



VEE LINE

NUMBER 77

FEBRUARY 1971

DIRECTOR'S CORNER

DON'T GET ALL SHOOK UP if you happen to notice that this is the February issue and you haven't received your January one yet. As many of you know, part of Volkswagen of America's support program for Formula Vee has been the printing of the Vee Line and the annual rules booklet for FVI. This has been great — we couldn't have made the progress we have without it, in the early days, especially. However, it has always been somewhat of a mixed blessing. Their Public Relations department also publishes their magazine, "Small World", one called the "Weathervane", for their dealers, and does a lot of other such work with a higher priority than the Vee Line. A couple of times our finished product was returned within two weeks, but more frequently it took a month or more, and the increasing emphasis on Super Vee didn't improve the situation any. When I found that our '71 booklet wouldn't be available until April, we sort of—ah—agreed to discontinue the arrangement. Future printing will be done here in Wenatchee, at FVI's expense. By the same token, Volkswagen will no longer be furnishing our literature to members of its organization, foreign Vee associations, etc.

Volkswagen's contribution to the promotion of Formula Vee has never been openly acknowledged before, by mutual agreement. It was thought best to avoid any implication that FVI was in any way connected with or run by Volkswagen (and up until 1968, when the pressure started for "upgrading Formula Vee", the entire organization had an official "no involvement in racing" policy, anyhow.)

This has been a good relationship, with no strings attached. Though it has been strained in recent years by my refusal to go along with changing Formula Vee, and more recently by my unenthusiasm for Super Vee, there has never been any censorship or pressure of the "or else" variety. (Sure, they've tried to *convince* me, but that's different.) This change will not, I hope, affect the friendships I have made in the VW organization—it is being made, not as the result of any disagreement, or by any action of VWoA, but at my suggestion, solely to improve the timing of our publications. If they're late from now on, it will be my fault.

So DON'T write in to tell us you didn't receive your January issue — it will be along one of these days, and so will the booklet.

NEW OFFICERS

Well, we had an election this year, anyhow, with choices in two out of the three offices. None of the races was decided by a landslide, and we were spared the problem of deciding what to do if two officers from the same state were elected, which was a distinct possibility.

For President: Don Reich, Issaquah, Wn. 96; Bob Boyd, Canby, Ore. 85.

For Vice-President: Richard Bell, Minneapolis, Minn. 90; Robert Dunsmore, Portland, Ore. 54; George Bell, Seattle, Wn. 35; and Ron Harmon, Sacramento, Calif. 1.

For Secretary: Tom Tomlinson, Erlanger, Ky. 176; Harriet Gittings, Fremont, Calif. 2; Stan Czacki, Trenton, N. J. 1. (There were three additional write-ins for non-members.)

One ballot carried only the comment, "After all, what's the point?" The point, friend, is that this organization's existence shouldn't hang entirely on that of its present Director. Nor should he be free of any responsibility to the members. The officers can, at any time they think it best for the organization, replace him. And on the other hand, should the office become vacant, through death, illness, or resignation, it is their responsibility to fill it, disband the organization in an orderly manner, or take any other steps they deem proper. Nothing continues unchanged indefinitely. *Sometime*, some set of officers is going to be faced with

this situation, so don't underrate their importance!

Incidentally, in case you want to get in touch with them, their complete addresses are: Don Reich, President, FVI, 19832 S.E. 29th, Issaquah, Wash. 98027.

Richard Bell, Vice-President, FVI 2207 Hayes St. N.E., Minneapolis, Minn. 55418.

Tom Tomlinson, Secretary, FVI, 3215 N. Talbot, Erlanger, Ky. 41018.

OTHER BALLOTS

As has been mentioned here a number of times, the 1200cc VW is *not* obsolete! It hasn't been sold in this country since the Fall of 1965, but it is still in regular production in many other parts of the world. It was sold in Canada for a time with the slotted wheels we refer to as "1300 wheels", leading to some discussion there as to their legality.

A recent poll by the Canadian Division of FVI resulted in a 39 to 3 vote for sticking to the unslotted '65-and-earlier type, in the interests of international uniformity. Now they can go to the slotted wheels, after all. (Canada observes the same rules we do.)

