

# the ToneQuest

*The Player's Guide to Ultimate Tone*

\$10.00 US, January 2002/VOL.3 NO.3

## Report™

## The Tone Tubby

**W**e've said it many times before in these pages... Speakers are the final transducers in the chain that defines your tone. Well, gang, get comfortable and settle in for our exclusive report on what may be the most significant development in guitar speaker design to have occurred in decades, and it's based on an organic 'technology' that is over 2,000 years old.



*John Harrison at A Brown Soun (no typo, it's Soun) has been reconing speakers in San Rafael, California for nearly 30 years, and his client list is a Who's Who of respected bands and musicians, including Carlos Santana, Pearl Jam, Metallica, REM, Van Halen, Robert Cray, Ronnie Montrose, Steve Kimock, Mark Karan, Boz Scaggs, Steve Morse, Neil Young, and many, many more. Harrison has been refining his reconing techniques and selection of superior speaker components for decades, and he has earned a reputation for having set a high water mark in reconing*

[www.tonequest.com](http://www.tonequest.com)

### INSIDE

John Harrison of A  
Brown Soun...  
The Wizard of  
Hemp

9

An American  
Treasure

Master Arch Top  
Builder Bob  
Benedetto

14

Output  
Transformers 101  
with Victoria's  
Mark Baier

15

Mercury  
Magnetics' Sergio  
Hamernik... Good  
Iron is Hard to  
Find

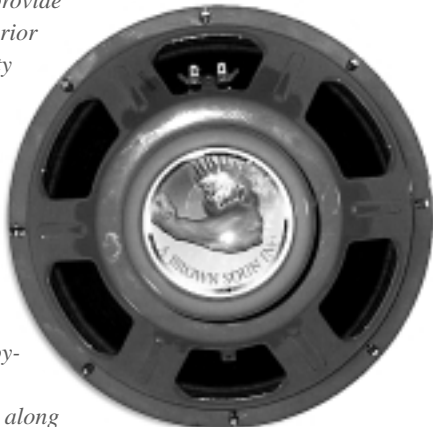
vintage speakers. The ugly truth about reconing is this: the majority of reconed speakers were (and still are) rebuilt with inexpensive, unspectacular generic parts and kits. Standards among reconing shops are very inconsistent, and far too many reconers compensate for their lack of experience and knowledge with good intentions and cheap parts assembled with gobs of glue that choke the life out of speakers that could otherwise deliver the tone you deserve. Sadly, without the benefit of being able to directly compare your reconed vintage Jensen or Celestion with an identical, fully original model in good condition, you may never know what you're missing.

Harrison had become so adept at tweaking reconed Vox Bulldogs that guitarist Steve Kimock started buying brand new reissue Bulldogs and having Harrison recone them right out of the box. The results were extraordinary. Harrison's experience with the Bulldogs led him to create The Tone Tubby, which is a supercharged cousin of the original 15W Vox Bulldog. Steve Kimock routinely uses a pair of Tone Tubbies with his custom 50W Two Rock amp and a 50W or 100W Dumble, and Carlos Santana has been playing Tone Tubbies through 100W amps... Supercharged indeed.

The success of The Tone Tubby spurred Harrison to experiment further, and his latest innovation may prove to be one of the most significant developments to occur in the history of speaker manufacturing. Harrison located a stash of hemp pulp that had been previously acquired by a supplier who had unsuccessfully flirted with hemp paper cone formulations. Fortunately, they kept the two tons of hemp pulp that they had ordered, and Harrison forged ahead with the notion of using hemp pulp for speaker cones, relying on his hunch that hemp could provide

dramatically superior tone and durability over traditional paper cones. He is now building and reconing speakers with hemp cones and the remarkable results are available for your enjoyment. Harrison's interview follows, along

with our own story related to the restoration of a vintage JMI Vox 2x12 cabinet and two silver JMI Bulldogs reconed by Harrison with hemp. We know you will enjoy one of the most whimsical, fascinating, and important stories we've had the pleasure to unearth for you, the TQR faithful. Best wishes for smokin' tone, ya'll.



**TQR:** You've been doing this speaker thing for a long time. Did you move from Atlanta to the Bay Area because of a band, perhaps?

Yeah, I've been out here since 1973, and I still feel like a visitor here on planet 'M' (laughs). Believe it or not, I've been playing in the same band the entire time. There was a period when we were kind of embarrassed to say that, but now it's pretty cool to think that we've been together that long.

**TQR:** On your web site you tell the story of having been told years ago that the only speaker reconer was in Oakland, to which you replied, "Not anymore," and that's how you began reconing speakers.

Yep, we were playing out here and in fact, that's the only speaker I've ever personally blown. Some friends of mine in Atlanta founded Wizard Electronics, and I went back to Atlanta and asked them to show me how to recone. I needed another source of income in addition to playing clubs all of the time. I had a week in Atlanta on my return ticket, so we partied for six days and the night before I left I went down to Wizard and they taught me how to do recones. After that, they basically bootlegged me reconing parts in California, because at that time you had to have a minimum order of \$3,000 to buy reconing supplies, and there was only one distributor in the country. To pay the bills for the reconing business, I played in clubs. The first

*The use of hemp fiber for pulp and paper dates back more than 2,000 years. The oldest surviving scrap of paper in the world was discovered by archeologists in 1957 in a tomb near Sian in Shensi province, China. It is about 10 cm square and can be dated precisely between the years 140 and 87 BC. The first paper sheets (reported 105 AD in China by Ts'ai Lun) were made from hemp fiber. During the 8th century, Chinese papermaking craftsmanship was transferred to Arabic and North-African countries. In fact, the first paper mill in this part of the world was located in Baghdad. The first European papermaking was reported in the first half of the 16th century and until the early 19th century, the raw material used for paper consisted of rags. These rags were worn out clothes made from hemp and flax (and sometimes cotton). Therefore, almost all paper in history was made from hemp and flax fibers. The first Gutenberg bible and the first drafts of Washington's Declaration of Independence were printed on hemp paper.*



-continued-

speakers that I ever reconed were out of those old Kustom PA cabinets, and I remember thinking, "Wow, what a great thing – eight speakers in one job!" So I basically started from scratch.

**TQR:** How long did you stay strictly with reconing?

For about five years, and in 1979 I went out on the road with my band and we brought our band manager's brother in to run the operation while I was in and out of town playing. I was still doing some reconing myself when I could, but we were on the road a lot. Eventually, I got back into the business full time and really concentrated on building it up with warranty business from companies like Boogie, JBL, EV, Celestion, Altec, Gauss, etc. I quadrupled the business in about a year, and aside from playing music, it's really the only other thing I know how to do.

**TQR:** Let's talk about reconing for a bit, because we have acquired a perspective that is rooted in skepticism when it comes to recones. Frankly, way too many of them simply aren't done well and they sound like shit. Meanwhile, reconed 'vintage' speakers are being sold for huge money – \$200 or more – yet you don't know what parts were used or whether the reconer knew what he was doing. We suspect that if the players or collectors who buy these reconed vintage speakers could hear them next to an identical speaker that was really right, they would just die...

*Bullseye*, and it breaks my heart, because it's like somebody that rebuilds your engine and maybe you get the car back and that engine is just OK... You don't want to tear the whole thing apart again, but if you have the money, that's what you have to do. I have gone behind a lot of reconers and fixed their mistakes

– we do it every day – and we even recone new speakers. Number one, experience really counts when it comes to



reconing. You have to do it long enough to have stumbled on some things that work, and that takes time. Number two, you can't be cheap with the parts you use. With the exception of JBL's and EV's, the parts for most speakers are only \$5-\$10, but you wouldn't believe the difference in a \$5 kit and a \$10 kit. It also takes a little work to hunt down the best parts. For a long, long time, Waldom was the only wholesale distributor

of reconing parts, and they sold their parts exclusively.

**TQR:** So everyone was using the same parts?

Pretty much. It was a long time before I ever saw a real Celestion recone kit.

**TQR:** When did Celestion start supplying recone kits?

Well, they don't, unless you are an authorized warranty repair facility. When I became Mesa Boogie's exclusive speaker facility, I obviously started seeing a lot of Celestion kits about eight years ago.

**TQR:** So you are manipulating speaker design for a specific outcome with each different make and model...

Exactly. Every model is different, and how far you place the voice coil down in the gap is really, really important. There are a lot of beautiful things you can do with speakers.

**TQR:** How much of the sound of a speaker comes down to parts, and how much to reconing techniques?

It's about 50/50. The parts are number one, but they can mean nothing if you don't know how to use them. Based on what I see here every day, I'm always astounded by how many bad reconers are out there. I don't think they do it on purpose, but I also think that being a musician is a huge advantage. You can hand me a speaker and by feeling the cone and spider I can tell you how that speaker is going to sound.

