



# VEE LINE

NUMBER 82

JULY, 1971

## WHAT'S GOING TO HAPPEN AT ATLANTA?

It's impossible to predict what will happen after the Vee race at the ARRC this November, but it will certainly be interesting! Which is a roundabout way of saying that there will be no clarification of the rules between now and then.

The Competition Board met on schedule, and duly considered the problem, and agreed that there was one, but decided to pass the buck to the Car Classification Committee. Seems the Board of Governors is adamant in opposing rule changes in the middle of the year, so there was no point in spending much time on the subject at this point anyhow, and it is the Car Classification Committee which is supposed to originate proposals for rule changes in the first place. Its next meeting will be in October (the one at which we present our annual ballot) but the Competition Board will have to consider its recommendations (at its November meeting) and pass them on to the Board of Governors (which meets in December) for final approval. Then they will be revised for better wording, and sent to the printer for inclusion in the GCR for next year, and you should find out along about February what the 1972 rules will be, which should give you ample time to prepare your car for the new season!

But back to the C.B. meeting. There was some feeling (as usual) that "the rules are perfectly plain the way they are", which is probably true. In the telephone conversation in which all this information was gathered, I had to admit that we certainly do have rules, and that now, thanks to Frank Schultheis, we have the means for detecting infractions, so they certainly are enforceable, but I then posed the question, "What's going to happen at Atlanta? Are you going to enforce the rules? Are you going to disqualify illegal cars — or just fine them \$100 again?"

The obvious immediate answer, of course, was that such decisions would be left to the Stewards of the Meet. And the obvious answer to that, of course, was, "Well, could we contact the Stewards and find out in advance, what their policy will be?" And obviously, again, that's really a silly question — how could they possibly answer it? So we left things rather up in the air, with agreement at least on the point that it was certainly going to be an interesting event!

Then, a couple of days later, (after the above was written) Bob Sharp, Chairman of the Car Classification Committee called, and we ran through the subject again. Seems there had been a few other phone conversa-

tions in the meantime, and "What's going to happen at Atlanta?" was beginning to take on the aspects of a serious problem.

Evidently even some of the Governors had been in on the discussion, because it seems now that it is possible to make rule changes (definitions, interpretations, or whatever) in the middle of the season, after all. SO—as things stand now, probably the Car Classification Committee will hold a special "meeting", via a conference telephone hookup, and make their recommendations, which will somehow be shuffled through the rest of the mill in quicker-than-usual fashion, so that before the ARRC we will all know just where we stand.

Thanks to all twelve of you who sent letters to the Competition Board! The rest of you, at least those of you with good intentions who just didn't get around to it in time, can still get in the act! This time, send your letters to:

Robert Sharp, Chairman  
Car Classification Committee  
11 Bryant Brooks Road  
Wilton, Conn. 06897

As for those of you who *don't* take the trouble, all I can say is, no matter what happens, just smile and try to look as though that's the way you wanted it all along!

## HOW ABOUT YOU?

We don't make much of a fuss about membership drives in this organization, nor do we make much of an attempt from here, either, to entice new members. Yet they keep coming! Many of them mention that one of you recommended FVI membership, or that they were told that they "couldn't race without a stack of VeeLines", so apparently it's mainly the members who are getting more members.

One of our members is certainly doing his bit—at least once a month we get an application with "JOIN!" written across it with a marker pen. I don't know whether he hands them out at races or mails them to prospects, but Burt Richmond (Chicago) really gets results!

We keep an ample supply of application blanks on hand at all times, so if any of the rest of you want a handful . . .

## The VEE LINE of FORMULA VEE INTERNATIONAL

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## ON SECOND THOUGHT

At the Kent (SIR) Nationals last weekend I met Neal Williams (the guy who started all this hassle about modification and stuff by protesting a disqualification for washers under his rocker arm shaft supports). A truly remarkable feller, who impressed me particularly because he verified some of my heretical theories. However, he disagreed with my contention that "blueprinting" leads to more uniform engines than we would have if we were restrained to strictly stock components.

