



The old sleeve shows why the sleeves are often well-secured to the block. The build-up is basically aluminum corrosion.

etc. Nothing is more frustrating than to be missing a vital part during an assembly.

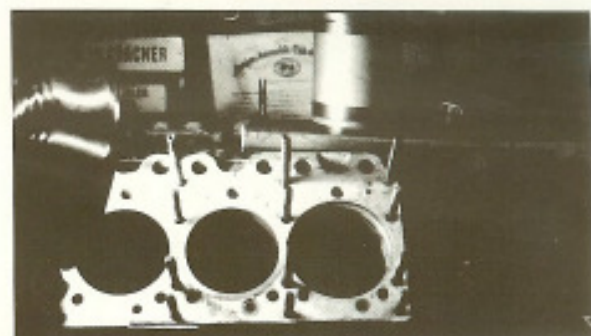
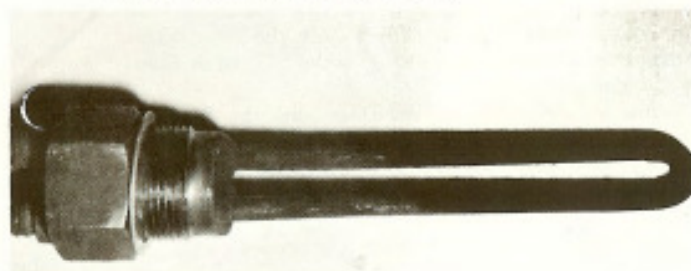
Starting with the bare block, fit each sleeve to a bore. They should be just able to turn in the hole, that is, just short of binding. Use sandpaper on the aluminum walls until you have the sleeves fitted properly. . . . 80 grit works best. Now take the block and sleeves in place to a good machine shop to have the sleeves cut off so that there is 0.002" to 0.003" of the sleeve standing proud of the face of the block. A good shop can do the whole job in less than an hour. It is most important at this point that the sleeves be put into the proper holes and not mixed up.

Next fit the three "O" rings to the interior of the sleeve holes, making certain that the grooves which hold the rings are very clean. Do not get involved with any type of stickum at this point. Clean the sleeve, oil lightly all over, and work the sleeve into the hole. Toward the end you'll have to put a wooden block on top of the sleeve and drive the sleeve home. Check that you stand proud the correct amount. If a sleeve really refuses to enter the bottom of the hole, check that you have not tipped over a ring.

With the sleeves in place you are home free. The rest is straight assembly work. Be certain your new oil-pump gears (driving) have 0.0033 or less lash. You might give some thought to replacing the relief spring in the pump (this is a miserable job, sorry I mentioned it). The spring is found under the core plug on the body of the oil pump. It takes a special tool to get the plug out.

Do NOT mix up the piston pins. They are selectively fitted to the piston. Mark them carefully (A1, A2, . . . B1, B2, etc) and put them in the proper piston. You may get wrist-pin knock if you don't watch this point.

This item is the choke stove which is found in the right exhaust manifold. For some reason R-R saw fit to extend the threads down into the manifold. The resulting build-up of carbon makes the unit very hard to extract. Turn off the first 0.250" of threads and make life easier for the next man. (He might be you.)



Block with one sleeve removed. Sign in background cautions re-builder to use oil for a lubricant.

When making up a joint, I have found Ford's Perfect seal (Part #B5A-19554-A) to be an ideal sealer; it is soluble in lacquer thinner but forms a nice neat joint. Cost is small. . . . 75¢ a can, complete with brush.

As you put the engine together you may elect to rebuild the waterpump. An article on this will appear in a future Flying Lady but do be careful in removing the cast iron front housing from the aluminum back housing. This breaks very easily.

To set up the skew gear on the back of the camshaft, turn the engine until cylinder A1 is at firing TDC. The axis of the flat distributor driving shaft will be parallel with the axis of the engine. The flywheel is foolproofed and use all the bolts to line up the flywheel on the crankshaft when picking up the timing marks. You don't have to tighten them down, however.

BEFORE you put the engine back into the chassis check the following items while you still have room:

Grease in the front universal joint.

All vacuum operating chambers work (LWB & Coachbuilt cars).

