VEE LINE

NUMBER 96 SEPTEMBER 1972

DIRECTOR'S CORNER

I sincerely hope that the 362 of you who voted "NO" on the rules proposal (about 350 of you who did it simply by not voting at all) really meant that you did NOT want the rules changed, because that's what you're going to get, and it would be nice to think that the majority opinion prevailed. Apparently I misjudged the situation, and have just been spinning my wheels for the past year. I was under the impression that a large majority of Vee owners wanted Formula Vee to stay simple and as inexpensive as possible, but obviously, I was wrong.

I got into this thing over eight years ago solely because it appeared that unless there was some unified effort to maintain the original concept of Formula Vee, it would follow all the other "Formulas" through a few years of "development and improvement"—and, then also disappear. It was a purely selfish motive—John and I were just plumb delighted with Formula Vee by the middle of our first season with it, and we wanted to do all we could be keep it intact. We tried to join the original "Formula Vee Automobile Racing Association", but found that it was defunct, and I was persuaded to try to revive it. The result was the "Formula Vee Association" later changed to "Formula Vee International".

The primary purpose was to combat those who, from the beginning, wanted to "improve" the Class—those who claimed it would "stagnate and die" unless the restrictive rules were relaxed. In order to do that, we needed an organization to represent the Vee owners, and we needed a lot more Vee owners in order to form an effective organization.

From the beginning, this has been the only recognized source of information on Formula Vee. In one year we answered more than 3000 inquiries! We haven't kept an accurate count, but the total, to date, is well over 20,000. Most of you got your first information about Formula Vee from this organization. We're responsible for probably 75 percent of the Vee owners—and at least ten percent of the membership of SCCA.

As I mentioned in another column, SCCA has never taken this organization very seriously when it comes to our opinions on rules. It has always been a case of "Daddy knows best". Reasons? There don't have to be any! "Not in the spirit of racing", is typical, or "The rules are perfectly clear the way they are now." Or how about, "Your people don't represent the *real* racing people', or "I doubt that your members really understand the rules?"

Nevertheless, I can only believe that at least we have had some negative effect —that we have at least been able to slow down the process of evolution. There is some indication that Formula Vee has passed its peak in popularity, but it is going into its tenth year now, still in pretty much its original form. What other class has ever approached that figure?

Actually, it probably would have made no difference to SCCA if all 480 of you had endorsed our rules proposal, but it would have to me. I probably would have continued to beat my head against the stone wall in Denver. However, I can now assume that most of you do *not* want to keep Formula Vee cheap and simple—that you *do* want freedom to innovate and improve, so I'll bow to your decision and try to continue to represent majority opinion. There will be no more rules ballots.

My thanks to the 120 of you who returned ballots, including the six who voted a flat "No". At least you expressed your opinions.

Now, if you'll excuse me, I've got to figure out some way to eliminate the fan, while still using a stock VW belt, without burning up the engine more than two or three times a season. Heck no! I'm not going to tell you how we do it! You want to innovate, help yourself!

THEY DID IT AGAIN!

It should come as no surprise to anyone who has been with Formula Vee for more than a couple of years that the SCCA brain-trust again "considered" our proposals "very carefully"—and then ignored them!

I learned in a call to Bob Tomlin (Director of Club Racing) that there will be four changes in the Formula Vee rules for 1973:

1. A stock VW fan belt will be required.
2. Wings, airfoils, diveplanes, etc., will be redefined for better clarity.
3. An official "cam profile" (checking procedure) will be established. Only "D" cams will be legal.

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MEMBERS' SOAPBOX

"Dear Don ... OK, you asked for the story on what happened at our school at Road America, so I'll give you everything that went frong (i.e., everything!) as quickly as I can. We arrived Saturday morning, about eight. The first good news was that a rod end on a Z-bar link had fallen off en route, and having no Z-bar raises heck with the camber. We rolled the car to tech and an inspector jumped on it, and it bottomed. That, in addition to our plexiglass mirror mounts which wobbled, didn't set well with the tech guys, so back we went to a vacant shed to ponder. While Rich was attending the class, I hightailed it for the County airport. This is a tip I think you should pass on—when you go to a new track, the first thing to do is find the nearest airport because you never know when you'll need a bolt, rod end, piece of metal, guages, etc.

