gets you that classic, fat PAF sound for thick, singing leads. The neck stays clear for chord structures, even when rolling off tone to get that perfect "woman tone" that still sustains. There's a refreshing lack of mud to contend with. Clarity can be a double-edged sword, as there's no place to hide with an honest pickup. But that's the sound of a PAF – straight up, open and honest. Just listen to Jimmy Page or Billy Gibbons recorded live back in the day. You can hear the notes breathe and bloom with clarity and sustain. It may require a trip back to the woodshed, but that's never a bad thing in the long run.

'Yer Woodshed Host – Doyle Bramhall II

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The process for developing single coils is essentially the same: identify a few magical tone targets, then develop fresh winding patterns that produce those same attributes with modern enamel. However, the tricky attributes to coax out of the wire are different. Single coil designs can get overly bright and harsh rather quickly, so the goal is often smoothing out the top and adding warmth and roundness on the bottom. With Strats in particular, I work extremely hard to balance all three pickups. It drives me nuts to hear a great neck tone and then an unusable bridge, or vice versa. I spent a lot of time listening, testing for balance, refining the recipe until all five positions really sing. But I can't stress this enough: the wind is the voice of the pickup. You can change the entire frequency response of the pickup with a twist and pull of the wire. Let's say we wind two pickups to the exact same number of turns. On the first pickup, we'll twist and pull the wire very tight and create a perfectly symmetrical pattern. On the second, we'll scatterwind and keep it looser. Those two pickups will read exactly the same on an ohm meter, but they'll sound completely different. You have to know when to pull, when to give a little, and how the pattern is shaping your tone, layer upon layer. TQ

www.wbpickups.com, 530-917-1356

ToneQuest Spoonful

It could be a spoonful of diamonds
Could be a spoonful of gold...

Or it could be a Goldtop with humbuckers… Our latest round of pickup evaluations concludes a process that has been ongoing for the past ten years, but our experience with the six Spanish Castle '59 bursts and the motherload of vintage humbuckers dropped in our lap by Kim LaFleur in 2008 changed everything. We wanted pickups that actually embodied the audibly superior sounds we had experienced with the

bursts and individual '59-'63 Gibson humbuckers, but where would we find them? We were also determined to further explore the relationship between individual guitars and pickups in determining the significant variances in tone we had noted and documented. How much did different guitars actually influence and change the sound of the vintage pickups we installed in them?

From July '07 to September '08 we played dozens of new Historic Les Pauls and bought seven at Midtown Music, deliberately choosing exceptionally resonant examples ranging in weight between 8.2 and 9 pounds (including one superlight chambered '59). We had also previously acquired and reviewed another nine Gibson USA and Historic Les Paul Standards spanning production years ranging from 1981-2005. Each guitar progressively expanded our understanding of how tone is inevitably influenced by the variable weight and random fundamental resonant frequency response found in different guitars, but the final group of six Historic '59s acquired in 2007-08 proved most instructive. The lightest

'59s were predictably bright and trebly, with diminished bass and midrange response, yet an additional eight ounces or so were often enough to substantially fill in these essential frequencies. The PAFs (and most other pickups) accurately mirrored the character of each guitar – thinner and brighter in the lighter Les Pauls that sounded so – bigger, rounder and more imposing in guitars that weighed between 8.75 and 9 pounds, which, by the way, is the average weight range of the actual '58 and '59 Les Pauls documented in the *Beauty of the Burst* book. Given our experience, any discussion of pickup

'tone' that fails to account for the influence of the guitar those pickups will be installed in seems flawed and incomplete.

Our research into current Historics culminated in August '08 when we found a new 2008 Historic '57 goldtop weighing 8.75 pounds that possesses mind-altering

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acoustic volume, resonance, sustain and tone that eclipse every other contemporary Les Paul we have ever owned or played. How and why? Randomly selected yet curiously exceptional mahogany for the body and neck, a rich Madagascar rosewood fingerboard, correct neck pitch and an ample neck profile, all culminating in a gloriously happy accident that emerged only after we had doggedly sorted through *dozens* of new Historics as they arrived each month over several years at Midtown. Oh… and the addition of Grover tuning keys *absolutely* enhanced the '57's extraordinarily resonant voice, while dramatically improving tuning as well.

POTS & CAPS

We also experimented with replacement pots and tone capacitors. While the difference between a 470K and 500K pot may be negligible, the CTS pots used in Historics are linear, producing very little if any taper (4 sounds the same as 8). We routinely use aged or new CTS audio taper pots from RS Guitarworks, which consistently measure within 5% of their stated 500K value and produce a smooth and consistent taper throughout their range of operation, nor do they feel as stiff as the stock CTS pots.