He's uniquely qualified to make such a statement—besides having no axe to grind (nothing to sell) he has probably done more pure research on VW engines than any of the professional engine builders.

Those of you who were active in GoKart racing, way back there, no doubt recall the "Go Power" pyramid reed valves and mag wheels and other goodies—well, Neal started that business while he was a sophomore in college. Remember the little "Go Power" dyno for Kart engines? That started him in the dynamometer business, which he and a partner built up into the largest dyno firm in the world at the time they sold it. One of their products was a complete kit for schools, including flow testing equipment, complete dyno set-up, and a small gasoline (or optional diesel) engine.

The flow-testing bit has now become almost another career, although he considers it more as a hobby, since he hasn't commercialized it—yet. Along with many other types of heads, manifolds, etc., he estimates that he has tested at least a thousand VW heads and a good many VW manifolds, including those of all the major builders. Facts and figures were coming so fast that I didn't retain many of them, but he compared probably eight or ten of the best-known jobs, some of which were very good, some fair, and one was even less effective than stock!

But back to the subject! He contends (and who can argue with him?) that stock heads are *not* all that different—that the variations between one head and another, of any series, are very slight, especially in comparison with the variations which are obtained by modifying them. There are definite variations between the different series, he said, but combustion chamber volumes and shapes, port resistances, etc., are very similar in similar heads. He feels that even by picking the best out of any lot of heads, less advantage could be gained than by a good flow-testing job as compared with a fair—or poor—one. To sum up, he feels that we would have a

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## ON SECOND THOUGHT

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much more equal class if we were using strictly stock components than we will ever have with modified ones, no matter how efficiently the modification is controlled.

His arguments were certainly convincing — or nearly convincing, anyhow — near enough to compel me to go over the entire subject with myself again. On the other side we have the fact that the rules as they are now (and have been all along) were *supposed* to be requiring stock components. The port diameters and head volumes specified are supposedly the blueprint dimensions for the most favorable *stock* head which might be found. If we stay with that, we're right where we are now. We could specify that no modification could be made to achieve those dimensions, but all that would accomplish would be to compel those who could afford it to go to a good deal more effort in order to disguise their work. If we eliminate the dimensions altogether and simply require "stock components", again it would allow those with time and money to use components even *better* than the best stock ones, as long as the modification couldn't be proved. (And with time and money you could get VW parts made to order right here in the U.S. of A.) Looking at it idealistically, it certainly would be better for everyone if everyone had to use strictly stock components. However I can only conclude that from a realistic standpoint this is unattainable. I believe we will actually have better control, and less cheating, if we establish limits (even more comprehensive than those we have now) and allow everyone to go that far — and no farther!

Probably this makes Formula Vee another class in which you have to buy the championship. (No! I mean like professionally built engines—not fines at Atlanta!) However, the price is pretty well stabilized, and the engines you can buy are pretty much equal, no matter who does them, and for those who can't afford it, the do-it-yourself route *can* get a car a few National points, at least. This gets Formula Vee away from the original concept, which was to the effect that you could take the essentials out of a wrecked Bug and go racing. However, we have drifted away from that concept, for some time, and actually are not discussing any change in Formula Vee, as it is now, but acknowledgement of its present status, and steps to prevent further drifting.

There is no doubt that many who started in Formula Vee, and many more who might have, have decided that even this simple class is too sophisticated. On the other hand, it has been some time now since anyone has dropped out because it is a class in which "you can't do anything". (Eighty VeeLines, for instance, nearly all of which contain "something to do", and we're still learning!)

This shouldn't be considered an argument intended to influence you—rather it's somewhat of an attempt to rationalize my own

## THE SEX LIFE OF VALVES

That title caught your eye, didn't it? It may be a little misleading, but on the other hand, valves do mate with their seats, don't they? Which is what this is all about.

You know how fast a bench grinder turns — about 3600 rpm. Do you really believe that your Vee engine can turn up to half again as fast, popping those little pistons back and forth every revolution, hour after hour? Neither do I! (We won't even consider real racing engines!) Do you believe that even at half the crankshaft speed the distributor cranks out 180 sparks per *second*? Or that the valves open 45 times per *second*? (That's what this is all about, actually.) And since they're closed most of the time, the actual opening and closing takes place in something like 1/150 of a second. And the part of that cycle which we're going to discuss must happen in less than 1/1000 of a second!