By contrast, the members of the Formula Vee Association of New Zealand (through a ballot of their members, sent to MANZ—their SCCA) has changed their rules to allow widening the standard VW wheels by as much as 3 inches, and the use of two

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MEMBERS' SOAPBOX

"Dear Don— (1) What legal things can be done on a Vee to get better braking, i.e., brake bias, what linings to use, etc? (2) What do you mean, "opening the valve guides to the dimensions stated for the ports"? I can't see how the guides could be opened that much. (3) I've seen Vees advertised with "long" and "short" gears. What are they from—transporter? If not, are they legal? (4) I can't find anyone who wants to tackle the increase in inside diameter of the manifold. Is opening it, grinding it, and then re-welding to the stock diameter legal? How much advantage is there in this modification? (5) Is it possible to publish the pictures of the officers in the Vee Line? I'm sure there are others who would like to see what you look like, too. (6) What made those NE Vees *not* so fast at the ARRC this year?

Tony Spiridigliozzi, Mt. Vernon, N.Y."

1. *In addition to clean, dry linings, and true, smooth drums, about all you can do to improve on the stock braking system is to install twin master cylinders, side by side, with a "balance bar" connecting the two pushrods which actuate the pistons. The pushrod from the pedal is connected to the balance bar so that it can be adjusted toward one end or the other, so as to exert more pressure on one cylinder than on the other. By trial and error you find the point at which the front wheels will lock up just barely before the rear ones do. This point would vary, not only with weather conditions but between different tracks, if you wanted to get the utmost out of your setup. With more traction (friction) between the wheels and pavement, the tendency to "dive" increases, putting more downward pressure on the front wheels, and reducing it on the rears. On a wet track, on the other hand, the front wheels would lock up without inducing much "dive", and the rears would still have traction they weren't fully using. You'd adjust your "bias" toward the rear cylinder, then. As for linings, because Formula Vee is a Real Race Car, you should probably have Competition Linings, like the metallic shoes which supposedly aren't subject to "fading" as they get hot. On the other hand, not very many drivers, if their brakes are properly adjusted, have had any problems in this area. Many use standard VW shoes. Petunia has done very nicely with American Brakeblok shoes for the past seven years, even though the drums have been hot enough to discolor the white paint. There was a complete article on adjusting brakes some time ago, so I won't repeat it here.*

2. *Did I say valve GUIDES somewhere? If I did, I'm sorry—I meant SEATS! The*

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MEMBERS' SOAPBOX

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intake seats (on an old head we have, at least) are 1.064" ID at the bottom. The permissible ID for the ports is 29mm, which figures out to 1.142", so if the seat is considered a part of the port it can be enlarged by .078" which is somewhat more than a sixteenth of an inch—5/64, if you have a machinists scale, which isn't exactly negligible! The contact area itself can be as large as the head of the valve (1.240") with only a narrow seating surface (like .030", perhaps) so the stock 70-degree taper could enlarge the upper part of the seat to beyond the 29mm somewhat.

On the exhaust side you can't meet the 33mm maximum—it's larger than the outside diameter of the insert—but you can enlarge it to where only the narrow seating area is left.

3. The new rules include all the dope on gearing, at long last!

4. Better stick to the acid method described in a recent issue. (Hope to have some firsthand information on this before the next one.) I'm sure that you'd have nothing but trouble trying a mechanical route—if you could get the walls thin enough to justify your trouble you couldn't possibly weld them back together.

5. I keep intending to do this, but there's never room enough, so just hang on to your mental image of a tall, young hero-type. It's close enough! Could probably find room for the other officers, though, if they care to furnish photos.

6. Glad you asked that! (I've been trying not to.) Frank Schulheis, perhaps?

WHAT IT'S ALL ABOUT

If you're one of our newer members you may be somewhat mystified by occasional references to "John" and "Petunia". Well, John Baker and I are long-time partners in this racing game. We started racing Go-Karts when they had lawn-mower engines driving one rear wheel. When that priced itself out of our league we took a shot at stock outboards, and then got hung up on Formula Vee. Petunia was entered in the first race for Vees in the Pacific Northwest

(1964) and has been in most of them ever since.

Petunia is one of the first Formcars, built from a kit, eight years ago. Her picture, in all her virginal glory, graces the front page of the #1 issue of the Vee Line. She was so christened after the little cartoon character, Petunia Skunk, due to her color scheme of black and white stripes. Since that time she has undergone surgery several times (usually amputation, for weight reduction) but what is left is almost entirely original Formcar, even though it has been rearranged somewhat.