**TQR:** What's your take on the debate over old AlNiCo magnets needing to be remagnetized?

I've reconed a million of them, including all the old JBL's. We're just getting started and experimenting with our magnetizer. Ted Weber (who is a respected authority on transducer magnetics and a good friend) told me that 90% of the old AlNiCo JBL's need to be remagnetized – D130's, D140's, etc. In my experience I haven't run into this problem much, but we are offering this service now.

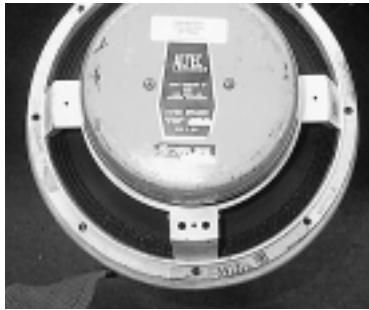
**TQR:** Vintage JBL's are some of the most pricey speakers on the market today. How do you feel about the aluminum dust caps on them?

JBL's are great, but as far as the dust cap goes... that's one of my pet peeves in life. They're horrible. They telegraph a lot of weird harmonics that you don't want to hear. Their take on the thing was that the metal would boost the highs. If the customer wants it, I'll still put it on, but I like to use hemp/fiber

-continued-

dustcaps on a JBL and all the other speakers accordingly. The hemp dust dome is another one of our hemp-related designs which we are having huge success with. Like our hemp cones, they allow the speaker to work without any odd dome related harmonics – totally smooth.

**TQR:** Are most of the clients listed on on your site reconing customers?



All of them are, and a lot of them live here, which helps. Neil Young has a couple of Magnatone amps with 12" speakers that he plays religiously, and I've been reconing his speakers for a long time. They'll send me

a speaker overnight from somewhere on the road, and I'll do it the next day and ship it back. The shipping costs more than the recone (laughs). I also have done Carlos Santana's speakers for years. He has always used Altec 417's until now. He's using our hemp Tone Tubbies! I'm very proud of this, and he really loves them! "They have everything!" (Carlos)

**TQR:** I bet you have players who come in with a favorite speaker and say, "Make it sound like this one."

Oh, all the time! *Totally*, and you should do that when you can, although I don't like to cut into a great old speaker that's working fine to see how it was built. My motto is "play it 'til it dies, and soak up everything it's got for as long as you can if you're really liking it."

**TQR:** Did you manage to collect a lot of vintage speakers and cabs over the years?

Yeah, and guys started mentioning AlNiCo a lot starting around 1985. I had tons of that stuff – the old P12N's and the P10's. I used to sell them for \$50.

**TQR:** What causes speakers to blow, in your experience?

Well, you got your players... but in my opinion, and I've verified this informally over many years, really good guitar players generally will not blow speakers, and it's because of the way they play. Instead of attacking the guitar, they kind of lean into it. With those guys, the guitar, the amp, and the speaker are used as a unit. Other guys will just go in and attack it, creating an erratic wave with a lot of percussion. I've noticed that when a cone is etched out in just one area over many years of playing, that's the sign of a good player, because he's been kind of gnawing on the cone with the same

frequencies...

**TQR:** Like a rat...

Yeah, exactly, and in the same frequency range. Back to your question, too much power will certainly blow a speaker, but I think strange and erratic sound waves are also a big part of it.

**TQR:** We've read that old, vintage speakers will blow sooner or later, and if you want to keep them original and intact for posterity or to preserve the value of your vintage amp, you should retire them to the closet and replace them with new speakers.

That doesn't do any good. What does that mean? Why don't you put your '62 Strat in the closet, too? Don't wear it out! (laughing).

**TQR:** Can you describe the differences in tone between AlNiCo magnet speakers and ceramic magnets?

AlNiCo speakers are smoother and more friendly to stringed instruments like the guitar. AlNiCo naturally compresses guitar tone, while ceramic is more dispersed and sterile sounding. Why? That's a question for an engineer. Like EV's for example...

**TQR:** They're built to be pushed...



Yeah, but not by a guitar. They will tear your head off. I can totally tell a big difference between the two, with a ceramic speaker sounding kind of sterile compared to AlNiCo. There aren't that many great ceramic guitar speakers, in my opinion.

**TQR:** Well, when the guitar explosion erupted in the 60's, mass production supported the use of the more cost-effective ceramic speakers. AlNiCo got priced out of the market.

Exactly, but when you look at the numbers today, it was so stupid. There was maybe a difference of \$3 between ceramic and AlNiCo.

**TQR:** Let's say you're building a cabinet and you're trying to decide which speakers to put in it. What do you do – get a couple of new speakers, old ones...

I'd buy a couple of Tone Tubbies, dude (laughs). Seriously,

-continued-

we have gotten so many rave reviews on them. People are always telling us that they are the best sounding speakers they have ever heard, especially since our hemp cones came into play. Other than that, I might get a couple of old Jensen P12N's or something and have them reconed by us if needed.

**TQR:** How did the Tone Tubby come about?

I've been doing all of the vintage speakers for years, developing my own tricks for different models, and a guy who owns a small amp company came to my shop with this speaker that looked like an old Bulldog frame. We built a speaker for him, which is now the



Tone Tubby design, and the guy just went nuts over it. That got us thinking about building more of them, because we knew that a lot of people needed them. Then Steve Kimock brought in a couple of brand new reissue Vox blue Bulldogs and said, "Here, have your way with them. Make them sing for me." So I gutted them and did the Tone Tubby thing, and Steve went out and immediately bought more of the Vox reissues and brought them here. Then I found a supplier for the identical frames, and we started building speakers and putting our name on them. When a guy calls for a Tone Tubby, I start off by asking him what kind of music he plays, what kind of guitar he plays, what kind of amp, and that determines what kind of cone I use. If a guy is playing, say, a 28W tube amp, I'll use a thinner British cone that we call the 'Cone One,' and if he's playing a bigger amp like a Boogie, Bruno, Dr.Z, or a Two Rock, etc., I'll use a 'Cone Two' which has a little more mass. We have a board of really great guitar players that we'll test different speakers with, and they'll give us their feedback, which is invaluable. After we had been building the Tone Tubby for awhile, a few players told us about a ghost note that they would get at one specific note on the guitar – what they call *cone cry* – and that's when we developed the 'Cone Two' speaker cone, which took care of that problem. That's also what prompted the development of the hemp cones that we're building now, and I'm telling you, there is *nothing* you can do to induce a ghost note out of those cones. They are absolutely sonically superior in every way to paper. We're coming out with 10" Tone Tubbies and also Tone Tubby bass speakers. Bass players have never had a really good AlNiCo speaker. We're going to build a complete line for bass players called the Fat Ass – 10's, 15's and 18's.

**TQR:** Will you do a 15" for guitar?

We sure will. The poor bass players, though... They love

10's, right? Well, the few speakers that are available to them today will sound really good for about the first six months, and then the cones start rippling around the suspension and completely fold up. The hemp is going to take care of that. Sit back and enjoy some great speakers coming up.

**TQR:** We saw Mark Karan on your web site hugging a Tone Tubby cabinet...

He's a great guy and he's real proud of his Tone Tubby cabinet.

**TQR:** Tell us about break in...



Well, they sound great from day one, but there is definitely a break in, and with the hemp cones, I've never heard a break in that is so significant in my life. It's phenomenal, and the whole thing with the hemp cones is just the most exciting thing I've ever experienced.

**TQR:** Your cabinets are very cool...

They're great. We've got over forty cabinets at George Lucas' Skywalker Ranch. You know... you make something for him and he likes it, you're in. The guitar cabs are constructed from D select Ponderosa Pine. This grade only allows for



very minor defects, not the large knots you see on pine boards from the home centers and lumberyards. They're tuned real simple and they sound unbelievable.

**TQR:** The oval opening in the back panels caught our eye.

Steve Kimock designed that – it's called 'The Football.' Those cabinets have actually made me get goose bumps.

**TQR:** An oval opening seems like the best of both worlds between an open and closed back...

Yep, those nutty guitar players are always looking for something new and different. I'll tell you a story... I've been doing Carlos Santana's Altec speakers for years, and we sent him over a Tone Tubby cabinet. We weren't trying to sell it – we

-continued-

just wanted to see what he thought about it. Well, the next day we got the cabinet back and his tech, Davey Crockett said that Carlos really liked the speakers a lot but he thought the cabinet



needed more bass. So we went to the 'Cone Two' cones in a cabinet with a sealed back and sent it to him. We didn't hear anything for well over a month, and then all of a sudden we get a call from Crockett. "Carlos tried the Tone Tubby. He went crazy over it. He took the cabinet home... he *never* takes stuff home." We loved hearing that, and then they started asking us for more Tone Tubbies. We had been working on the hemp cones, so we sent Davey back with a Tone Tubby cab and a speaker for one of Carlos' Boogies. The next day I got another frantic call from Davey, all breathless. "He tried the hemp cones, John. He went



crazy. He wants more, and he wants to meet you." Carlos also said something about the cabinet speaking to him. He said, "This cabinet speaks to me from my toes to the top of my head." You know what's even more amazing is the fact that we nailed the formulation of the hemp cone material the first time around, and that *never* happens. One of the engineers at the company we work with said that it was unheard of to get it right the first time – it usually takes 30 or 40 tries to get it right. Fortunately for us, the company had over two tons of hemp pulp on hand from previous failed attempts to do something with it. At one time they had tried injecting 2% of hemp into paper cones, but the project died pretty quickly. It's definitely the start of something fantastic, so we patented it just to protect ourselves and the idea. We knew immediately that in Nashville the guys playing Strats and Teles were going to go ga ga over them. I can't tell you much about it, but we're talking to a major amp builder about building an amp around the Tone Tubbies, and it will be fashioned after the AC30.