Opinions on the effect of different tone capacitors in guitar circuits vary. Some people don't believe they have an audible effect at all, while those who have experimented with older caps often become ardent fans of specific types determined by value, composition and manufacturer. Our experience with a broad range of modern and 'vintage' tone capacitors has led us to conclude that modern ceramic disk and polypropylene caps produce a comparatively sterile, linear sound. Some suppliers of pre-wired pickguards and harnesses like to use Orange Drop caps as a way of elevating the perceived value of their work, but we don't like them in guitars any more than we do in many amplifiers, nor do we care for the resistor and cap sometimes added as a 'volume kit' to reduce treble roll-off when volume is cut on the guitar – it adds a thin, grainy artificial character best avoided. The replica 'Bumblebee' caps found in Gibson Historic instruments also seem unimpressive, yielding a bright, linear and uninteresting, one-dimensional tone.

Our favorite old tone caps include the '50s .02 400V Cornell-Dublier Grey Tigers marked 'GT452,' Cornell-Dublier Black Cats, Sprague Bumblees (in some, but not all guitars), and turquoise 'Greenie' Cornell-Dublier .02/400V caps. All three versions of the Cornell-Dubliers seem to impart a smoother, fuller vocal quality. True old Bumblebees can be identified by their red/orange/grey/yellow stripes and a tiny '2' stamped inside the small circle found on either side of the stripes. Bumblebees are otherwise identical to another sought-after cap, the Sprague Black Beauty. These old Sprague caps often seem to significantly brighten the tone of our guitars – sometimes too much, but we do like them in fat-sounding Gibsons that can benefit from the added bite the Spragues usually impart. We say *usually* because these old caps are marked with a stated value of + or - 10%, and may be off as much as 20% today. Typical values appropriate for Les Pauls are .02 mfd/bridge and .02-.15 mfd/neck. Many of the old caps being sold for guitars today have been pulled from amps, TVs and radios, either to be sold to tone-afflicted guitarists like you, or because they had originally drifted too far out of spec. Buyer beware – not everyone owns a capacitance meter. Your best bet for approaching the look and sound of vintage caps without the risk and expense are the repro Sprague and Cornell-Dublier caps made by Luxe and sold by RS Guitarworks and Acme Guitarworks. You can usually find the old caps referenced here on eBay, or at Angela Instruments… (*www.angelainstruments.com*).

COVERS

When Seth Lover was working on the development of the PAF cover, he quickly concluded that a material with high resistance, such as stainless steel or nickel silver was needed

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to avoid the extreme dampening effect on high frequencies that would be imposed by a material like brass, for example. He also noted that gold plating produced the same undesirable effect, confirmed by our experience with a PAF with gold-plated screws. As noted by Tom Holmes, metal covers on humbuckers add capacitance to varying degrees depending on the material used and the thickness of the cover and plating. Gibson actually switched from nickel silver to chrome plated brass covers as they departed from the original PAF design, which no doubt contributed to the nasally honk heard in typical Gibson T-top humbuckers throughout the '70s. Michael McWhorter at Mojotone (now supplying pickup makers with parts) informed us that there are a few companies in the USA, two sources in Asia and one in Europe manufacturing nickel silver covers, while many manufacturers offer much cheaper plated brass. Like Alnico formulations, 'nickel silver' can be subject to broad interpretation, consisting primarily of varying proportions of copper, nickel and zinc. Antimony, tin, lead and cadmium can also appear in alloys referred to as 'nickel silver.' We have noted an audible difference among various 'nickel silver' covers used by contemporary pickup makers, prompting us to wonder who is and isn't paying attention to their effect on tone. Mojo has purposely specified thinner nickel silver covers from their supplier to reduce capacitance and the dampening effect that thicker covers create. Definitely avoid brass covers that may be simply described as 'chrome' or 'nickel' (plated), and unless you are playing through high gain amps or distortion effects that can cause unwanted feedback, unpotted pickups will usually produce a less veiled and clearer, more open tone. Or go coverless… Either way, experiment with varying the distance between the strings and polepieces – "close as you can get" isn't necessarily better. We set our humbucking pickups roughly .25" below the open strings to produce a clearer, woodier tone.