She still has the original Monroe shocks in the rear (though the springs and mounts have been changed) and well broken-in VW's in front. Her "camber control device" is a simple cable across the rear of the frame. Her vital engine parts (crank, rods, pistons, cylinders and valves) have been replaced over the years, but she still has the original '62 "A" heads, which have been ported and CC'd, but not flow-tested. Rods, pistons, and flywheel have been carefully balanced, but the crank, valve gear, etc., is strictly stock. The engine has been track-tuned only—never on a dyno. (Everything we've ever done has been in the Vee Lines.) Our "maintenance" program is "fix it when it breaks", usually, although we do have every intention of giving the engine an overhaul this Spring that it hasn't really cried for yet. (We always intend to!)

Petunia will never make it to the ARRC. Probably she'll never win another National, but she did win one Regional last year. She's not feared by many of the front runners, but she's not sneered at, either—she's surprised several of them, more than once! Despite her age and general condition, she doesn't hang around at the back of the pack—she's nearly always in the first 25%, at least, even at Nationals.

This can only demonstrate the importance of the driver—the necessity for cutting a tenth of a second off each corner; for shifting at the proper moment in order to keep in the peak horsepower range; for anticipating what the other drivers are going to do. (All we've learned in this area has been in the Vee Lines, too.)

The basic theme of Formula Vee has always been that all cars are (or *should* be) created equal, making driving paramount in importance. When one marque or another gets a reputation for being better than others, it's usually because a few drivers, responsible for establishing that reputation, just happen to be somewhat exceptional, too. The fact is ignored that other cars of the same make can also be found in the rear ranks. This, then, is what we've attempted to prove with Petunia—with a good driver, even an eight-year-old Formcar can still be competitive in Formula Vee.

If you're dead set on a National Championship, and if your driving is perfect, you really should get a car—and engine—to match it. However, if you can afford to race at all you can still be up where the action is, at least, with a lot less. And that's what Formula Vee is all about!

OTHER BALLOTS

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standard VW carburetors on "free" manifolds. The wide wheels are still due for more research before the optimum width (and tires) are determined, and only a couple of the cars have yet been equipped with the twin carbs, so the results are still inconclusive. However, "lap times are coming down", presumably due to these "improvements". Isn't that great? All for a cost of only two or three hundred dollars!

By the time those who can afford to experiment have found the best wheel width and tire size and type and manifold design (and those who can't have dropped out) Formula Vee should become a relatively equal class again, except that *everyone* will be going FASTER! This is what is known as "improving the breed".

WHAT TO DO WITH AN OLD FORMCAR

DON'T throw that old Formcar away! There are lots of things you could do with it. You could set it on the front lawn, fill it with rich loam, and plant flowers in it. Or seal up all the cracks and make a wading pool for the kiddies. Or with a full belly pan, and the machinery removed, you could mount an outboard motor on the rear. Or you could make a race car out of it!

After all, what *is* a Formula Vee? It's a Volkswagen front suspension, and a Volkswagen engine and transaxle and wheels, connected to each other through a tubular frame and covered with a fiberglass shell. Except for the frame and shell, they're all identical! OK, they have different brands of shock absorbers, and different springs, and some have cables across the back end while others have Z-bars, but the biggest basic difference is appearance. Some of them look a lot better than others. True, as the saying goes, you can't make a silk purse out of a sow's ear, but you could make a leather one, couldn't you? So don't throw that old Formcar away—make a race car out of it. It may not look as sexy as that new AD, but it doesn't have to look like an old Formcar, either!

Like everyone else, we're faced with the need for a new roll-bar this Spring. So which way to go? We could copy the old

UNCLASSIFIED ADS

FOR SALE: '64 Formcar, original shape, extensively reworked engine, many extras \$1000. Trailer available. Dale B. Sawyer, 201 So. Division, Auburn, Wash. 98002, (509) 939-3434 or 941-0292 (work), 939-3856 (home).

FOR SALE OR TRADE: Formcar, engine rebuild July. \$650 with trailer or trade for tow vehicle (van, station wagon). Alan G. Lewis, 895 Tower Road, Winnetka, Ill. 60093. (312) 675-6570 weekdays, 446-6266 evenings.

FOR SALE: Autodynamics tilt-bed trailer \$110 and 4 Firestone wet tires, mounted. Dan Kaljian, P.O. Box 402, Marblehead, Mass. 01945, (617) 631-4656.