Unfortunately, it was a left-hand rod-end we lost, and the airport manager couldn't help us there, but he found a piece of light alloy channel ... The tech inspector pronounced it to be OK for a mirror mount, so we went to work with pop rivets, sheet metal, bolts, and racer's tape and fabricated an ugly, but legal, set-up. We screwed up the springs as tight as we could, so they would support the car, called out a tech guy, and got approved.

It was now afternoon. We were legal, but not running. We checked over everything, but it just wouldn't go. We killed the battery, and then pushed it for awhile, but still no go, so we went back to the paddock to solicit some suggestions. Most were obviously irrelevant to the situation, but one which sounded good was to recheck the valves. Most were tight. I set some kind of a record by getting six out of eight correct the first try, and we tried it again. Still nothing!

"It was getting late, so we pushed the car back to the shed, to contemplate some more. We were informed that we would have to move to another shed, where we could stay the night, so we got some beer, turned on the track refrigerator, and started taking things apart. About 9:30 we were told that we'd have to vacate im-

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The VEELINE of FORMULA VEE INTERNATIONAL
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THEY DID IT AGAIN !

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4. The rear axle housing and brake assembly may be rotated from the standard position.

That's it! That's all there is!

Other comments made during our 45 minute phone conversation would have been funny, if it hadn't all been so frustrating, and if I hadn't heard them all before from other SCCA officials. A few examples:

(Regarding weight with driver—) "If the heavy drivers think their weight is a handicap they can always go on a diet." "No other class has it—why should Formula Vee? If we started it for Formula Vee all the others would want it."

(Regarding oil filters—) "They don't need them! What they *really* want to do is use a lot of tubing coiled around to get additional oil cooling."

(Regarding front camber changes—) "The only way you can change the front camber is to bend something, and that's illegal."

(Regarding the excessive length of the rules as proposed—) "They're too long to put into the GCR—too expensive. Well, yes, the Production class rules *are* much longer, but that makes it a much more expensive class, too. The longer the rules are, the more room there is for cheating."

(Regarding the qualifications of FVI members to vote on the rule proposal—) "I don't believe they actually read them—or understood them if they did read them. They only voted that way because you asked them to." (He did agree that it would probably be impossible to find a hundred owners who would agree on the rules for any other class, however.)

I'm not pointing the finger at Bob Tomlin alone, you understand. None of those remarks was original—I've heard them all, before, and from several people. Do you suppose they have a handbook of some kind, with standard responses—or are they handed down, like folk lore?

MEMBERS' SOAPBOX

mediately, so we bought a spot in the campground across the road from the track, and set up shop next to a Formula Ford in the Handicraft Center.

"We decided the coil might be bad, so went to town to get a new one. The best we could do was a 12-Volt Autolight, but the service station fellow thought it would work, and he seemed to be an enlightened sort, so we tried it. We were up until 11:30, chasing down a battery charger and installing the coil. No good!

"We were up at six, and went back to "our" shed and fiddled some more, with no success. About nine, I had a brainstorm. At Road America there is a 20 to 30 foot drop from the paddock—perfect for push starts (we were getting as tired as the battery!) so we towed it over and rolled it down the hill a few times. No results, except a few puffs of white smoke. So off comes the lid, and we found we were as good at firing orders as we were with valve clearances—#2 and #4 spark plug wires were reversed! I fixed that, and we rolled Rich down the hill. It missed once, then caught and started (I jumped straight up about 8 ft!) and died after about 1000 feet.

"Again and again it did this. So we hauled it back to the garage and fiddled some more. Finally, I looked into the carburetor bowl and found it to be empty, which it hadn't been, up to then. I pulled the fuel line and found very little fuel coming from the pump, so we changed pumps, with no success. It was about 3:00 by then, so we gave it all up and went home. The problem finally turned out to be some gunk in the pickup tube in the gas tank!