**TQR:** The buzz over the Tone Tubbies and the hemp cones seems to be building a lot of momentum, even though they haven't been officially launched yet. It

seems to have started out as an underground thing within your circle of clients.

Yes, people like Kimock and Mark Karan played a key role. We're getting Carlos set up with a 4x12 Tone Tubby cabinet because they are 25W speakers, and Carlos really pummels them, you know?

**TQR:** We were wondering about all of these players who seem to be using 2x12 cabs with 100W Dumbles, Two Rocks, and Boogies...

The hemp has definitely added some horse power, and to be truthful, I really don't know how much power they can take now. It's crazy. I'd say they are about 30W, but they have taken 50W. The thing is, when guys are playing 100W amps, they aren't running them wide open. But still, Carlos pounds the living shit out of them, so that's why I wanted him to use a 4x12 cab.



**TQR:** You mentioned that Kirk Hammett of Metallica has recently latched on to a Tone Tubby cabinet that you sent them.

About two weeks ago I was working on some Urei speakers for a new studio they are building here in the Bay Area. Their road manager, Zack, and I were talking about the project, and I told him about the Tone Tubbies. They picked up a 2x12 cabinet and I told them to put a Marshall 50W on top of it since they are Marshall guys, and see what happens. A week later Zack called and said, "Oh, about that cabinet you loaned us... Kirk loved it, and we've been down in L.A. working on our new album and he used the Tone Tubby cab on seven cuts, including the single." They've ordered two more 2x12's since then.

**TQR:** Paul Lamb builds your cabinets, correct?

Yes, Paul and Ken Moonitz. Paul does the covers and cloth and Ken builds the cabinets. You know what's really great is that those two have been working together since high school. Those cabs are built *so* well. Ken hand picks this Ponderosa pine, and he told me that you would not believe what a difference a knot can make in the tone of a cabinet. I'm serious! We've actually had cabinets that have sounded better than others – it's wild, yet again, hundreds of people are slamming Tone Tubbies in god knows what kind of cabs and they call

-continued-

us up to tell us that *these speakers scream, man*. Ronnie Montrose has also using them on his new album. I love his playing and he's a real tone meister. He's more of a 4x12 guy I think, but he's getting a 2x12 cab and I'm really excited about that. This entire thing with the Tone Tubbies and now the hemp cones has been an amazing trip for us, and I'm so grateful that they have been well-received. It's a very rewarding thing to see so many great players appreciate what we're doing here. **To**



*A Brown Soun, 23 Joseph Ct. San Rafael, CA 94903  
415-479-2124. www.abrownsoun.com*

**TQR:** Mark, it's been a while since we last checked in with you. How long have you been using Tone Tubbies and how did that come about?

**Mark Karan** It actually came about as a result of working with Steve Kimock in *The Other Ones* in 1998. I always thought Steve had good tone, but at that time he wasn't using Two Rock amps. He had his Dumble and a Boogie, and I know that Steve and John Harrison were working pretty closely together on the Tone Tubbies. I was still using the Line 6 stuff, and I also had my Matchless DC30, and I had found a '65 Super Reverb that Steve helped me get tuned up with some RCA blackplate tubes. Through Steve, John helped me get the original speakers back into the Super. So for that tour I was using the Matchless and the Super daisy-chained. It was a great sound, but every night I'd be next to Steve and his tone would just explode and blossom, and I'd think, "What the f\*\*\*!" I'm a tonefreak, and after hearing him I just had to have it. My first introduction to the Tone Tubbies occurred during rehearsals with Steve, where you can get a lot more microscopic with your sound as opposed to a 20,000 seat venue where you can't hear details to save your life, anyway. Overall, I liked my sound, but it still wasn't touching his. Then I started listening to my Matchless, and my opinion of that amp changed. It sounded kind of harsh and unpleasantly 'buzzy' in the top end when I compared it to the other sounds I was working with and the sounds I was aiming for in my head. Steve strongly suggested that I try Tone Tubbies in the Matchless, and the difference was just phenomenal. Now I'm using a Tone Tubby 4x12 cabinet with the Two Rock.

*For more information on Mark Karan and his current recordings, please visit [www.markkaran.com](http://www.markkaran.com). Stay tuned for more of our conversation with Mark in an upcoming article and reviews on Two Rock amps.*

## VOX Vobiscum

In preparation for an upcoming in-depth article on Jennings Musical Instruments (Vox), we scored a wonderful '64 candy panel AC30 Treble head on eBay, so we began looking for vintage Bulldogs and a 2x12 Jennings-era cabinet. Far more combos were built by Jennings than AC30 heads, and they are comparatively rare. Finding a 2x12 Vox cabinet can be equally challenging. It's also hard to find original, unreconed blue or silver Celestion 'Bulldogs,' and we were prepared to settle for reconed speakers, since we planned to send them to A Brown Soun for reconing. We were lucky to find two reconed silver Bulldogs and a Vox 2x12 empty cabinet on eBay, and the seller turned out to be an Athens, GA based guitarist, gearhound, and collector by the name of

Michael Guthrie. His astounding collection of British amps and Beatles-era guitars will be featured in an upcoming



issue. We bought the cab and speakers and immediately sent them off for reconditioning. The Bulldogs received hemp cones and the full Tone Tubby treatment at A Brown Soun, and the cabinet (which was missing the original back) was sent to Gregg Hopkins at Vintage Amp Restoration. According to Guthrie, the Bulldogs had been reconed perhaps ten years ago and stored in boxes as spares. John Harrison confirmed that they had been reconed with stock Waldom parts, and they were pretty dull-sounding and unremarkable when we received them, which was just what we had expected.

We asked Gregg Hopkins to create a 'football' cabinet back for the Vox and install a new brown grill cloth, cabinet corners, a new handle, and rubber feet. He also replaced the damaged gold piping and turned the white vinyl trim inside out to reveal the cleaner side that had been facing the baffle for the past 35 years. We considered all of this TLC to be pretty minor stuff for a heavily giggered 35 year old cabinet. Gregg also informed us that when he cleaned the cabinet with Tuff Stuff upholstery cleaner (available at auto parts stores), sheets of orange nicotine stain ran off of the tolex through three cleanings. When we received the cabinet back from Gregg, it was beautifully authentic, aged, and worthy of worry-free-go-ahead-and-ding-it gigging, but hardly recog-

-continued-

nizable as the old road dog we had shipped a month earlier.



UPS delivered the cabinet in the afternoon, and six weeks of anticipation was about to finally end as we

removed each of the screws holding the back of the cab to install the Hemp Bulldogs. But wait... one of the screws wasn't backing out of the metal insert in the Vox frame. What's this? It's *turning*, but it isn't *moving*. *Shit!* The insert was loose and turning inside the frame. Twenty minutes later we had somehow boogered the insert out of the frame with no damage. We filled the pilot hole in the frame for the insert with Titebond, replaced the insert, and let it all dry while we installed the Bulldogs. With the speakers installed and wired up, back went the cabinet back and the mounting screws. *Zitttt, zitttt, zitttt* whined the Black & Decker as we snugged up each screw with care. Cabinet backs gotta be tight or they'll rattle and buzz, you know... *Zitttt, zitttt, zircicchg*. Shit, shit, *shit!* A second insert was now twisting in the frame with the screw frozen in place. OK... this worked once. It will work again. Push on the back end of the insert from inside the cab with a screwdriver and f-o-r-c-e that m-o-t-h-e-r out. Ain't budging. Slowly circling the Vox, we eyed the cabinet now with the knowledge that something sinister lurked within. This simple task was becoming agonizingly reminiscent of 'vintage' Volvo ownership. With a final barrage of profanity and brute force, we busted the insert loose from the frame, which yielded a few splinters that had to be glued back in place. Sweating and swearing now with a vengeance, it was back to the business at hand as we proceeded to install the remaining screws by hand.