FOR SALE: '65 gearbox, \$55; 1200 engine, dynoed @ 46.5, \$200; 1200 front end w/2 sets torsion arms and spindles, \$45; new adjustable Konis (80T-1669) with springs, \$75; '70 1600 transaxle w/

starter, \$150; '68 1600 disc brakes, \$30; '68 1500 dual port, flat fan short block, \$225; 2 ea. '67 1500 stock heads, \$30; 2 ea. '65 1200 heads, \$25. Robert Hall, 10700 Fallbrook Way, Oakland, Cal. 94605 (415) 562-0576.

FOR SALE: Autodynamics Mk III. Good shape, trailer, some spares, \$1350. Steve Johnson, 3825 25th West, Seattle, Wash. 98199, (206) AT 3-3023.

FOR SALE: Bobsy Vega. Modified suspension, perfect condition, ready to race. With trailer and many spares, Thomas Crowther, 12 Cedar Ave., Kentfield, Cal. 94904, (415) 453-5532.

FOR SALE: '69 Bobsy Vega. Firestone fuel cell, Konis, Goodyears, spares, excellent condition. Engine disassembled, \$1495, assembled, \$1695. Delivery arranged. Chuck Haines, 5846 Glen Hill Drive, Bethel Park, Pa. 15102, (412) 833-1584.

one, making it a couple of inches higher (it's conspicuously high already) or we could get John down lower in the car and perhaps get by with a bar even lower than the present one. We've idly discussed the possibility of getting the pedals ahead of the tie-rods for several years, and this seems to be the logical time to try it. A simple decision, really, but look where it led!

First, Petunia has six inches of ground clearance, but four would be ample, so we'll lower the frame, in relation to the axle tubes, by two inches, which appears to be fairly simple. Then, the frame is slanted upward a couple of inches at the front, so by straightening that we can gain another inch or so between the belly pan and the tie-rods. Still not enough! The tie rods are going to have to be raised in relation to the axle tubes, too.

If we simply make a new steering arm, bending it in an "S" shape to get it as high as possible it still won't be sufficient because it has to clear the steering shaft with its large VW U-joint. OK, we'll make an extension on the shaft, getting the joint farther back and out of the way, and gain another inch. Great! That will do it—except that by lowering the belly pan that much we also have to lower the body shell, and now the gear box and U-joint are too *high*! All right, so let's move the gear-box forward ahead of the axle tubes and drop it down as much as possible, replace the large fabric U-joint with one from a socket set, get the steering arm up to where it just barely clears the shaft itself, and that will do it! A good clear 12" between the lowest part of the steering system and the deck, and still room enough for the nose cone. Looks like that solves our problem doesn't it? Hah! That's just the first couple of links in a long chain reaction!

The engine has already been removed for an intended overhaul, and the side panels will have to come off for accessibility, and that leaves only a few more screws holding the belly pan, so it comes off, too. Now a few more items come to mind. In order to use that foot room the pedals have to be moved ahead, of course, so the brake lines, clutch and accelerator cables, and the shift lever will have to be altered, so out they come. Without them, it's fairly easy to complete the removal of the transaxle, so it comes out. The old rollbar—and the firewall—will have to be removed, and what do we have left? Just the bare bones, laying there on the sawhorses.

The last lowering job left John just able to see over the steering wheel and cowl, so now they'll have to come down a few inches, too. After eight years the Dzus fasteners on the cowl are getting pretty loose—a couple are gone entirely—now if we could bring the sides in a little at the same time we could trim the edges of the cowl down a bit and install a new set of fasteners. It wouldn't hurt Petunia's shape any, either, as she's somewhat broad across the bottom anyhow.

OK, let's look at what it would take to narrow the frame about three inches. The front cross-member, which supports the pedal assembly, will have to be relocated anyhow, and the one under the seat will be

in the way for the new seat location, as will the one behind the seat to which the seat belt is attached (installed at the last session). All we have to do, then, is shorten the rest of them, plus the X-brace, in order to give Petunia a New Look! Hey! Just a minute! If we narrow the frame and body, that will make the rear body section higher, right? Right! That will provide an inch or so of clearance between the body shell and the fan shroud, right? Right! OK, so let's *not* shorten the two cross members which support the engine (also from a former revision) but cut them as long as possible and set them on *top* of the lower frame rail. That will raise the transaxle an inch and a quarter (lower the frame, actually) to match the front—or almost, anyhow. We already have adjustable shock mounts, so there won't be any complications there. So let's do it!

Isn't it amazing how one thing leads to another?