"Things seem to be OK now, except for a high-speed misfire, which I believe will be cured when we get a six-volt coil. We've been running it in slaloms, and one more drivers' school. Maybe I'll tell you about that, next time . . .

"Do you accept multi-year membership renewals?

Curt Fredrikson, Chicago, Ill."

OK, Curt, you win the Dented Hubcap Hard Luck Trophy! There are three basic requirements for engine operation—compression, ignition, and fuel. This is the first time I've ever heard of anyone having problems with all three at the same time! It's too late to be of much use to you now, but for the benefit of others, you've prompted the "checklist" elsewhere on these pages.

No, we'd rather not accept non-routine memberships. We have your address plate in a file drawer with all the others coming due during the same month. Each month, all the names in the drawer for that month receive renewal notices and the plates go into a "hold drawer". As renewals are received the plates are returned to the original drawer, and at the end of two months, those remaining get a reminder notice, and the plates go to the dead file. Again, those for which renewals are received go back into the active drawer, but the rest are dead. We try to keep track of early renewals, and a couple of long-term memberships we have accepted, but we do make mistakes, and sometimes those people have to write and remind us that they're not receiving the VeeLine. It's much simpler if you just wait until you get your renewal notice, and then renew.

TROUBLESHOOTING

We've covered a lot of the more exotic and unusual things you might run into in connection with the VW engine, but evidently there is some need for the more basic items, too. You professional engine builders can skip this—or perhaps you can add something if you care to stay with us.

First, the "firing order" for the VW engine is 1-4-3-2. If you can't remember that try 4-3-2-1 (1-*4-3-2-1*-4-3-2). This applies to valve adjusting as well as to arranging the spark plug wires. If you use the latter figures, just remember that #4 cylinder fires when the timing notches on the crank pulley are at the *bottom,* #1 fires when the notches are at the top. We'll come back to this later.

There are three basic requirements for proper engine operation. It must have the proper mixture of fuel and air, good compression (tight valves and piston rings) and ignition. And, of course, these things must all be available at the proper time.

Let's start with an engine which has just been rebuilt, but has never been started, like the one Curt Fredrikson described. Some of the things we'll cover won't apply if the engine has been running properly, and then quits or gets sick, but some of them will. It's very unlikely that valve timing, for instance, would be a factor on such an engine (unless accompanied by nauseating internal noises) but compression on one cylinder could be lost, due to a broken valve or holed piston.

Let's start with an engine like Curt's, then, where *nothing* happens when starting is attempted. Whether you've noticed or not, you've been making a rough check of compression every time the engine turns over. Does it turn rapidly and easily, with very little resistance? If so, did you adjust the valves? Did you do it properly? Is it possible that you forgot, and perhaps switched rocker arms or push rods, or fly-cut the heads, decreasing the clearance so that none of the valves is completely closed at any time? OK, we'll forget that one. In that case your engine won't exhibit signs of extreme compression on each half revolution, either, as it would if you had forgotten to install push-rods or cam followers. If you adjusted the valves at all, you'd have noticed any of those things.

Well, then, does the engine seem to have a lot more compression on two alternate cylinders than on the other two? (We're talking about the sound, now, as the engine is turned over by the starter.) If so, did you adjust the valves in the sequence described above—or did you use the order 1-2-3-4? Don't laugh, you wise guys—it's been done. And the engine doesn't run too badly, either! Actually sounds more powerful, and has pretty good low end torque, but it runs out of steam at about 4000 rpm.

(The VW manual does specify adjusting valves in a 1-2-3-4 sequences—but if you read the fine print, it also says the engine is to be turned *backward*—"to the left".)

If one cylinder seems to be "tighter" than the rest, it could be a loose valve adjusting screw keeping one valve from opening properly. If one is lighter than the rest, better use a compression tester. It could be just a valve sticking in the guide (not really likely) something accidentally

dropped into the intake passage during assembly keeping a valve open, or any of a number of such things.