The Last Round

After the April 08 *Spanish Castle* issue hit the streets, we received a call from Will Boggs, who told us a friend and TQR subscriber had suggested he send us a few examples of his work. Will was anxious to get some of his pickups in our hands, and we also took the initiative to contact a few custom pickup winders ourselves, inviting them to submit humbuckers for review, including Harry Hausel in Germany, Bare Knuckles in England, and Jon Gundry at ThroBak Electronics in Michigan, who claims to have acquired the original winding machines used to wind PAFs in Kalamazoo. In each case we also provided a PDF copy of the *Spanish Castle* issue. Harry Hausel kindly sent two sets that were very reminiscent of Gibson T-Tops – bright, bold and assertive but lacking fluid harmonic texture and dynamic bloom, Jon Gundry replied that he wasn't ready for a review, and although Bare Knuckles promised to send pickups for review, none appeared. Of course, we had also previously reviewed pickups by Lollar, WCR Coils, Gibson ('57 Classics and Burstbuckers), Fralin and Harmonic Design, as well as playing an assortment of pickups by Duncan and DiMarzio that were not reviewed in print. During the past year we often revisited many of the pickups we had reviewed in the past, if only to confirm our original documented impressions. The fact that they are not reviewed again here merely indicates that we found little similarity to the tone of the vintage Gibson humbuckers we were chasing. If you happen to have fallen in love with a particular set we have not reviewed – Boogerbuckers, Timbuckers, Sheptones, Wolftones, etc., we encourage you to enjoy them, confident in the knowledge that only you know what is best for you. This ain't no snobfest…

We acquired a new set of Tom Holmes plus a third unpotted Holmes bridge pickup for comparison, several newer examples from Lindy Fralin, and a True '60s set from RS Guitarworks (wound by Fralin), having already reviewed the excellent Greg Martin Psychebillies. And in consideration of Stratocaster players, we found Rod McQueen's Slider Stratocaster pickups while poking around on eBay, contacted Rod, and he promptly sent us a '57 Strat set with aged covers. Here's what we learned…

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SLIDER'S

Rod McQueen lives and works in Sydney, Australia, where classic guitars and amps have long been appreciated and coveted every bit as much as they as here in the USA – perhaps even more so. We were initially intrigued by McQueen's detailed descriptions and informative background information he provides on the pickups he lists on eBay. Clearly, 'Slider' had devoted a lot of thought, skill and care to building pickups, so we introduced ourselves and suggested a review. We quickly received a cordial reply, and within a week a set of Slider's Classic Vintage '57 Strat pickups arrived with the most authentic vintage repro '50s covers we have ever seen. They can't do this in Corona? We loaded Slider's Strat set in our Custom Shop relic '60 Strat, admiring the artfully beveled and burnished polepieces poking through those deliciously rounded '50s covers. On cosmetics alone, McQueen had already elevated himself to Holmes-like status. We promise when you see these pickups and covers, everybody else's will look as if they were made by lazy hacks. Blame McQueen, boys, not us.

Like Tom Holmes and Will Boggs, McQueen charges his own magnets, and if you paid attention to his reasons for doing so, they make perfect sense. The Slider's are a *big* jump up from the usual Strat set – loaded with sexy, shimmering, chiffon and denim tones from a reverberating dancehall in Victoria, Texas. All three Alnico V pickups are remarkably well matched and balanced, with a perfectly smooth 6.03K neck pickup that begs for a B3 and horns, outstanding neck and middle blend, a fat and spanky 5.95K middle pickup, classic 'Ronnie Earl' middle/bridge tone, and a taught and properly trebly 6.10K bridge pickup that avoids sounding thin, razory, harsh and brittle. What more could we want? Absolutely nuthin.' Did we mention the covers? We love these Strat pickups – arguably the most challenging to find in a stock set where all three pickups really sound the way you want 'em to. You've found them now. Slider also offers excellent aged, pre-wired pickguards with vintage reproduction caps. Check out his MySpace page and eBay listings for details, and by all means, *Slide forth…*