All heater tap and flap motors working properly (standard cars).

No bare wiring showing.

Most of the dirt cleaned out.

The rear motor supports have special blocks to keep the engine from running through the fan on a sudden (or otherwise violent) stop or crash. The part *without* the rubber goes on the engine, lip to the front. The rubber piece goes on the frame, lip to front. Keep about 0.250" of space between the two lips. Change the front motor support before installing the engine or you'll wish you had later on.

Put the engine back into the chassis. It will take you either a full day or about three evenings of hard work to get it hooked up and running. There is nothing easy about putting the engine back. Reinstallation is hard, drudge-type, work.

Radiators can generally be recored by a competent shop with costs about \$50. Put in a new pressure relief valve if you go this route. Also be careful not to twist off any of the short small studs which hold the wind-sucker to the radiator. They are not too strong.

Put the power-steering pump on before the generator. It's not easy to work on anyhow and the generator is right in the way.

There isn't much of anything too serious about rebuilding these engines. Make up with accuracy what you lack in knowledge and, above all, clean everything most completely before starting the assembly. Our British cousins use a preservative on everything. "Perk" takes it off very quickly. Do not be dismayed and do not mix things up. When in doubt, ask or call, it's cheaper in the long run.

OVERHAULING THE V-8 ENGINE, MORE

A local SC-II, Member Jim Deisenroth's LSWC150, had developed a definite miss on idle which tended to disappear with increased RPM. Tentative diagnosis of a burned valve was confirmed by a compression test showing cylinder A-2 to have a reading about 90 psi lower than the average of the other 7. We followed the procedure given in the Engine Manual for the SC-II for removal of the heads, but discovered a couple of unmentioned items which deserve to be noted. One was that removal of the dipstick tube made access to the manifold and other bits on the left side of the engine easier. Access to the mounting screws for the dipstick tube is much improved by removing the splash-pan on the underside of the frame at the left of the sump. Otherwise, to quote an old McFarlane-ism, you need spaghetti fingers and curved eyesight.

The directions call for disconnection of 4 electrical units from the loom which is clipped to the induction manifold and runs across the front of it, as well as the right side. A 5th connection should be undone: the one to the oil pressure sender at the left front of the engine block, low down.

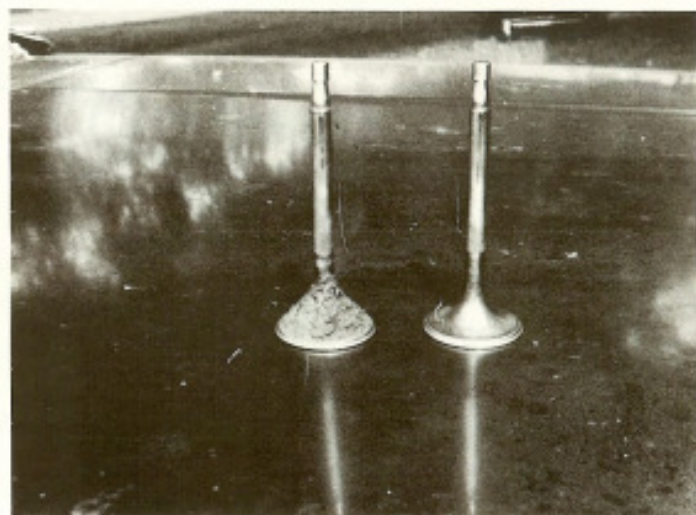
After disconnecting petrol feed pipes according to the recommended procedure the manifold fuel overflow pipe should be uncoupled at its rear. We found this out by trying to lift off the manifold and being brought up short by the unanticipated ligature. Another item that must be removed before trying to lift off the manifold is the water pump bypass hose.

Another unmentioned obstacle is the high-tension plug wire guides mounted on the rear of both cylinder heads. Since these are close to the firewall, it's easy to ignore them until you try to lift a head off and get frustrated by the clinging tentacles. For removal of the cylinder head nuts, the manual specifies use of tool RH7126. We wondered for a moment what this tool could be like and then tried an ordinary 11/16" deep socket. It worked just fine!