You say the engine has been turning over normally, indicating even resistance for each cylinder? Then you did a good job of assembling, and the trouble narrows down to fuel or ignition. Let's make a quick check of both, before starting to dismantle the engine. First look into the carburetor throat while you open the throttle. Does fuel spray out of the accelerator pump nozzle? This wouldn't guarantee that the carb is OK, but even that much fuel should give some sign of life if the ignition is working.

If no fuel appears, remove the main jet holder at the bottom of the bowl. If several spoonfuls of gas run out, the throttle pump is at fault. If none appears, the trouble is between the carburetor and the fuel in the tank—probably, but not necessarily, the fuel pump.

Before disecting the pump, however, check the fuel supply, because it's quicker and easier, and you may have to do it anyhow. (There *is* gas in the tank—isn't there?) Disconnect the fuel supply line from the pump, and suck (carefully!) on it. If you get a nice full slug of gas in your mouth with very little effort, the trouble is in the pump. If not, DON'T blow on the line! Obviously it is plugged somewhere and if you blow you may clear it, but you'll leave the "plug" in the system to give you trouble later. If you have an in-the-line filter, disconnect the line at the tank and blow through it from that end. If there's resistance, the filter is no doubt due for replacement. If not, remove the dip tube from the tank, and you'll find it to be plugged. (If you don't have the fuel take-off at the top of the tank, with an internal tube reaching to the bottom, you should have! Besides being a safety factor, it makes this operation much easier. Otherwise you'll have to remove the shut-off valve, or whatever you have at the lower outlet, and clean that.)

When you're sure the line is clear between the tank and pump, there's one more quick check before opening the pump. Disconnect the line to the carburetor, at the pump, and blow on that one. It's a remote possibility, especially if the carb hasn't been used for a long time, that evaporated fuel may have formed "varnish" which is sticking the float valve in a closed position. No.? OK, then let's consider the pump.

First, you did put that push-rod in the hole in the plastic adaptor before you installed the pump, didn't you? If not, this would be a good time to do it. If you're sure you did, take the lid off the pump and check the filter screen there. It's unlikely that it would be completely plugged, but let's check it anyhow.

Let's go back now to where you can suck gas through the pump (whether you had to clear the line, or it was already open). Now blow back against the pump and note whether any gas appears at the little vent hole on the side of the pump body. If it does, the diaphragm is leaking and the pump will have to be repaired or replaced. If not, probably the intake valve has a speck of dirt under it, as was mentioned a couple of issues back. It is possible that all the sucking and blowing may have cleared it, so it might be worth trying a couple of turns with the starter again, to see if the pump has healed itself. If you get a good healthy spurt of gas every other revolution of the engine, your troubles are over. If you get just a few drops, you'll probably have to operate. If you have compressed air handy you might try blowing it through the pump from the inlet side, in hope that it will dislodge whatever is keeping the valve open, but if that doesn't work it's not too big a deal to dismantle the pump. Leave it in place, removing only the top part of the body, which contains the valves.

The little reed-type valve is probably the guilty one. Even if you can't see anything, remove the screw holding it and the valve stop in place, wipe and blow everything clean, and reassemble. Check the other valve, too, to make sure it's closing properly and that there is nothing under the seat. It is rather difficult to take apart, but only something like a coarse hair, metal shaving, or something equally visible, would be likely to lodge in it.

With the pump dismantled, turn the engine over a couple of times. Does the diaphragm move up; and down? OK, you *did* install the pushrod, and the linkage in the pump is all right.

Put everything back together, except the line to the carburetor, and make the starter test again. This time it HAS to work, but try it anyhow. So now you know you have fuel!

We still have the main jet removed, don't we? So take the jet out of the holder and be sure it's clean before you replace it, too. Especially if you were able to keep the engine running by pumping the throttle, but it died when you quit.

We're reasonably satisfied with the compression, and we know we have fuel, and still nothing happens. It HAS to be ignition.