Let's consider what all happens during that final milisecond while a valve mates with its seat. (Talk about rabbits!) Volkswagen valve stems are normally what might be considered a rather sloppy fit in their guides. Measured at the head, side movement of 0.008" is acceptable for a new intake valve, and the wear limit for exhausts is 0.031". OK, so the valve spring is plenty strong enough to pull the valve head into the center of the seat, even if it is a bit off center when it first makes contact. Right? Well, obviously it does, at moderate speeds, anyhow. But what happens when the engine gets up into those high rpms?

Even though numerous changes have been made in the valve train geometry, no rocker arm can push a valve stem straight down. The adjusting screw moves in an arc, centered at the rocker arm shaft, so that at best it can push straight down at only one point. During the rest of its movement it is sliding across the top of the stem and pushing it against the side of the guide so that the head simply has to make its first contact with the seat on one side, sliding at an angle toward the center before it makes contact all around. There is some suspicion that it may even bounce across to the other side before finally coming to rest. This isn't a description of valve "float", which applies to valves which just can't close as fast as the camshaft would allow them to, thereby delaying the closing point appreciably—this is just the normal action which has to take place at permissible engine speeds. This additional movement doesn't take very long, if you were timing it with a stop watch, but it doesn't *have* very long to do it in, before starting the next cycle. And a lot of other stuff is happening along about then, too.

The main occurrence, of course, in the case of the intake valve, is the explosion which takes place in the cylinder just a few degrees after it is *supposed* to be fully closed.

thinking. If you can suggest a better solution, PLEASE do! Tell it to Bob Sharp, and send us a copy.

This is strictly conjecture, but the deposits of soot, lead, and other crud on the underside of the intake valve head might just be the result of such leakage. If the exhaust valve isn't entirely closed when the explosion takes place, it should be—after all it has over 1/100 of a second in which to get ready! Even so, every time that head hits the side of the seat and slides down to the center some wear is caused.

Just how serious is this situation? Well, obviously a good many million engines have run a good many million miles without it being recognized as a problem, so it probably isn't serious at all. On the other hand, any thing you can do to improve it can only be beneficial, in terms of better reliability, if not more power.

The next time you do a valve job, and are considering going all the way with new guides, as well as new exhaust valves, save yourself ten or twelve bucks and get the guides "knurled", instead. Well, actually, if you get it done it will cost nearly as much as new guides, but if you can borrow the knurling tool for a week-end it's much cheaper. If you do get it done, you can still save some by telling the man you *don't* want the guides reamed. If he says he doesn't have tools for VW guides, tell him a standard 5/16" knurling tool will be just dandy.

Knurling isn't exactly knurling any more — technically, that's that diamond-shaped pattern which is rolled into the handle of your ratchet wrench. That's what guide knurling started out to be, but it has evolved into a simple process of tapping the guides with a special tap which doesn't *cut* threads — it displaces the metal from the outer part of the thread to the smaller inner diameter, so that the effect is to make the guide smaller. (There's also a type of knurl which has several small thin rollers, expanded against the side of the guide by a tapered pin, which forms a series of grooves with high spots between them, rather than a spiral thread. Don't borrow one of those—they break very easily, and the cost of even one of the tiny rollers would pay for getting the job done!)

Normally, in cast-iron heads, the guide is reamed after knurling, in order to provide clearance for the valve stems (exhaust, especially) which get hotter and expand more than the material of the head. However, here again the Volkswagen engine is different. The brass guides and aluminum head don't get as hot as the valve stems, of course, but their rate of expansion is twice as great as that of the stem, so that little, if any, initial clearance is required.