The accompanying picture shows what can happen when flow of oil down the valve stems is not properly controlled. Part of the operation on LSWC150, as long as the heads were off for a valve grind, was to update the oil seals to later specifications as described by John McCombe on page 1278 of the July, 1970 F.L. We had our automotive machine shop remove the old valve guides and press in the new ones before reseating the valves. Incidentally, the culprit causing the low compression was an exhaust valve with a gap in the edge you could throw a cat through. The valves shown here are intakes, one with the accumulated carbon of 137,000 miles, the other after about 15 minutes of treatment with scraper and wire brush.

It might be well to mention inflation here. An exhaust valve which cost \$28.66 in 1970 was \$67.27 in August, 1974. Valve guides had gone from \$1.70 to \$4.44 and from \$.84 to \$1.59 for exhaust and intake respectively. We don't have the price of a top overhaul gasket then, but now it comes to \$188.67. For a '56 Cadillac, the J.C. Whitney Co. in Chicago will sell you valve grind gasket kit for \$13.98. The '68-'72 cars command only a paltry \$9.35.

John Utz, N.Y.



BURGLAR ALARMS ON MASCOTS?

Len Goldfarb (Conn.) sent the following article, found by him in the Sunday Telegraph while flying with the Red Baron over Dusseldorf.

Rolls-Royce is considering fitting burglar alarms to all "Flying Lady" radiator mascots because so many are being stolen for sale to collectors.

They are becoming increasingly popular among teenagers who fit them on to old bangers and families who use them as ornaments.

A sudden spate of thefts, estimated at about 20 a month throughout Britain, is causing Rolls-Royce mascot casting foundry in Crewe to fall short of demand.

A spokesman for Rolls-Royce said: "The mascots are in short supply because we cannot keep pace with the standard of morality of people with bolt cutters.

"We are seriously considering fitting mascot alarms to every new car rather than just offer them as optional extras."

Previously, the mascot, a young woman with flying robes depicting "The Spirit of Ecstasy," could be unscrewed. Rolls-Royce owners would carry out a "removal ritual" every time they left their vehicles unattended.

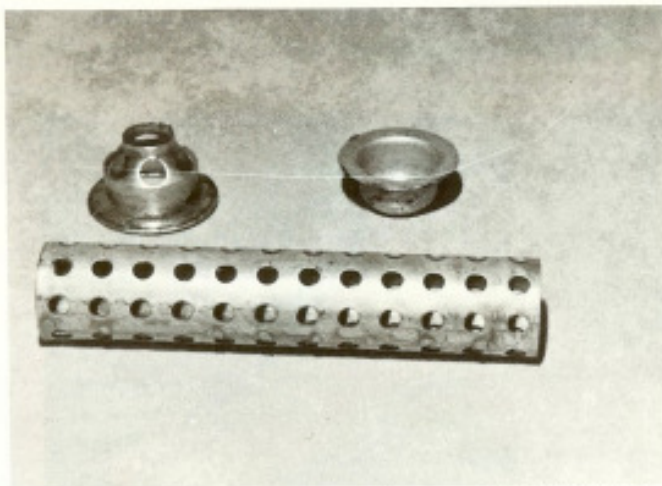
STAINLESS STEEL EXHAUST SYSTEMS

Road Motors (Leeds) Ltd., Victoria Mills, 511 Bradford Rd., BATLEY, Yorks., England are now prepared to ship ex stock complete systems for the S1 and S2 cars only. The Technical Secretary of the RREC advises that they are extremely well made and that they fit without bending and adjusting. At present production is limited to only the S1 and S2.

OIL FILTERS, MORE

On page 1686 an article appears on making a filter for a modern engine using a Hastings Filter number 121. While this conversion will fit, the filter described is not of the full-flow variety, but is a by-pass type filter. The filter is made of somewhat denser materials than the conventional full-flow filter and the component being removed by the screwdriver is the by-pass as fitted by the manufacturer.

While we do make suggestions to ease the financial pain some experience in owning a Rolls-Royce or Bentley, generally speaking it is better to fit original equipment parts where possible. (In other words, crossing a desert you use what you can get your hands on . . . next door to a dealer, you buy the proper parts).