*Twist, twist, twist,* clockwise with the screwdriver we turned as if we were defusing a bomb. The last screw was almost tight when we suddenly felt a slight rubbing sensation as the last few turns of the screwdriver went slack. The insert had sprung free, and with every turn of the screwdriver the screechy yowl of metal against wood revealed the evil spirit of the old Vox pub crawler. *Talk to me, you bastard.* It was time for a beer and a calming



moment of reflection. Yes, these things usually come in threes, we mused, and that one was number three. Good enough. We removed all of the screws on the cabinet back save the frozen one, and began pushing the insert out from the backside, inflicting as little damage as possible to the surrounding wood. *Nothing*. Nothing again, and again, and again. This one wasn't coming out, by god, and that was that. Circling the beastly Vox once more, it was time for cooler heads to prevail. No... it was high time for the head of that frozen, useless screw to come off. Rummaging through toolboxes, we grasped the hacksaw blade – a crude and unforgiving tool capable of exacting punishment and mayhem of unimaginable ugliness on virtually anything. We must be careful, musn't we? Oh yes, we must be *very* careful... In five minutes the screw head was gone, the cabinet back was off, and we could finally attack the amputated stump of the screw with a big-ass pair of pliers. With a crack, the insert popped out. We collected the splinters and glued them carefully back in place, leaving no sign of the battle that had been fiercely



waged and won with our British 'dog house.' But our work was not done. Minutes later we were standing in front of several dozen

gray metal drawers containing a bewildering assortment of screws, nuts, washers, and flanges at the local Ace hardware. We determinedly filled small paper bags with replacement inserts that could be installed with a screwdriver, new stainless steel screws and washers, and stainless cup washers to prevent the screws from ever freezing again, regardless of the method used to snug 'em up. The dark underbelly of Vox ownership had been revealed to us in an unimaginably cruel, uh... *twist of fate*, if you will. Was it worth it? Absolutely. The cabinet sounded like a million bucks with our two reconed silver Hempsters throbbing inside. No rattles, no buzzes – just tight and right – and Hopkins had performed just the right amount of restoration work to leave the cabinet appearing respectably used, but not abused.

These speakers are magnificent, people, and they get better every time they're cranked. Imagine the tightest, most lush bottom end you've ever heard, rich midrange that pins your ears back and says, *pay attention*, and clear, musical highs that never sound harsh, shrill, or piercing. *Smooth, sweet, and satisfying* – that's the Tone Tubby mojo *con hemp*, and we couldn't agree with Carlos Santana more when he said, "This cabinet speaks to me." It'll speak to you too, so get yours now. And remember – nothing worthwhile comes without a price, but leave the electric screwdriver on the bench when you mess with a Vox cabinet, mate. *Quest forth. To*

# Benedetto.

*The signature of jazz guitar.*

There are still master craftsmen creating works of art in the form of musical instruments today, and Bob Benedetto is truly one of the greatest contemporary builders of fine archtop guitars in the tradition of John D'Angelico and Jimmy D'Aquisto. Bob is a profoundly gentle and modest man who, with the capable assistance of his wife, Cindy, has succeeded in creating a successful business from the pure love of his craft, without compromising his vision of fine guitar building.



Young Bob on right.

He continues to work very closely with Fender and their master builders to insure that every Benedetto guitar is worthy of his name, while building custom ordered guitars in his shop in Florida. As you read Bob's story, we think you'll agree that he is indeed an American treasure.

**TQR:** We suspect that you must have been exposed to music very early on.

Not only music, but the arts in general. There would be Caruso records playing in the house and at the same time records by Eddie Condon and Tony Mattola, so it was diverse enough that we were very well rounded I guess, without even realizing that we were soaking it all up. It was a very typical Italian family and weekends were very festive. I actually grew up in New Jersey, and one of my uncles was my first influence with the guitar, and in his youth he was a violinist. His brother was the artist of the family, and he inspired me to pursue my dream with the guitar, although I really received encouragement from everyone.



...backrow on right.

**TQR:** When did you start playing professionally?

I was 13 or 14 and I was fortunate enough to grow up in an area where as long as we were chaperoned, I could play in bars as a kid, and that was my education. I wasn't the kind of kid to spend hours practicing, although I would spend hours

with the guitar just goofing off. The band that I played with was a group of kids that were my own age. I remember sitting in with Jimmy Carmichael, Hoagy's brother. I couldn't have been 14 years old, and what was wonderful about it was listening to the chords he was playing, and the vibe... the dimly lit lounge... It was a jazz setting where I grew up and it just seemed to go along with the archtop guitar.

**TQR:** What kind of guitar were you playing in the early days?

It had no name on it. There was a factory in New Jersey that had made bodies for John D'Angelico, and they made a few other off brands, and some with no name at all, and that's what I had. It was a laminated 16" body with one pickup. It played pretty well, actually, and before that I had a Stella. Who didn't have a Stella?

**TQR:** How did your interest in playing the guitar evolve into repairing and building guitars?



When I first saw my uncles playing (one would play a guitar and the other mandolin), I just seemed to gravitate toward the guitar. My uncle played a small bodied Gretsch, and all I wanted to do was make one. I started taking lessons from my uncle, but the entire time I was playing I really wanted to get inside and build a guitar, and I started out carving little miniature guitars and violins. I made my first real guitar after getting out of the air force in 1968.

**TQR:** How did you learn about woodworking?

The basics were right there at my disposal because my father was a cabinetmaker and his shop was in the basement. I was in wood shavings up to my knees all of the time, and my father was a fantastic cabinet maker. He taught me how to sharpen chisels and saws, and how to make a good glue joint. Shortly after I started making guitars, I began taking in repairs, and I had a lot of wonderful instruments on my bench - New York Epiphones, D'Angelico's, Gibsons... I was learning as I was doing it, but archtops were the guitars of the day, and I could see and feel the bracing patterns, the graduation of the tops and backs, the recurve and the overall look and appearance of these great instruments. But like anything else, you learn by doing. I did repairs and restoration work for about 15 years, splitting my time between that and building guitars.

-continued-

**TQR:** There seems to be a golden era for virtually all types of guitars. When was the golden era for arch tops, who built them, and how were they distinguished from the mass-produced instruments of the time?



I used to think that the golden era for arch-tops was back in the mid to late 40's and early 50's, but I don't think that is the case anymore, and I believe we have yet to see the pinnacle of archtop guitar building. There has been a big turnaround in the

past 6-8 years, with more interest in archtops by builders and players, and there are more guitars being built than ever before. They are also generally better than ever. As far as a benchmark, the factories in the old days like Gibson, Epiphone, Guild, and even some of the Gretsches were real fine guitars. These companies were making great guitars back then, and I remember seeing Gibson and Epiphone guitars that were every bit as good as any D'Angelico I had ever seen. I can't generalize and say that small-production guitars were better than the factory guitars, and the same thing applies today.

**TQR:** Have you settled on a particular form of construction and materials for your guitars?

Unfortunately, yes, (laughs). I used very traditional woods by necessity, because the consumer expects to see the traditional woods, such as a spruce top, curly maple sides, back, and neck. If we split hairs and compare Sitka spruce to Englemann spruce or European Spruce, or pine, cedar, or redwood, I've used all of those woods, but not in enough volume to form an opinion about one being better than another.

**TQR:** How do you deal with acquiring the very best material these days? Do you find particular boards that are better than another?

These days it is easier because we have vendors right here in the U.S. who know the criteria and sell different grades. They'll send you what you order, but years ago it was



more difficult, and I really did have to use whatever was available to me. Often, it was an unhappy surprise when the wood arrived. A matter of fact, out of necessity I was the first to use big leaf maple on an archtop guitar because I couldn't find different varieties. I remember cutting up an old bookcase and making redwood tops because I couldn't find spruce.

**TQR:** Were you lining up behind the big manufacturers?

To some extent, and I also just didn't know where to go. I remember finding a company in New York that supplied sitka spruce for boat builders. They would use sitka for the masts, but the boards I could buy from them were only about 6 inches wide. I have quite a few 3 piece tops floating around out



Bill Schultz, President of Fender with Bob

there, but they sounded great, and I discovered that a lot of the stories that I had heard about tight, straight grain, weight, and all of this other stuff really didn't matter. I

was tapping boards and listening for the best tap tones – 'best' meaning a clear bell tone rather than a thud – and again, out of necessity I was making guitars out of thuds mixed in with some bell tones, and I couldn't tell the difference in the finished guitars. Often, the wood that gave me the worst tap tones produced that best sounding guitars. I would never discard a piece of wood because of the tap test, because I couldn't afford that luxury. It worked for me because I wasn't blinded by other people's rules, and an experienced maker can intuitively find a way to make that wood work. More recently, I can get away with practically anything and I have selected 'bad' wood on purpose just to make a point (laughs).

**TQR:** How many models are being built by Fender?

I licensed seven models to Fender, and the operation has been moved to the Custom Shop in Corona. The facility in Corona is tremendous – state of the art, great quality control, outstanding craftsmen, and excellent management.