OK, so you knurled your guides (or had it done) and you're ready to get on with the valve job. Well, right off, the pilot for the valve reseating grinder won't go into the guide—it's too small! So take one of your old valves and drive it through the guide with a hammer! Feel the end of the stem first, where the split keepers fit, and you may find that the stem is burred at this point so

## MEMBERS' SOAPBOX

"Dear Don—Has anyone indexed the information in the previous VeeLines, such as "CC-ing the Heads, VL#43", "Piston Identification, VL#51", etc? I intend to build a Vee engine this fall, and figure to save 100 hours if someone else has done the book work.

I have a Formcar in the state of rebuild, but the weight is way past competitiveness, so I will have to make up the difference.

Question two: Is it true that removal of the locking screw on the lower torsion bar will achieve the same results as removing the torsion bar altogether?

Edward Riggs, Levittown, N.Y."

that it is larger than the normal diameter. If it is very slight, that's fine! Those grooves will act as a broach, cutting the hole just slightly oversize. If not, no matter—drive it through anyhow, and then drive it out and in again several more times, until you can't tell that you're getting it any looser. It will still be too tight to use, but not much! Now stick the stem of the valve you're going to use in a drill press (or a hand drill held in a vise) and use emery cloth on the stem to reduce its diameter by a millionth of an inch or so. Don't worry about the grooved end in the chuck — you can drive it through again — but keep trying the valve in the guide until you get the rest of the diameter down to where you can easily push the valve back and forth with your finger tips. Now it has to center in its seat at first contact because there's no way it can do anything else.

Keep the valves sorted out so that you can put each one in the hole it was fitted to when you get ready to assemble them, because they do vary somewhat.

You may run into a slight problem when you try to insert the pilot for the reseater—if it's 8mm, it won't go in the guide! However a 5/16" pilot, which is about 0.004" smaller, works just dandy. And another thing—some pilots have just a slight taper, so that they fit tightly in the guide when they are pushed into it, but only at the large end of the taper. A better type has the taper, but also has an expanding screw at the end. It is inserted until it fits tightly at the top, and then the expanding screw centers it at the other end, too. The first type can be off center slightly at the smaller end, which would cause your valve seat to be off center in relation to the guide to the same extent. Among other things, even a standard valve grind could be considered technically illegal at this time, and some of the non-standard treatments which are commonly being used in professionally "flow-tested" heads should be. For the time being, then, this is as far as we go. If you don't want to let your heads just set there and rust until this rule bit is straightened out, let your conscience be your guide.

*Yes, there is an index for the VeeLines—up to issue #66, at least. Frank Schafer, who compiled it, was somewhat disappointed by the lack of enthusiastic response, so I don't know whether or not he has kept it up to date. You can find out by writing him at 5 Melrose St., Boston, Mass. 02116. Enclose \$3.50 if you're in a hurry. If it has been updated, it will include some items pertinent to your weight problem.*

*No, removing the lock screw won't accomplish anything at all. In fact, with no other modification it would get you in trouble. There is a solid block, with a square hole in it, anchored in the center of the tube. This is what keeps the torsion bar from turning. The setscrew only anchors it endways. Without it the bar would move longitudinally in a hard turn, putting a lot of strain and stress on the link pins and the rest of the suspension. Note that when you replace it with a sway-bar you also replace the rubber seals with machined washers (preferably brass) to take care of the end thrust. If they're legalized, that is. You'll find some directions for making a sway bar in the #5 VeeLine (according to the sample index Frank sent me) and one of these times, when there's room, we'll discuss negative front camber, which is closely related.*

"Dear Don—You've gone stark, raving bonkers! Mount the carburetor behind the engine, indeed! Having just completed converting my Zink to 1971 "cold air box" configuration, I will state unequivocally that (1) it's a heck of a lot of work, done properly, and (2) it involved no small expense! This modification of yours would entail a complete redesign of all ducting components, throttle linkage, engine cover, etc.

As for that \*!#1/2& about fire protection, properly prepared race cars do not have sticking floats or "fuel line gone adrift" maladies . . . In all honesty, I don't begrudge a penny invested in safety gear, but the benefits to be derived from this are so miniscule that they fade to insignificance. If you're looking for a cause, how 'bout those tanks which we sit over, under, beside, or between? Fight for fuel cells! . . .

Ralph Tremaine, Kirkwood, Mo."