Take out a spark plug, reconnect the spark plug wire, and lay the plug next to its hole, where it will be grounded. Turn the engine over with the starter and check for a spark. Since we're assuming that there has been no sign of life, we'll assume that you get no spark at the plug. It *could* be a bad plug, or faulty wire, so you could try another cylinder, but since there has been no action, it would probably be a waste of time. Go to the coil, instead. Pull the center lead from the distributor cap, and bend it around so its end is about 3/8" from some grounded metal part of the engine. (Hold it in that position at your own risk! That high tension current wants to take the easiest path to a ground, and if the gap is too great it will go right through the insulation on the wire and into you!) Turn the engine over again, watching for a spark. If you do get one, take off the distributor cap and make sure there is a rotor inside—and that it is tight on the shaft, and that the shaft turns when the engine is turned over. Also check to see that the little spring-loaded contact in the center of the distributor cap is in place. Check the inside of the cap for signs of moisture, and look for spark "trails"—fine hairlines where a spark has been going to ground, due to moisture or a crack in the cap. Look for these on the rotor as well.

You could probably rig up a test setup for checking the cap and rotor for leaks, but if you have a good spark at the coil and can't get it to come out of the plugs, you'd better take the whole high-tension system (cap, rotor, and wires) to an automotive shop where they have adequate testing equipment.

If you *don't* have a spark at the coil, you might as well start at the beginning. If you don't already have a test light—not a fancy timing light for use on an operating engine, but just a six or twelve volt bulb with a couple of leads on it—get one, or make one. One of those trouble lamps you plug into the lighter socket works fine if you put an aligator clip on each wire, and it may still come in handy as a trouble lamp, too. At the other end of the scale is a bulb with one wire carefully soldered to the terminal, and another to the base, with a clip on each wire. OK, you've got one?

If you've been using the starter, the battery and the ground connection have to be all right, so go to the ignition switch and check the "hot" line from the battery, grounding one wire of the lamp and touching the other to the terminal on the switch. It's hot? Then touch the other terminal, where the wire goes to the coil. No light? Try turning the switch "on". Still no light? A new switch will end all your troubles. In the meantime, if it's five minutes until grid time, just disconnect the two wires from the switch and tape them together when it's time to start your engine.

If you *didn't* get a light at the "hot" side of the switch, trace that wire back to its other end, and see if it's hot there—or if it is connected to a terminal which isn't supposed to be hot (like maybe the tach, or the open side of the starter switch, or something like that).

If you got a light at both sides of the switch, go back to the coil and see if you have "hot" at the coil terminal (the one marked "15"). Disconnect the other wire (from the "1" terminal) first, since the juice runs through the coil and then to ground through the points, if it can, rather than through your light. You get a

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TROUBLESHOOTING

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light? OK, now try the other terminal on the coil. You get a light there, too? Then the primary side of your coil is all right, so don't replace it yet—your trouble could be somewhere else, at a lot less expense.

OK, you have juice through the coil, so check to see if it's going anywhere. It's supposed to go to ground through the points when they're in the closed position. Pull off the distributor wire #1 at the coil and connect your test lamp in series—one clip on the coil terminal and the other on the end of the wire. The lamp may or may not light, depending on the position of the points, but when the engine is turned over it should light up twice each revolution, with the "on" and "off" periods about equal.

It doesn't light up? Check your point gap first. Turn the engine over slowly by hand and measure the gap with a feeler guage when it is at its widest opening. It should be .016". (If you set that gap when the little fiber rubbing block is on the flat of that square cam, the points never will close so be sure it's on the high part.)

Now they close, but there is still no light? Poke around with a screwdriver, grounding the points and terminals, and stuff, inside the distributor and see if the light comes on. If it does, keep it up until you can locate the trouble—burned points not actually making contact, even though they are closed, or a broken spring which doesn't convey current to the movable point. If you still get no light, check the terminals on the wire between the coil and distributor. If they are the type which is crimped onto the wire around the insulation, it is possible that the wire itself, inside the insulation, is broken. If you wiggle it around you should be able to get a flash or two, at least, from the light.