**TQR:** So you're strictly building custom one-offs?

I stopped taking orders about a year ago because my plate was just too full. I have a few years worth of orders on the books, and I'm making violins again, so I stopped taking guitar orders. Once I fill the orders I have I'll probably start taking them again. Most of the guitars that I'm building are one of a kind instruments, and I'm happy to get away from the standard models and build the guitars that I only had time to think about building before. I can stretch out a little bit now.

-continued-

**TQR:** Do you work alone?

Yes, I do. I've had people working with me before with nothing but great results, but I really prefer working alone.

**TQR:** What do you use for bracing?

I generally match the bracing wood with whatever wood I use for the top. If I use sitka for the top, then I'll also use sitka for the braces.

**TQR:** Light weight guitars are generally associated with superior resonance and tone. What's your take on that subject?

On any acoustic stringed instrument, the lighter it is, the better it will sound, generally speaking – more responsive, balanced, and just a more vibrant instrument all around. The wood should not only be lightweight, but also stiff, and of course the geometry of the guitar comes into play. The arch is not just for aesthetics. If the arch is not matched up with the correct neck angle, you're very limited as to how thinly graduated you can carve the top. I'm talking about structural design being married to acoustical design.



IL Palissandro

**TQR:** Why did maple become the standard for archtops as opposed to mahogany, for example?

It's directly related to the violin, and there are many similarities between the arch top and the traditional construction of the bowed instrument family.

**TQR:** The emphasis on highly figured wood has really gotten out of hand recently, as if it is some kind of guarantee of an exceptionally fine sounding instrument. Your thoughts?

It's all about aesthetics. If you studied the world of violin and cello making, you would discover that many, many master grade instruments made by the premier master builders were often made with inferior wood cosmetically – perhaps a knot on the top dead center, unflamed backs and sides, plain maple or plain poplar. It really made no difference, but the obvious

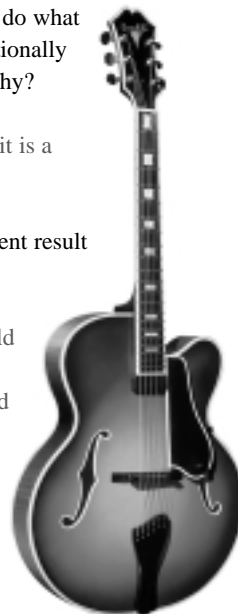
result was an instrument of tremendous sound.

**TQR:** Are there magical boards that do what they are intended to do exceptionally well, and do we understand why?

There are, and we don't know why, but it is a happy experience nonetheless.

**TQR:** How do you achieve a consistent result from one guitar to the next?

That only comes with experience. I could review the various components and dimensions of one guitar to the next, and I'm sure there is some consistency there, but it's really about refining your skills, whether you are a player or a maker. I have found myself developing practices that I didn't even realize I was doing. It just happens with repetition.



Fratello

**TQR:** Is there an optimum size and style of guitar that you have settled on over the years?

Yes, without a doubt the 17" body with a 3" body depth results in the sound that I want – a nice fat, rich quality that's balanced and loud. Fingerboard scale – I've found the 25" scale to be the optimum. Many players will play the guitar with the 25" scale and they may not really know why it's more comfortable, but it is. It just seems to appeal to the masses.

**TQR:** What are your thoughts on nut and bridge materials?

It doesn't matter to me as long as I'm staying within my comfort zone, and that is ebony or rosewood on the bridge. As a matter of fact, on the bridge, ebony is my preference, but I'm not opposed to using any hard wood, and I've even used maple on the bridge. I like them all, but of course I use ebony on a regular basis because that's the traditional wood. For the nut, I use bone or ivory unless it's an unbound instrument, and then I'll use ebony. You know, a lot of materials – wood and synthetics – probably work equally well, but I don't have much experience with synthetics.

**TQR:** Hide glues... they were used exclusively in the past and we know the problems that Gretsch guitars had with them...

Well, in defense of hide glue, the problem was not the glue, but how it was applied. Hide glue has a shelf life. There are

-continued-



some people who don't use it very often, and it will sit there for a month and mold will grow in it. When they're ready to use it again, they'll add a little water, heat it up, and use that old moldy glue. Well, by that time it has no strength. And of course with hide glue, your joints have to be really good. The joint should be good anyway, but hide glue works beautifully when it's used properly. It requires more finesse and

skill and more understanding than the modern glues like Titebond.

**TQR:** What do you use?

I use hide glues on the violins and Titebond on guitars. Tight bond is a resin glue and it's not far from the old Elmer's Glue-All I suppose, but with better properties – it dries better and stronger, and it sands well. It's very much the industry standard.

**TQR:** Tuning keys... what have you settled on over the years?

That's an interesting subject, because tuning keys can significantly affect the sound of the guitar. On my earlier guitars, I wanted to use the tuning machine that was used on the high priced guitars of the day, and that was the Grover Imperial.

**TQR:** The stair step tuners...

Yes, and they had a massive housing and they were quite heavy. Well, they were originally made in Ohio, and then they began manufacturing them in Korea, and they were really bad. I forget when this was exactly. Anyway, at that time I switched to the M6 Schallers, and eventually the Grovers improved again, but I had discovered that the lighter weight



La Venezia



Schaller was good for the tone. I was not adding unnecessary weight to the guitar, and as time went on I started using the Schaller M6 mini tuners with a standard size ebony button. If you can lighten the instrument in any way, it's to your advantage.

**TQR:** Let's talk about strings for a minute – composition and gauge.

To tell you the truth, it's a matter of personal preference, and if the guitar is a good one to begin with, almost any string will sound good. You'll lose power with lighter gauges, and the most popular set that I find is the .012 -



Bob with the Manhattan

.052 pure nickel strings. That doesn't mean that other sets aren't appropriate, but that's what I ship with my guitars.

**TQR:** And the brand...

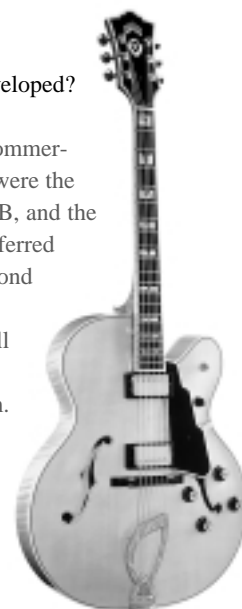
The Benedetto brand (laughs). They are made by Fender.

**TQR:** Let's talk about the seven string guitar – what prompted you to build them?

An order! I got a call to make one, and I'd known about George Van Epps and Bucky Pizzarelli, of course, and Bucky was very influential and helpful with string spacing and the general design. There again, the more seven strings I built, the better I got at it.

**TQR:** How were your pickups developed?

Well, I always needed pickups, and commercially, the only thing available to me were the Gibson Johnny Smith pickups, the BJB, and the DeArmond #1100, which was my preferred pickup, and that was about it. DeArmond was shutting down production of the 1100, and they gave me a courtesy call to see if I wanted to place one final order before they ceased making them. I bought 50 and Guild bought 50, and once that supply was depleted I started using Bartolini and Kent Armstrong pickups, and then I developed a licensing agreement with Seymour Duncan. The sound that I wanted was a reproduction of what



La Venezia

-continued-



Bob with Jimmy Bruno

was natural to a good arch top guitar, using the criteria that we all know – the balance, warmth and richness, with a high note that isn't thin and tinny. So I went back and forth, working with Kevin Bellar at Seymour Duncan, and we arrived

at what we were looking for, which surpassed anything that I has used in the past. In the meantime, I was receiving calls from people who wanted to buy pickups, and I developed a large mail order business. It eventually got out of hand, however, and that prompted the licensing agreement with Seymour Duncan, who now does all manufacturing and marketing of the Benedetto line of pickups ([www.benedetto-pickups.com](http://www.benedetto-pickups.com)).

**TQR:** Since the golden era of archtops has yet to be reached, what does that mean for you?

Well, within the trenches, there is a lot of competition these days, and if you want to keep a roof over your head, you'd better be better than the next guy. It's pretty fundamental. For me, I'm finishing up my life's supply of orders with the freedom to selectively take new orders as I choose, and I'll have the time to stretch out and explore new designs and maybe new woods.

**TQR:** Will you experiment with acoustical chambers and variations in bracing patterns?

I think so, but I've experimented enough in the past to know what not to waste my time with. All things being equal, I could probably build ten guitars with different bracing patterns, and when all is said and done, I doubt that you could tell the difference. There's a lot of myth and uncharted waters that we really don't understand. Find something that works and duplicate it until you do understand it.



Frank Vignola Prototype

**TQR:** If someone is interested in acquiring one of your guitars from Fender, they can reference your web

site and Fender's, decide on a model of the seven that are produced, and place an order, correct?

Yes, there are select dealers with guitars readily available.

**TQR:** Do you have any tips on the care and maintenance of guitars?

Just keep your instruments in a controlled environment that is much the same in which you yourself are comfortable. Sudden temperature changes are terrible. I don't believe in using heavy duty waxes and polishes to preserve the finish.