*Shh, Ralph! Don't let the likes of Hall and Brabham and Grable and Chapman hear those remarks about properly prepared race cars—you might hurt their feelings! As long as race cars are prepared by people, there will be such occurrences. Primarily, though, the thought was in connection with cars upside down, and I can give you a couple of references if you like—people who've wondered if the rescue crew would get them out before the gas dripping down their necks caught fire. I agree that it would entail some work, and some expense, no doubt—probably as much on Petunia as on any other car. How about just making it legal, so anyone who wants to can do it?*

"Dear Don—In one of the earlier issues you offered to give details on the trailer you built for Petunia. Apparently you had no takers, since I've heard no further mention of it. I would appreciate some words on your trailer, and on trailers in general. Some comment on sprung vs. unsprung types, and comments on some of the boat trailers converted for Vee use that we see occasionally.

Monroe H. Rackow, Brooklyn, N.Y."

*OK, again, if ten of you even, want details on Petunia's trailer, I'll sketch it out and give you a few basic dimensions, at least. We figure we haul it around 5000 miles a year (for eight years now) and except for the fact that it shakes the filaments out of the light bulbs fairly frequently the only repairs have been to put some wear plates under the V-shaped tongue where it drags on the side-walks at service stations when hauled behind John's overloaded station wagon. It was built light (265 certified pounds, for licensing) because most of its miles have been behind an MGA.*

*This is just opinion, but especially where weight is a factor, I believe an unsprung trailer has to be OK. One trick, when using one, is to keep tire pressures to a minimum in order to avoid bouncing. We use standard Vee wheels, with standard VW tires—tubeless 5.60x15—and 16 lb. of air, cold. They warm up considerably in hot weather, naturally, but don't get any hotter than those on the station wagon. The trailer has been off the ground many times when hitting really large holes or rough railroad crossings, but it takes normal bumps and crossings very smoothly.*

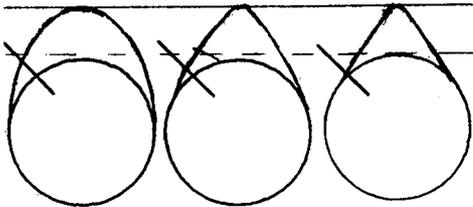
*Sprung trailers seem to have a tendency to sway, especially if they are built on old solid beam front automobile axles, or if they have leaf springs with a pronounced curve, which leads to moving the axle backward and forward as it moves up and down (bump-steer). A little initial camber in an axle (which straightens up, under load) is fine, but there should be no toe-in or out. If you're building one, try rotating the axle, with the wheels in place, before you install it. If the wheels wobble, check to see whether it is due to built-in camber, or to built-in carelessness. If you're using springs, use good shocks, too. They're just as important as they are on your car, or maybe more so.*

*If you load your trailer so it is exactly balanced, it will be nice to push around by hand, but you'll feel every bump it goes over in the car. On the other hand, putting a lot of weight on the tongue only strains the hitch, bumper, springs, and tires on your tow car. Around 75 pounds on the hitch, and unless the trailer has a built-in sway, you'll hardly know it's there.*

**CAMS AGAIN**

In the course of the phone conversation with Bob Sharp I was asked my opinion on the practice of shimmying under the rocker arm shaft. I replied that I don't care *how* it's attained—if the valve *action* (lift, overlap and duration) is within the limits of Frank Schultheis' checking procedure, it doesn't matter whether the engine has shims, short pushrods, modified rocker shaft pedestals, long studs, or whatever. I suggested that while his checking (like a lot of other things in FV) is still subject to improvement, it's far enough along now to be adopted as "official". Whether they call it "Schultheis procedure" or "SCCA procedure" or "Formula Vee procedure", the specs now available should be officially recognized as the Formula Vee standard throughout the country. (I hope you all agree.)