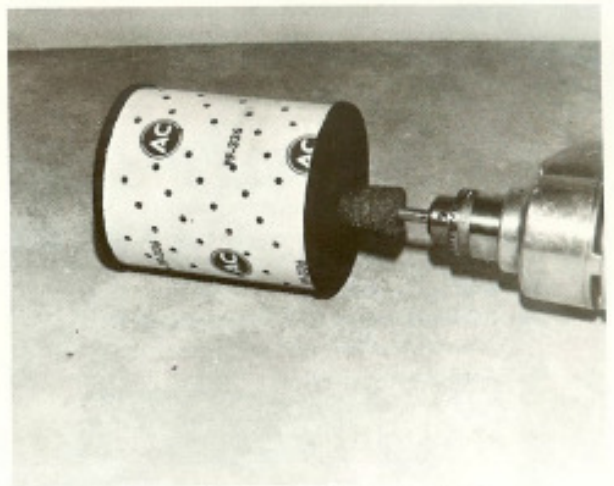


1478 Here are the bits you must take from an original "British" filter. S/SC II & III take the same filter.

OIL FILTER FOR SCI AND SI CARS

In order to use a conventional filter cartridge in place of the R-R element on a SC-1 or S-1 engine, strip the felt socks and supporting metalwork from the core. This is done easily with a pair of side-cutting pliers; tack-weld deposit should be ground off the center core.

Get a Purelator P-76-1 or A-C PF-336 from your neighborhood discount house and grind the end holes to slip over the core, about 15/16 in. dia. Slip the end

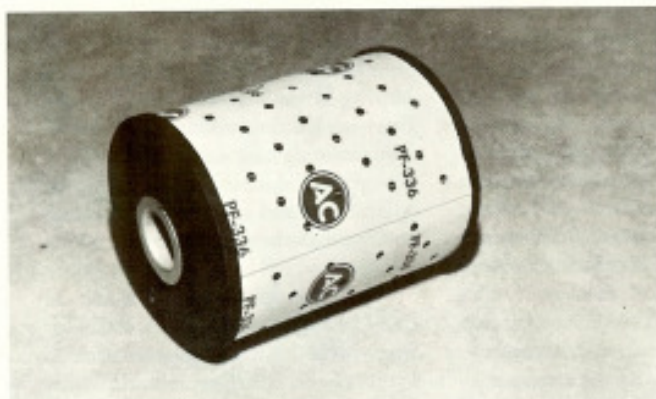


One way to enlarge the hole in the U.S. filter.

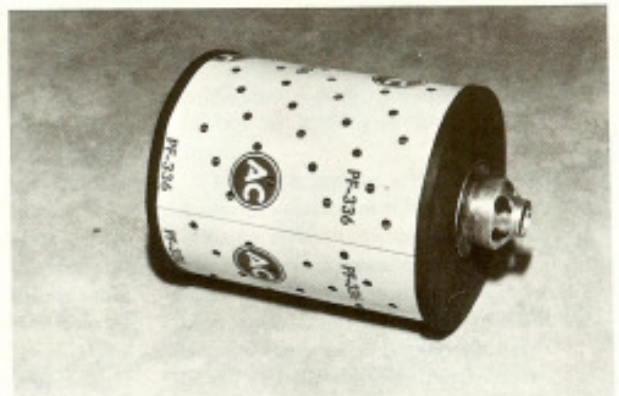
pieces on and it is ready.

By making up two sets, one will be ready to go at each change. I ran premium multi-grade oil for just under 5,000 miles when my Cloud had some 70,000 miles on the odometer, then drained the sump and had a sample tested at the motor research laboratory of a major oil company. They reported that the oil looked good for at least 3/4,000 miles more and that the filter was doing a fine job.

C. C. Wuth, Mo.



Here is the bottom installed in the U.S. filter.



The top of the U.S. filter. Metal center supports the pressure.