**TQR:** Have you ever used humidifying devices?

In my workshop, yes, but not in the guitar or the case.

**TQR:** What type of finish material do you use on your guitars?

I use nitrocellulose lacquer and I sometimes use a violin varnish.

**TQR:** Does the thickness and heaviness of the finish have a substantial effect on the tone?

Yes, and I apply as little finish as possible to do the job. You want to see through the finish right into the wood. After the guitar is sanded, I spray about seven coats.

**TQR:** What type of fret wire do you use?

Jim Dunlop jumbo 6130 wire.

**TQR:** Have you ever noticed how many factory guitars get the crown on the frets leveled and flattened? The old 'fretless wonder' railroad tie thing...

You know, it really doesn't take much more time to do the job right. I don't care if it's a one man shop or a big factory environment – if you train people properly and give them the right tools for the job, you can crown frets in very little time.

**TQR:** Aren't many frets on factory guitars installed mechanically?

Some are and some aren't. I know that at Fender they are done by hand. Either way can work fine, and fortunately, with the technology that we have



Smithsonian Exhibits Benedetto Guitars

-continued-

today we're able to create fingerboards and necks that are so true that when the frets are installed, there is very little filing that needs to be done. And when you do less filing there is a lot less re-crowning that needs to be done. The entire process has been simplified.

**TQR:** Do you have any suggestions for players who want to be introduced to the archtop guitar?



Howard Alden, Bob, Frank Vignola, Jimmy Bruno & Cindy Benedetto

Honestly, I'm somewhat biased on that subject. For the past three years I've been working very closely with the Guild and Fender custom shops as well as both factories. Our mission has been to achieve the highest level of quality on the entire line of archtops, from the most affordable laminated bodies to the top of the line carved tops. Both the Guild and the Benedetto brands are by far the best option for anyone interested in today's arch top guitars. **To**

For more information please see [www.fender.com](http://www.fender.com), [www.guildguitars.com](http://www.guildguitars.com), & [www.benedetto-guitars.com](http://www.benedetto-guitars.com).



## Transformers 101

with Professor **Sam Bisbee**

Hey, you guitar players... don't think for a minute that you should skip the following articles because they are too technical. You've dropped some big money over the years on your guitars and amps, right? Transformers are the very heart of every amplifier, and your output transformer can influence your tone every bit as much as your choice of pickups, tubes, and speakers. Our attention was recently focused on output transformers after one of our all-time favorite 'keeper' amps, a blackface Fender Pro Reverb with an amazing pair of Jensen Vibranto speakers went down with a bad output transformer. (By the way, Pro Reverbs remain some of the best vintage bargain tone machines ever made, and why they have failed to receive the high praise (and prices) reserved for blackface Super and Deluxe Reverb amps is mystifying. Get yours now). César Diaz kindly sent us a new Mojo



Tone replacement OT, and it was immediately apparent to us that although we had always considered the tone of our Pro to be extraordinarily good, things had improved significantly after installing the new OT. The amp had more punch and power with less sag, and that got us wondering if output transformers could slowly decay over time, subtly sapping the full potential of a great amp. We concluded that it can, which led us to consult with a couple of experts on the topic of guitar amplifiers and transformers. We asked Victoria Amplifier founder Mark Baier (aka Sam Bisbee) to comment on his experiences with OT's, along with the premier builder of custom amplifier transformers on the planet, Sergio Hamernik of Mercury Magnetics. Sergio has been blueprinting exceptional vintage examples of the great transformers of the past and supplying discerning guitarists and their technicians with accurate reproductions that succeed in delivering authentic vintage tone. Stay tuned for reviews.

**TQR:** Good Morning Mr. Bisbee. Your mission, should you choose to accept it...

Yikes, I expected the computer to go up in a puff a smoke!

So you want to know the inner secrets of output transformers, eh? Be forewarned – once you make that commitment, you'll be cursing the days when you slept through "Advanced Frightening Mathematics 300..." How's this for a wake up call? The following is the very first paragraph from Chapter V of the venerable RCA Radiotron Designer's Handbook (4th ed.)



### TRANSFORMERS & IRON CORE INDUCTORS

#### (i) Definitions

An ideal transformer is a transformer in which the winding reactances are infinite, and in which winding resistances, core loss, leakage inductances and winding capacitances are all zero. In such a transformer the voltage ratio between any two windings is equal to the turns ratio of the windings under all conditions of loading. Also, in such a transformer the currents in any two windings are inversely proportional to the ratio of turns in the windings under all load conditions...

The entire chapter is 53 pages long!

To keep things from getting out of hand, let's just say that there are many factors influencing output transformer performance. Aside from an obvious fault like a shorted winding, fatigue of the core (the metal laminations) is the most prominent consideration in transformer output and tonality.

-continued-

Fatigue is a natural consequence of normal operation. Suffice it to say that it's a veritable Fourth of July inside the atomic workings of your output transformer every time you bust your best licks through it. The magnetic properties of the metal used in the core, the type of laminate used, the size of the core, and many other factors contribute to the final performance and longevity of the output tranny. Actually, most guitar amplifier transformers are made of rather inexpensive materials (yeah, try telling that to your parts supplier). The real high end stuff ends up in mega bucks hi-fi and industrial applications. In the grand scheme, guitar amps don't rate the kind of respect we tone geeks assign to them.

To understand why a tranny gets fatigued, let's remember what's happening in the OT. You are transforming a high voltage/low current signal into a low voltage/high current signal.



There are lots of electrons jumping around from point 'A' to point 'B'. This creates magnetic relationships and phenomena that act to age (or fatigue) the characteristics of the iron. Over time, the constant forces acting on the core change the ability of the laminate material to perform its duty efficiently. It will saturate quicker, and it reacts differently than when it was new, thereby altering the tone and performance of the amp.

To be sure, this is a slow, incremental change, and one which will take years of use to manifest as a perceivable degradation in tone. In fact, one of the reasons we like old 50's amps is the quicker saturation and compression of an old, fatigued tranny, so don't get too spun out of shape thinking your tone is being sucked away by a tired transformer. It may be your personal ticket to tonal nirvana. Just remember, however, that old amps with old trannys means old everything else, too... yin and yang.

Most of us are looking for the most reactive, intuitive amp that our minds and fingers can handle. In many cases, if the amp is checking out A-OK but it's otherwise sounding a bit soft and saggy, perhaps a popping a new transformer in is just the ticket. Replacing an output transformer is not an inexpensive procedure, but it's a simple one, and one that is easily switched back if the results are less than fruitful. As to the question of swapping out old components like caps and resistors that test and sound good, I advise leaving the old ones in when we are dealing with vintage pieces, the qualifier being that these components should *test* and *sound* good. Unless the '57 Bassman amp in question is going to be used on an extended 300 date tour to sold out sheds, leave it alone. Most vintage amps will let you know that they're giving it up by an audible degradation in tone and performance. Let's face it, a 40 year old capacitor will

most likely fail in the next couple of decades (especially filter caps), so consideration must be given to the intended application of the amp. For most weekend warriors, the original passive components will suite you fine if they test and sound good. One last thought on the use of increasingly expensive NOS tubes in an amp that is old... You will have to determine if you want to jeopardize a \$259 pair Mullard EL34's in a vintage 40 year old amplifier. When a coupling cap decides to fail, it can put the tube in a potentially dangerous operating point, causing it to fail too. I know I'm kinda swinging both ways here, but in this case, the vintage geek wins out (let's not forget the tales of unscrupulous techs carving all the old Astrons out of vintage amps and then turning around and selling them for big bucks – it does happen, folks).

I could go into a more, more, *extra more* technical explanation of what's happening in a OT, but I don't want to lose everybody in a run down of big math with variables like reactance, gilberts, and flux densities that would scare everybody into suicidal seclusion... **To**

I remain,  
Mark Baier, a.k.a. Sam Bisbee

*Victoria Amplifiers*  
[www.victoriaamp.com](http://www.victoriaamp.com)  
630-820-6400 630-369-3527

## Mercury Magnetics

**TQR:** How did you get involved with the entire realm of transformers and guitar amplifiers?

I have always had a passion for music and audio. Guitar tone through an amplifier aroused my curiosity early on because many of the design rules for hi-fi equipment didn't apply to producing great guitar tone. In the case of vacuum tube amplifiers, transformer design has a significant influence on the characteristics of tonality. Unfortunately, there is not a lot of reference material available and many of the original designers have either retired or passed away. In the early 1980's my partner and I purchased Mercury Magnetics, a transformer design and manufacturing company, from one of the early pioneers who founded this company in 1954. Our close proximity to the Los Angeles recording industry gave us access to studio technicians and many well-known musicians. Out of necessity, and to meet the demands of this level of clientele, we had to develop precise, "no compromise" methods of documentation and assembly techniques to rebuild and replicate these transformers to exacting specifications. A past example of this was when a legendary guitarist sought our services to help solve a frustrating problem. A technician had replaced the original output

transformer in his amp with a generic copy, which resulted in completely changing the character of the amp. Several breakthrough albums from the late 1960's and early 1970's were recorded using this particular amplifier, and the sound of that amplifier really had helped define his signature tone. Needless to say, most musicians are very concerned about maintaining the character and unique tonality of their amplifiers. We ended up rebuilding his original output transformer and we provided two additional clones as backup.