WB PICKUPS

Will Boggs has created a broad range of different humbucking pickup options, including his stock replica PAFs described as 'VTPs,' *hot* VTPs, Habaneros, and '67-'07 VTPs wound with vintage enamel wire from 1967, among others. We received the sets mentioned above for review, and our two favorites were distinctly different. The stock VTPs are Bogg's take on a classic set of PAFs, neither overwound or particularly hot. In terms of tone, they squarely nail the neighborhood in which typical PAFs are found, with a bright and trebly 7.44K bridge pickup that produces good string definition, clarity and a raw attitude that is slightly less dimensional and rich in harmonic overtones than our favorite PAFs, but still an improvement over most contemporary bridge humbuckers that are voiced warmer and less bright. The 6.78K neck VTP is smooth, very musical, open-sounding and responsive with lots of dynamic 'pop.' The neck VTP lacks a bit of the treble bite on the B and E strings found in exceptional PAFs, but it does not suffer from the usual muddy and muffled tone typical of so many contemporary humbucking pickups. The vocal and bright quality

of a great PAF in the neck position seems to be among the most difficult aspects to reproduce in replica PAFs. Strictly in terms of tone, Boggs gets close in the VTPs – it's the subtle dynamic response, dimensionality and vocal character that remain elusive (and disappear beneath intense pedal or amplifier distortion). If you're having a little trouble understanding what we're talking about, listen to any very early Santana track, then switch to one of his more recent releases…

The WB Habaneros will appeal to players who appreciate humbucking pickups that can light up an amp with high output, *cajones* and power. As much as we appreciate the subtle, nuanced musicality of more modestly voiced PAFs, we also thoroughly enjoy and appreciate how the Habaneros put the hammer down on our vintage amps in the style of a second gain stage, only better, with the far more organic, realistic

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sound of naturally-brewed distortion. We paired the Habaneros with our '59 Gibson GA40 and easily channeled the sounds described in our interview with David Grissom and his latest solo recording, *Loud Music*. If you don't have Grissom's CD, get it now at *www.davidgrissom.com*. David likes his humbuckers shaded on the stout side – bright, strong, clear and well-defined, but tough in the Texas tradition of Billy F Gibbons. If this is your thang, the WB Habaneros are aptly named and recommended. The 8.82K bridge produces strong treble and upper mids that are edgy and raucous with great sustain, power and touch sensitive response. The Habanero is hot, but musical and nasty without going too far over the top where many jizzed-up humbuckers sound too compressed, dark and tight. The 7.64K neck pickup is equally musical and animated – powerful with excellent balance in all frequencies and zero midrange honkiness. This pickup is proud and hits the front end of an amp hard, pushing it into early distortion, but it does so with a graceful musicality rarely found in 'hot' humbuckers.

We preferred the stock VTPs over the hot set, and the '67-07 set wound with vintage 1967 enamel wire reminded us very much of the mid to late '60s Gibson T-tops – better than the Gibson humbuckers that would follow, but too bright and a little stiff for our taste. Boggs winds other sets not reviewed here, but we can confidently recommend his stock VTPs and Habaneros as a step up in the quest for contemporary PAF and high-powered humbucking tone.

LINDY FRALIN & RS GUITARWORKS

Lindy Fralin has been winding pickups for decades, offering stock and slightly under or overwound options in his quest to meet the needs of his clients. His standard 8.5K bridge humbucker is appropriately bright and trebly, bold and powerful, yet it does not push an amplifier into early heavy distortion. The level of harmonic coloration, depth and detail seems less pronounced in the Fralins compared to our benchmark PAFs, but like the WBs, Fralin's humbuckers reward you with an

overall tone and voice that sits squarely in the realm of true PAF tone. What you might miss in a direct comparison to a good PAF is not really related to tone at all, but in the PAF's distinct and vivid note separation within chords, the 'bloom' and responsiveness to pick attack in which you can hear the percussion of a pick raked across the strings, and treble tones that are just slightly less strident and 'new' sounding than in a true PAF.

We smiled when we first installed the True '60s set wound by Fralin and tweaked by Roy at RS Guitarworks, because they very much reminded us of the early '60s *patent number sticker* pickups we had bought from Kim LaFleur at Vintage Checkout.com. The True '60s 8.52K bridge exhibits the sharp, ringing treble presence heard in our early '60s pickups, with moderate output that won't turn your tweed Fender into a Marshall (without turning the amp up), and like the Fralin, the tone is on the money, if lacking a bit of the dimensionality and vocal qualities of the vintage Gibson humbuckers. The bridge also oozes the right amount of sweet compression and rich personality, but the E and A strings lack the fully solid punch, presence and authority of some (but not all) of the PAFs we evaluated. The 7.42K neck pickup stands out with good treble bite on the B and E strings, solid, reedy saxophone tones on the G, D and A strings, and while not quite as bright overall as some of the PAFs we played in the neck position, you're definitely in the neighborhood compared to many of the most popular neck position PAF 'clones' being made today, which we find virtually useless. Both Lindy Fralin's humbucker and the RS True '60s will bring you closer to the classic tones that perhaps first attracted you to Gibson electrics in the first place, offering a brighter, clearer tone that had gone missing in humbuckers for decades, and in many cases, remains missing today. Tip: Try simply turning your neck pickup around with the polepieces closer to the bridge for a brighter tone.