If you get a steady light which won't go off, even with the points open, check the insulator where the terminal screw goes through the side of the distributor housing. Probably the insulator is cracked, or perhaps the screw has been tightened to the point where it has squeezed the insulator out of place, permitting the screw to ground directly to the housing. While you're checking that, you'll have the condenser lead off the terminal, so try the light with one lead on the coil terminal (No. 1) and the other on the lead from the condenser, only. If you get a light there, throw away the condenser—it's shorted inside, allowing the current to go directly to ground.

Now let's back up to the point where you do get a light indication that the points are opening and closing, as they are supposed to, but still there is no fire from the coil. (If the light flashes were rather uncertain, like missing a few times, probably the points were burned, but you should still get some action, even though you'd probably have the same kind of missing.) Reconnect the distributor wire to the coil, watch the points as they open, and observe the spark they make. If it's very small—sometimes almost invisible—every thing should be OK, but if you get a pretty bright one, it would indicate condenser trouble. You already checked for a short in the condenser so now try it for an "open circuit".

Take a short extension cord and remove the socket, or whatever, on the non-plug end, leaving the bare wires exposed. Connect one wire to the condenser body, and the other to the lead wire coming out of the center of it. Now plug the cord into a 110 volt socket, and take it out again. With an insulated screw driver or piece of wire, connect the prongs of the plug to each other. As the connection is made, you should hear and see a spark if the condenser is in good condition. (Condensers are ~~either~~ good, or bad—not poor.) If you don't get a spark, try it again, several times. That 110 volts is alternating current, and the intensity of the spark will be determined by the position of the "wave" at the moment the connection is broken. If it's done just as the current is reversing you won't get any spark at all.

(To be continued next month)

UNCLASSYFIED ADS

FOR SALE: Kellison Vee. Schultz heads and manifold. 4 races on most parts—brakes, engine, etc. $2400 with trailer. Will deliver in B.C. or Alberta. Bob Ostergard, Box 883, Squamish, B.C. (604) 892-5133.

FOR SALE: Crusader, for 6'3" 200 lb. driver. Super engine by Jim Wild (flow tested heads and manifold). Slicks. $2000, firm. Bob Klingler, 5236 Charlotte Way, Livermore, Cal. 94550. (415) 447-3853.

FOR SALE: New Fiberkit Vee kit, 90% complete. Trans and front end in place, wheels and tires on. Trailer included, $1300. Kip Milam, 729 No. D St., Apt. 3, Lompoc, Cal. 93436. (805) 736-1680.

FOR SALE: Brand new '72 Zink kit, Daytona tail, exhaust system. Must sell, $1000. David Colpak, 6 Norwood St., Worcester, Mass. 01610. (617) 754-3463.

FOR SALE: Autodynamics, professionally built, never raced; extra tires and wheels, new trans axle; '60 Chev 3/4-Ton truck with rack and winch; Simpson suit, underwear, gloves and sox, for 6'2" 200 lb. driver, never worn; Bell Star helmet, full package, $1800. E. Vern Rice, 2901 Puesta Del Sol, Santa Barbara, Cal. (805) 687-4357.

FOR SALE: '70 King Vee, never bent. Hyd. clutch, Z-bar, Smith's instruments, lowered front end, Goodyears, new wheel bearings, brake cylinders, front suspension parts. 2 schools, 4 races, since new. Without engine, $1050, with stock 40HP engine, ~~$1200~~, or best offer. Tony Spiridigliozzi, 138 Primrose Ave., Mt. Vernon, N.Y. 10552. (914) 664-1152.

FOR SALE: Autodynamics MK-5B, excellent condition. Jim Wild heads. Goodyear slicks. Built for 6'2" driver. Will deliver 500 miles, $1650. Tom Tomlinson, 3215 N. Talbot, Bldg. 24, Apt. 1, Erlanger, Ky. 41018. (606) 341-2657.

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