**TQR:** Are you referring to all types of guitar amps, or more specifically British amps rather than, say, vintage Fenders?

I think that in all guitar amps, regardless of origin or brand, you can find better sounding specimens. Inconsistency in the same models of amplifiers isn't all that unusual. During the course of rebuilding transformers, we have noticed manufacturing anomalies and variations in impedance, inductance and other values with tolerances ranging up to 50%.

**TQR:** We've heard about variations in components found in vintage amps typically running +/- 20%, but a 50% variance in transformer specs is news to us. That's an alarming stat if you're considering buying an expensive vintage amp based solely on the reputation of that model and year.

There is no cause for alarm. Most vintage amps will perform just fine. Nevertheless, I would not be surprised to find a variant in the transformer of a tonally exceptional specimen amplifier. I'm not implying that all vintage amps have transformers that are slopped together – I have a lot of respect for the people who designed and manufactured transformers in the 50' and 60's. However, they were building high production, affordable transformers with roughly 10% of the budget of today's fabrication cost. They also had a limited choice in materials and they used primitive winding methods. They never imagined that they were building "classics." Today, we are rebuilding and cloning these vintage transformers with meticulous, painstaking detail. Leakage reactance, dielectric constants and many other characteristics are carefully scrutinized.



Imagine disassembling the laminations in a core and numbering each one so we can re-laminate them back in the same sequence.

**TQR:** No thank you! And this all began in the mid 80's?



Yes, around that time, practically by default, we became an insider's source to artists and vintage amp collectors for our rewinding services and our clone spare transformers. We were

also supplying custom transformers to amplifier manufacturers. Our extensive collection of vintage transformer designs really began to take off at that point in time. The ongoing accumulation of the finest sounding examples we could find inspired our line of Axiom® Tone Clone transformers.

**TQR:** What is it about those particular transformers that make them so special, and how do you evaluate them? Do you install them in an amplifier and A/B them, or is it done more or less on paper?

We do have the necessary test equipment and software to check various parameters, but ultimately the ear has to make that decision. We also plug in, play, and conduct A/B testing at our facility. I have a dedicated sound room at home that has been tuned for the purpose of testing and evaluating audio equipment. We are lucky,



because the Los Angeles area offers us an amazing amount of guitar playing talent that continues to help us maintain a level of objectivity. Also, some of our best listeners are avid tone enthusiasts who work in and for the local studios. These people understand good tone and give us their experienced opinions.

**TQR:** And can you describe what it is that makes these transformers special? What would we hear, specifically?

Having a detailed transformer spec is only the beginning. Breaking down into fine details what materials and assembly techniques were used decades ago helps us assure our customers an accurate reproduction of vintage tone. We have carefully selected the best of new and old technology to put performance and quality ahead of economy. Our transformers are hand wound and the cores are hand stacked. Some materials we fabricate in house, and others, like our steel laminations, are custom ordered. Because we build them one at a time, Axiom® Tone Clones are only available in limited quantities. Consequently, there is an audible difference

between a budget transformer and an Axiom® Tone Clone.

**TQR:** Can you describe the audible differences?

A good output transformer should go beyond its job of impedance matching, and an amplifier's overall personality depends on it. A desirable output transformer's distortion has more detail. The harmonics seem even and smooth. Played clean, the transformer should sound natural without harshness, obviously within the boundaries of the authentic tone characteristic the player is seeking. Better said, we still can't make an apple into an orange.



**TQR:** What are some of the comments that you hear from players when they hear the Axion transformers that you build? Is it a matter of touch dynamics, harmonics, all of that?

Yes, and let's not forget musicians' colorful tone speak, such as... The amplifier sounds more open, glassy, sweet, brown, fat, with more notes perceived. Barred chords are not muddy or squashed. Chimes and bell tones are much more apparent. Good note separation, sustain improved, more definition, etc...

**TQR:** And these things can all be affected by the output transformer in some considerable detail...

It is pretty much the last tone filter in a series of components. Other factors like tube quality and speakers can play an important roll as well. Also, if you were to look at an amplifier circuit as a modulated power supply, then the quality of a power transformer and choke, if a choke is used in the circuit, also affects tonality. The ghost note phenomenon would be an example.

**TQR:** Like a few amplifier builders we know, you have taken the direct route of precisely replicating the materials and tolerances that comprised the industry standard decades ago...

I remember having a conversation with Leo Fender a number of years ago and getting a chuckle out of him as he told me how amazed he was that so much scrutiny was being given to how things were done in the early days of Fender. He said that they had taken what they were doing in the 50's and 60's so matter of fact back then. They were hardly thinking at the time that they were building future classics. They were trying

to make an affordable, good sounding, quality amplifier while still trying to make a buck. Leo also mentioned that for reasons of cash flow and/or inventory problems, they would resort to using alternate vendors from time to time. They kept a careful eye on cost of materials, and their supply, rather than hand picking components with alleged magical tonal qualities.

**TQR:** They weren't matching tubes, either. All of this can and does get out of hand, but when your rig sounds so good that you can get lost in the magic of it, as a player, wonderful doors can be opened.

Years of research led us to the conclusion that not every aspect of a vintage transformer needed to be copied. There were problems and limitations in their day, so why repeat them? We achieved better results by combining old and new technologies. Making the math work for the best tone characteristics together with improved consistency and longevity is the formula we chose to follow. There are a lot of vintage amps today with transformers that are going bad simply because they have aged. The tonal quality of the amp is deteriorating along with the transformer. Paper and certain types of varnishes used in these transformers tend to have hygroscopic properties. Moisture is absorbed over time, affecting the insulation system and increasing the chance for high voltage breakdowns. To make matters worse, the primary winding voltage is high enough to produce a corona effect whose ions help oxidize this insulation. Over time, reliability and tonality will suffer. Do you believe in transformer cancer?

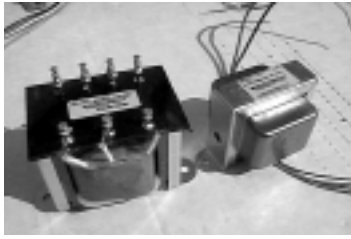


**TQR:** That leads us to an interesting situation in which the original output transformer in our 60's Pro Reverb died, and we noticed how much better the amp sounded

when we had installed a new transformer, which was a commonly available unit sold by MojoTone. Now, the amp sounded great before the old transformer went out, but it sounded significantly better with the new transformer. I asked our tech and advisory board member Jeff Bakos if it was possible for an output transformer to gradually decay over time, dying a slow death while you continue to lose 'tone' in a very subtle fashion over years of use. Is that possible? It seems as if that was the case with our amp, which we had always considered to have a rather legendary vibe.

Not only is it possible, it is *probable*. Keep in mind that if high voltage insulation breakdown has started, there is no

-continued-



reversing it. Assuming that the transformers insulation system is intact, we have in the past reversed some tonal degradation in original transformers under controlled labora-

tory conditions. I've proven that point with my more cynical, high-end customers. One example of this is an amp (a Marshall JTM 45 or a Plexi – I forget which) that had been used in England for years and then brought over to the United States. The owner felt that the tone had decayed over time, seeming darker, lifeless, and the higher frequencies were less pronounced. We asked him to remove the transformer and all we did when he brought it in was to re-bake it in an oven to drive out the moisture. We then vacuum impregnated the transformer with our proprietary resin to hermetically seal it before the final bake. He put the transformer back into the amp and the results were pretty amazing... it became a lot brighter and more detailed from the upper midrange to the upper frequencies. I'm not recommending that anyone start baking their old transformers, however...

**TQR:** No, but it seems to be a fair statement to say that it's possible that your good sounding old amp might sound significantly better with a new output transformer. At least that was our experience, and in hindsight, we didn't realize what we had been missing.

That's true. The tonal degradation I'm speaking about is very slow and gradual. Your results would be even better if you had used an Axiom® transformer. Any of our transformers should outlast older vintage transformers because each are put through the same process during production.

**TQR:** Doesn't it become particularly more problematic with amps like AC30's and Hiwatt's, where repro transformers have typically been poor compromises at best?