This is primarily for Formcars, of course—there are still a lot of them around, and this may bring some more of them out of hiding—but if you have some other make which was designed for a midget, or even if you plan to start from just a bundle of tubing you may find something of interest here.

There is a lot of work involved, but it's all simple cutting and welding. Well, almost all—you'll have to get a little machine work done on the steering gear, like boring and keying the hub for the steering arm, and boring the extension to fit the steering worm shaft—but if you have a torch and a grinder (or lots of files) and a hacksaw, you're in business.

First, of course, you cut out all the cross members, as close as possible to the longitudinal. Before cutting, however, scribe a line 1½" in from the rail on the X-braces and all the cross members. Also scribe marks across the lower frame rails to indicate the location of the two rear members so that you can set them between the marks, on *top* of the rails, and maintain their original location. (If you don't have these, we'll come to them later, but for now, you'll need two tubes almost as long as the original ones, so don't shorten *all* of them.) Remove the old roll-bar and braces, and the two side frames will fall apart, and there you are, ready to start building a Revised Formcar.

Grind the welds off the side members, hacksaw the scribed cross-members to the new length (or burn and grind, if you prefer) except *don't* shorten the front one or the two rear ones.

Set the rear cross member in place on the frame rails, using the scribe marks to locate both fore-and-aft and spacing across the frame. Hold it in place with C-clamps. Lightly tack the upper and lower cross tubes in place at the firewall, keeping the rear sides parallel to those of the vertical tubes so that the firewall will fit snugly. Don't weld them yet.

We'll assume that by the time you get to this point you will have noticed that you also had to remove the front suspension, so we won't go into that. Cut out the vertical

piece of flat bar to which the suspension was bolted (if your car still has it) and the gussets bracing it and bend the lower frame rails down until they are horizontal. You'll have to heat them, of course, and it will help if you hacksaw the vertical member at that joint almost all the way off at the bottom, starting at the front. The saw cut will open up as the tube is bent, but can be welded later. Also, you'll probably get some bumps and dimples in the lower side of the rail, but you can hammer them out, as they won't show anyhow.

Now you'll find that the bolts in the lower rail are no longer horizontal—they're angled downward. You won't need them, so trim them off, along with enough of the plate to which they're welded so that you get the front end of the tubes square across and vertical. Again using the scribe marks to establish the frame width, tack the front cross member to the front ends of the rails, letting the excess hang out at the ends, for the time being. (If you want to relocate the pedals sideways a little you can let more hang over at one end than at the other as long as you maintain the same distance across the frame.)

Now is the time to make sure everything is squared. Measure from the front of the front cross-member to the rear of the rear one on each side, making sure that both sides are equal. Assuming that you cut off the front suspension mounts equally, shift the rear tube forward or backward as required. Then measure from the same points, except diagonally, between opposite corners. Again, these measurements must be identical. If they are not, push or pull on the opposite corners until they are. Then check the side measurements again. When everything checks, tack the X-bracing in place to hold it that way.

Make sure that the saw horses are level, so that you won't be building a twist into the frame, and you can start welding. Work back and forth, from one side to the other, rather than weld all of one side first. Each weld will cause some distortion, but by following each weld by the corresponding one on the opposite side they'll cancel each other. Finished? Looks better, doesn't it? If you still have the original engine mounts you can either replace the rear mount (shortened) back in its original location, in which case everything should still fit, or you could set the rear cross member on top of the frame and shorten the rear diagonal tubes to raise the rear of the transmission. It would probably be simpler, at this time, to install the engine mount described in #62 Vee Line. Regardless, run a string from the center of the front cross member to the center of the rear one, and use it to line up the engine mounts. Don't just measure from the sides.

Now make the vertical mounts for the front suspension from 1½ x 1½ x 3/16 angle, with 6" of angle below the lower tube. But don't weld it to the suspension yet—we won't do that until way later, after the body is fitted.

Next, you'll have to make a decision. As shown in the picture, we simply lowered
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WHAT TO DO WITH AN OLD FORMCAR

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the upper rail in the front bay of the frame, in order to permit the tie rods to operate above it. However, the next time we do this job (Hah!) we'll shorten the vertical frame member and the diagonal brace and bend the rail downward starting at the next vertical member to the rear. This might very well be better from the standpoint of fitting the body back in place. Suit yourself, but in any case it's probably a good idea to add the diagonal stiffener in the front bay. Petunia has taken some hard knocks without any such support, but this remodeling wouldn't make it any stronger, otherwise. Either way, the upper rail is ten inches above the lower one, measured overall, top to bottom.