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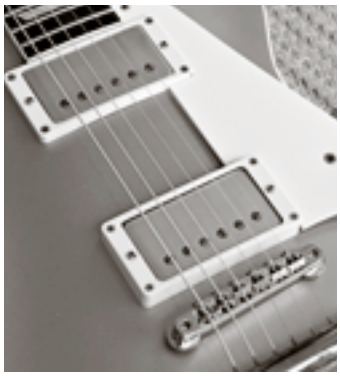
HOLMES

Unlike many in the pickup business who started out as guitarists frustrated by what they weren't hearing in their guitars, Tom Holmes is a tool-maker, engineer and guitar builder, who, by his own admission, has been far more successful as a pickup builder than a builder of guitars. His research into early PAFs dates to the late '70s, but you'll never hear him resort to using the term 'magic'… Men with Holmes' skillset develop a more pragmatic view that comes with an innate understanding of how things really work. He is also an artisan with a keen eye for details that would be unthinkable in modern manufacturing, stamping and buffing his signature nickel silver pickup covers to a finish that appears plated in its raw state, plating and polishing the steel screws used in his humbucking pickups with a finished look of fine jewelry, and creating his own bobbins, keeper bars, baseplates and hand-wound coils.

And Holmes' pickups sound, as Riverhorse put it, *beautiful* – even more richly detailed than the typical vintage PAF, which seems raw – even crude in the bridge position by comparison. The irony lurking beneath the surface is that Holmes has accomplished something so remarkable having never advertised or otherwise publically exploited the decades of research and thought that are reflected in the pickups he builds today. You get the impression that Holmes simply did his homework, tooled up, took his best shot and as he says with complete modesty, "People seem to like them." We do, too. In fact, after all the countless pickup and guitar evaluations we've made since that trip to Houston to meet the six '59 bursts, we'll credit Holmes for having created pickups that clearly, unmistakably stand out from all the rest. We don't know how, and it doesn't seem as if Holmes is too concerned with offering an explanation that ventures far beyond 'craftsmanship' (although he admitted to keeping some details to himself). But he has succeeded in creating pickups that are exceptionally unique and rare… One can only conclude that part of the 'secret' has to do with his decision to make as many of his own parts as possible – otherwise, why bother? The stock Holmes '450' potted pickups with 5K turns on the neck at 7.42K and 5500K turns on the '455' bridge at 8.29K produce complex harmonics and richly detailed clarity that seem entirely



unique among modern humbucking pickups. The potted set isn't the brightest of the pickups reviewed here, but only just slightly less so, in a trebly but less sharp and smoother fashion. We also acquired and tested an *unpotted* Holmes bridge pickup at 8.71K that reprises the full treble bite of a strong PAF, while interestingly producing a more raw tone endowed with slightly less vivid harmonic textures. Neither is 'better' – merely a matter of taste. Uncovered, the Holmes' are just a little bolder and less refined, and we may actually prefer their sound *with* covers – again, a matter of personal taste.

The descriptive terms we've used to describe the tone and voice of stellar vintage Gibson and contemporary humbucking pickups reflect subtleties in tone, complexity, feel and responsiveness that may seem difficult to grasp in words, but once heard and experienced, they inspire a renewed soulfulness in the music we play, buoyed with fresh energy and anticipation that only discoveries of this magnitude can create. The truth is, no one may ever be capable of reproducing the *exact* tone, dynamic and vocal character, clarity, bloom and rich harmonics found in a great set of PAFs, which were, afterall, essentially happy accidents created by the convergence of extremely varied and largely undocumented materials and components, assembled by relatively unskilled factory workers laboring with flexible specifications and imprecise equipment. For now, we can only do our best to help demystify the art of pickup winding in these pages, while providing you with solid choices worth pursuing. Is this the end of what began at the Spanish Castle in Houston, where, after a full day spent with the six '59s, Jonn Richardson muttered, "I wish I had never heard any of these guitars?" No. We've merely reached the end of a chapter in a larger story that continues to unfold. We're not the only ones to have fallen under the spell of the true sound of Gibson's early humbuckers and '50s Les Pauls, and at this very moment, efforts continue to decipher the elusive keys to their magnificent sound. In the meantime, keep the faith, as we send our very best wishes in 2009. And as always, *Quest forth…*TQ

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