I believe that Marshall, Vox and Fender, to name a few, are doing an outstanding job of building affordable vintage reissue amplifiers. When an owner of one of these fine amps wants to take his/her tone to the next level, they will usually consult someone like a Don Butler (Toneman) for example. Don is an expert in the field of amplifier upgrades and the art of tonal improvement. Don is also one of the key figures in this mini industry, which is similar to the aftermarket for automobiles and motorcycles. Much like an engine tuner, Don will replace transformers and other components in the signal path to give the customer an upgraded, outstanding sounding amp that comes much closer to capturing the origi-

nal tone they were seeking.

**TQR:** Your web site seems to be very comprehensive, but can you be contacted over the telephone for customers that either don't see their amp listed or perhaps have additional questions?

Yes! Paul Patronete, an accomplished guitarist who has a good ear for vintage tone and heads our Axiom® division, is



happy to help those customers when I am unavailable. Our website is constantly being updated with vintage and modern transformer versions. We will probably always be two or three pages short of hav-

ing all of the various models listed that people may be interested in. Of course, we can't possibly list every one-off we've done. Another cool thing we offer are modern, updated versions of many of the classic transformers. We have added output impedance taps for many of the classic Fender transformers, which were never originally offered. For any make of amplifier, we offer various mounting styles from the original. We can, in addition, alter tonal characteristics to fit the unique needs of each customer.

**TQR:** Are you building transformers for many small builders?

Yes. If you own a high end, small production amplifier, there is a chance you will find a Mercury Magnetics label on the transformers. Some exceptions are when certain amplifier manufacturers remove labels in an effort to keep us and other vendors a secret. We do maintain a confidentiality agreement with all of our customers if this is their desire.

**TQR:** Schumacher was a primary supplier to Fender during the tweed era, and they are still operating, although we understand that you generally have to be capable of placing a fairly large order to get geared up. That seems to be a significant barrier to many would-be amp builders.

That company is doing a good job of supplying inexpensive transformers to a high volume market. When a lot of emphasis is placed on meeting price points, something has to give. The cost of labor and materials are logically their first consideration. The end result is a compromise, and who could blame them? Ultimately, end users will determine if the resulting tone is adequate. Someone who has paid several thousand dollars of their hard earned money for a "high end" amp is expecting to have something that excites their senses

-continued-

## Who's Playing What?

along with a build quality that justifies their investment. This is where we can assist the amp builder. It goes beyond Mercury Magnetics "sending in the clones." We have made every effort to break those barriers by eliminating minimum buy requirements. We work closely with today's designers and builders to provide them with a thoughtful, next-level approach to their signature tonal requirements. **To**



*Mercury Magnetics, Inc.*  
9167 Independence Ave., Chatsworth, CA. 91311  
818-998-7791 [www.mercurymagnetics.com](http://www.mercurymagnetics.com)

## Who's Playing What?

*Buddy Guy* is playing his Stratocaster through a couple of Fender Cyber Twins with his own variant of a '59 Bassman sound programmed into the Cyber Twin by his guitar tech, Mark Messner.



*BB* is still faithful to Lucille, and he's been using Gibson's old Lab Series amps for years. Why change now?

*John Hiatt* loves his Gibson acoustics, and a big Fishman-equipped J200 seems to be his main squeeze.



*Steve Kimock* plays everything. Stay tuned for an upcoming interview on his mind-blowing guitar tone. And don't buy another amp until you've read our take on Two Rock amps.



*Monte Montgomery* has a custom made Parker 'relic.' Pleez burn us one, Ken!

*Buddy Whittington* is playing through a custom built Dr. Z MAZ Senior amp and a new Strat built by Jay Lentz.



*John Mayall* is playing a custom Fender-lookin' little geetar. You should have seen the case – a cut-down original tweed from the 50's.

## Thank You & Best Wishes for 2002

We'd like to thank all of our subscribers, advisory board members, and friends for your invaluable support of The ToneQuest Report, and with our sincere thanks and appreciation let us add our very best wishes for the coming year. Without you, this publication and all of the joy and friendships it has created would not exist. And for the year ahead, we leave you with the following thought. Thanks to Mark Karan for having been thoughtful enough to share it. **To**

*Work like you don't need the money...  
Dance like no one's watching...  
Sing like nobody's listening...  
and Love like you've never been hurt...*

coming in  
**Future Issues**

**INTERVIEWS:** *Aerosmith's Jim Survis*  
*Monte Montgomery*  
*Terry Dobbs - Mr. Valco!*  
*Steve Kimock*  
*Ronnie Earl*

**FEATURE ARTICLES:** *ToneKing Comet Amps*  
*Jo-Mama*  
*The Blackstone Overdrive*

**AMPLIFIERS:** *Mesa Boogie Maverick*  
*Two Rock*  
*'53 Gibson GA20*  
*Sound City 50R*

**PICKUPS:** *Joe Bardens - Are You*  
*Ready To Go Noiseless?*  
*Duncan - Seth Lovers*  
*Fishman Powerbridge*  
*Tom Holmes Revisited*

**GUITARS:** *Tal Farlow Historic RI*  
*TQR's 2002 Acoustic Picks*  
*Gibson ES150*

the  
**ToneQuest**  
Report™

**Editor/Publisher** David Wilson  
**Associate Publisher** Liz Medley  
**Graphic Design** Rick Johnson

**EDITORIAL BOARD**

**Tom Anderson**  
Tom Anderson GuitarWorks

**Mark Baier**  
Victoria Amplifiers

**Jeff Bakos**  
Bakos AmpWorks

**Joe Barden**  
Joe Barden Pickups

**Dick Boak**  
CF Martin & Co.

**Dave Boze**  
Best Amp Repair

**Don Butler**  
The Toneman

**Steve Carr**  
Carr Amplifiers

**Mitch Colby**  
KORG/Marshall/VOX USA

**Ben Cole**  
GHS Strings

**César Díaz**  
Diaz Amplification

**Elliott Easton**

**Buzz Feiten**

**Bill Finnegan**  
Klon Centaur

**Ritchie Fliegler**  
Fender Musical Instruments Corp.

**Lindy Fralin**  
Lindy Fralin Pickups

**Audley Freed**  
The Black Crowes

**Joe Glaser**  
Glaser Instruments

**Johnny Hiland**

**Gregg Hopkins**  
Vintage Amp Restoration

**Phil Jones**  
Gruhn Guitars

**Chris Kinman**  
Kinman AVo Pickups

**Mark Karan**  
Bob Weir & Ratdog

**Mike Kropotkin**  
KCA NOS Tubes

**Winn Krozak**  
Paul Reed Smith Guitars

**Sonny Landreth**

**Albert Lee**

**Andy Marshall**  
THD Electronics

**René Martinez**  
The Guitar Whiz

**Greg Martin**  
The Kentucky Headhunters

**Terry McInturff**  
Terry McInturff Guitars

**James Pennebaker**  
Nashville, TN

**Scott Petersen**  
Harmonic Design Pickups

**Dave Pomeroy**  
Nashville, TN.

**Paul Rivera**  
Rivera Amplifiers

**Roger Sadowsky**  
Sadowsky Guitars Ltd.

**Chris Salamone**  
Salamone's Recording Studio

**Tommy Shannon**  
Double Trouble

**Todd Sharp**  
Nashville Amp Service

**Tim Shaw**  
Fender Musical Instruments Corp.

**John Sprung**  
American Guitar Center

**Peter Stroud**  
The Sheryl Crow Band

**Randy Volin**  
Rockindaddy's Guitars

**Donnie Wade**  
Jackson Guitars

**Steve Wilson**  
The Kentucky Headhunters

**Laurence Wexer**  
Laurence Wexer Limited  
Fine Fretted Instruments

**Lord Valve**  
NBS Electronics

**Buddy Whittington**  
John Mayall & The Bluesbreakers

**Ted Weber**  
Weber Vintage Sound Technology

**Don Young**  
National Reso-phonc Guitars

The ToneQuest Report™ (ISSN 1525-3392) is published monthly by Mountainview Publishing LLC, 235 Mountainview Street, Suite 23, Decatur, GA. 30030-2027, 1-877-MAX-TONE, email: tonequest1@aol.com. Periodicals Postage Paid at Decatur, GA and At Additional Mailing Offices. Postmaster: Send address changes to: The ToneQuest Report, PO Box 717, Decatur, GA. 30031-0717. The annual subscription fee for The ToneQuest Report™ is \$98 per year for 12 monthly issues. International subscribers please add US \$20. Please remit payment in U.S. funds only. Visa, MasterCard and American Express accepted. The ToneQuest Report™ accepts no advertising and is published solely for the benefit of its subscribers. Copyright© 2002 by Mountainview Publishing LLC. All rights reserved. No part of this newsletter may be reproduced in any form or incorporated into any information retrieval system without the written permission of the copyright holder. Please forward all subscription requests, comments, questions and other inquiries to the above address or contact the publisher at tonequest1@aol.com. Opinions expressed in The ToneQuest Report are not necessarily those of this publication. Mention of specific products, services or technical advice does not constitute an endorsement. Readers are advised to exercise extreme caution in handling electronic devices and musical instruments.