This is where you build in your "caster". We use 5 degrees, which works out to cutting the upper rail 3/4 inch shorter than the lower one. Set the suspension brackets in place, square them up with the frame and sight across them to make sure they're parallel, and weld them in place. Trim off the overhanging ends of the cross-member, and weld covers on them. Besides looking better, it will strengthen the joint considerably.

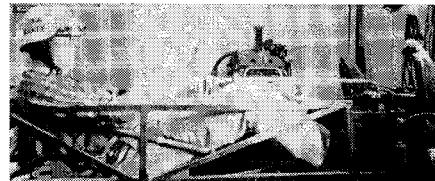
Now you can set the suspension in the notches in the brackets, secure with C-clamps and see how everything looks. Surprise! If you have the original Rambler master cylinder you can't get the rear cap off the reservoir, can you? Oh, well—one-inch spacers and longer bolts, and an inch of extension on the push-rod will take care of that. This would be the time to install dual Girlings, balance bar, etc., but with a new set of tires, \$35 entry fees, etc. . . . Maybe next year.



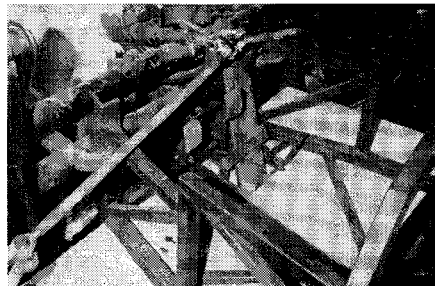
Two rear frame members set on top of frame rails. Engine mount was described in #62 Vee Line.

Now for the steering gear: The support for the gear box is a section out of another VW axle beam. There's nothing else in this country that's 2.055" in diameter, so if you can't find one, you'll have to get something turned to the proper size from a piece of heavy Shelby tubing, perhaps, or a piece of *double extra heavy* 2" pipe. Don't try to make the box fit a piece of 2" OD tubing, even with shims—this is no place for short-cuts! The tube is mounted 1-1/8" ahead of the axle tube and an inch below it.

The hub for the steering arm is made from a piece 2" x 2 1/2", an inch thick. The hole for the 1/2" bolt must be drilled before



John is 6'3". His helmet is 28" above the deck, 2" higher than the fan housing will be. Steering shaft is 3 1/2" above frame.



Pedals against the axle tubes, with 12" vertical clearance. Note throttle pedal. When John wants to go faster, he pushes harder.

the hole for the shaft is bored. The keyway is 5/16" by 1" Woodruff. (It's not practical to try to fit to the original splines in the shaft, and you certainly wouldn't rely on just the bolt alone, would you?) The arm itself is 1/2" x 2" mild steel, tapered to an inch wide at the end with a torch and grinder. Start with a piece a foot long, though you won't need all of it. For the bend, make a template of heavy wire, with the hub on the gearbox and the box in place on its mount. You'll have to make some revisions, no doubt, but this will give you something



Effective length of steering arm is 10", for "quick" steering. Stock length is 6". About 1 1/2 turns, lock to lock.

to start from. Be sure to leave enough clearance so the arm can swing from side to side without hitting the axle tube. When you think you have it, weld it to the hub with the bottom side of both pieces flush and flat, so the arm will clear the rear mounting bolt on the box. (OH—radius the rear—keyed—end of the hub, too, so it will clear that bolt, with the nut in place).

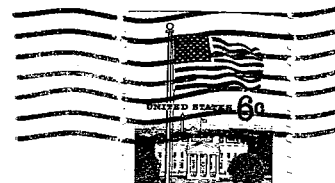
Drill a couple of 7/16" holes (or whatever size your ball-joints are) in a piece of 1/2" x 1" x 2 1/4" steel, 1 1/2" apart. Now measure the *horizontal* distance from the hole in your spindle steering arm to the center of the upper link pin. (On Petunia this is 3-3/4", but the arms have been bent in order to maintain proper "Ackermann", so yours could be different.) Hold the little drilled piece under the new steering arm so that the centerline of its holes is the same distance behind the center of the axle tube, mark the arm, cut it off (beveling both sides) and weld the little piece in place so that it is level, regardless of the angle of the arm.

OK, enough of this drivel for this month! We may even have some non-Formcar owners in the audience who think it's *too* much. Besides, that's as far as we've gone on Petunia at this time. (And only a month until the first race!)

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