There's some misconception, even among some of those who would know better if they just thought for a moment, that cams can be checked by just measuring the base circle (the width) and the major diameter (base circle to top of the lobe). Subtract the first from the second, and you have the amount of lift. This is true, and would provide a rough check in an emergency, but it doesn't go far enough. Look what you can do within those limits:



All three cams have the same basic dimensions, and would give the same maximum lift, but look at the difference in duration (start to finish of the lift) and the amount of lift at 45 degrees of rotation. Which one

**UNCLASSIFIED ADS**

**FOR SALE:** Zink, with all '71 factory modifications. Excellent condition. With 2 sets Goodyears and truck load of spares, \$2795. Chuck Haines, 5846 Glen Hill Dr., Bethel Park, Pa. 15102 (412) 833-1584.

**FOR SALE:** Autodynamics MK III. '71 roll-bar, custom trailer. \$1700. Dave Gordon, 3760 Bel Pre Rd., Silver Springs, Md. 20906 (301) 871-1105.

**FOR SALE:** Vee engine. Fresh rebuild—new bearings, Grant rings, "B" cam, light flywheel, balanced rods and pistons. Ready to install, \$300 F.O.B. M. Dickson, 794 N. Main, Apt. 7, Akron, Ohio 44310 (216) 376-2756.

**FOR SALE:** '70 Reichmark Vee. Sportelli manifold, extra nose, trailer and driver's suit. Fred Ray, 6701 NE 19th, Tacoma, Wash. 75478.

would you rather have? These are extremes, of course—the right hand one would bust up lifters like mad, and the left one would have its valve partly open for a full turn of the crank, but it shows the possibilities. (Guess who didn't make it in mechanical drawing!)

The only way a stock cam can be improved by regrinding only, is to reduce the size of the base circle, which makes the rest of the cam larger, in proportion, so that some of the excess meat can be ground away there, too, but some can be left. In effect, it gives an opportunity for a better shape, but the overall cam will be smaller, and simple to detect, of course. The smart guys build up the ramp portion with weld metal and then regrind. The shape can be obviously different, but if only the two basic dimensions are checked, it would have to be called legal. (Incidentally, Canadians, someone in the Toronto area is doing this!)

**FOR SALE:** Completely rebuilt Chinook, fits 63" 210# driver. Balanced, ported, 4 adjustable Armstrongs, 2 races on Goodyear Blue Streaks. With trailer, \$1250 or offer. Will trade for Econoline-type van, or sell parts. Marcis Esmits, 1145 Logan Ave., Apt. 1103, Toronto 355, Ontario.

**FOR SALE,** Bobsy Vanguard, modified frame, suspension and body. Konis, Goodyears, tall 3rd. \$1200 with trailer and spares, or will sell seperately. Bill Deras, 2600 Ivy Drive, (#9) Oakland, Cal. 94606 (415) 893-0944 (home) 271-2633 (office).

**FOR SALE:** Zink with legal "Boyd" engine, Goodyear dries and Firestone wets. Professionally maintained. Bob Boyd, Check Point Motors, 1661 NE Forsythe Rd., Oregon City, Ore. (503) 655-2321.

**FOR SALE:** Bobsy, like new — never crashed. One hour on rebuilt engine, rebuilt transaxle, hyd. clutch, Goodyear R-2's on new wheels, with spares. Many other spares, incl transaxle, starter, generator, racing oil, matching Bell helmet. New paint. Custom sprung trailer with ramps, 13" wheels. Reasonable offers considered. Steve O'Bryan, 48 Utica St., Hamilton, N.Y. 13346.

**FOR SALE:** '68 Viper (looks like Crusader). Good condition, with trailer, \$950. Dan Harman, 13423 3rd Ave. S., Seattle, Wash. 98168 (206) 248-1842.

**FOR SALE:** Huron Vee, ready to race, \$900. John Cramm, 1866 Main St., W., Apt. 1012, Hamilton, Ontario 527-5279.

**FOR SALE:** '69 Zink, 2 races on new engine. Built for 64" driver. With trailer, \$1500. Brown Racing, 3659 Acacia, Memphis, Tenn. 38116 (901) 332-2078.

**FOR SALE:** '68 Venus. Never raced, needs linkage. Todd Sorlie, 1225 Rose Vista Court (#7), St. Paul, Minn. 55113 (612) 646-5892.



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