Post-War Pre-Shadow Tune-Up Seminar

February 21-22, 1992
Mechanicsburg, PA

Based on notes from
Roger Hadfield, Ont. & Bob Leonard, PA
Photography © 1992 M. Karger



Roger Ford, seminar leader

Equip yourself with the appropriate shop manual for your car. It contains enormous and valuable step by step procedures and information and was prepared by Messrs. Rolls-Royce who built these cars. Many manuals (including that for the S3) are available from Club Stores. Roger Ford was a mine of information and experience, bright and cheerful and equally willing to tackle small as well as large problems. This seminar focused on techniques, running commentary, and demonstrations. References to Bentley S1, S2, and S3 can be presumed to refer equally to the Rolls-Royce Silver Cloud, Silver Cloud II, and Silver Cloud III. A number of cars were put on the lift, and Roger took them on the road afterwards, with a number of seminar participants going along for the informed ride.

Preliminary

Prior to adjustment of ignition and carburetter, set your valves to .006" inlet and .012" exhaust for 6 cylinder cars. Do a compression check. Should be even within 5 or 10 psi when engine warm. Expect compression of 90-110 psi for 6 cyl., 125 for S2, 135 for S3. Write down the compression test numbers on paper so you can compare them when you test again next year. Be sure the battery is well charged, so it's still able to turn the engine at last cylinder tested. V-8: if no compression on one

cylinder, possible lock in hydraulic lifters - try again later. Remove the spark plugs from all cylinders but the one whose compression you are testing.

Fuel & Carburetion

Check carbs (S.U.'s): Pull apart & clean. Use carb cleaner, but away from car. It will cause paint to drop off.

Auto transmission fluid can be used in S.U. carb piston dampers in most climates, winter and summer. In warm climates such as Southern California, the piston will come up too quickly and cause a flat spot so use 30 wt. oil.

Carb synchronization: A Uni-SYN gauge indicates the flow into each carburetter, making comparisons of them easy. Use only when the engine is warm. Roger Ford doesn't use Uni-SYN gauge on an RR/B car because the linkages are good enough to synchronize the carbs by zeroing them. You can use the carb tickler to check each carb separately. Press on one tickler; if the engine revs, then dies, the second carb is too rich. If the engine dies immediately, the second is too lean. Then check first carb with the tickler on the second.

Volume screws on S1/S2/S3 carb: Tighten lightly and then back off 2½

turns. Do not back off below two or above three turns. If you find you have to, then your carb has a problem.

S.U. carb rebuild: Watch washers. Some are serrated on inside. Do not replace with standard washer. You will create a vacuum and cause engine to run very lean.

Idle speed: 6 cylinder, 500 rpm; standard V-8, 600 rpm; V-8 with air, 700-800 rpm; V-8 with Sanyo compressor, 600 rpm. You need to know your engine to set idle speed right.

There is a small valve with a ball bearing in the fuel line right near the flywheel housing. This prevents fuel from running back out of the carbs. If you get a puddle in the morning, the ball is not seated or is missing. Replace it. On 6 cylinder cars it is down near the oil pan.

One participant mentioned the use of 100 octane low-lead aviation fuel for use in his SCIII. It seems paradoxical to me (Roger Hadfield) as I use auto fuel in my aircraft - to each his own!

The cost of overhaul parts for S.U. fuel pumps is such that the purchase of a new Shadow pump and fitting of pump units to the old brass center valve body is cheaper (\$220) and better with new actuators. Don't put one on a 'show car' or an experienced judge will notice (Doug Seibert). Be cautious of after-market pumps as the pressure can be too high: 2½ - 3 psi is standard S.U. pressure, but you want 2 - 2½ psi at the carburetter. If in an emergency you must use an American fuel pump, put a regulator in the line near the pump and set at 1 pound. It will end up at 2½ psi at the carb.

There are excellent manuals available for S.U. carbs. *S.U. Carburetters*,

Frank Sedey, PA, enjoys 51VC37, his 1964 Phantom V Mulliner, Park Ward limousine, for its comfort and prestige. It should last for a very long time.



Post-War Spark Plugs		
Model	Champion No.	Gap
6 cyl.	N8*	.025"
S2	N12Y, N14Y	.025"
S3	N14Y	.030"
PV	N14Y	.030"

* Roger Ford recommends using N12Y. N8's are now difficult to obtain.

Haynes Publications Inc., 861 Lawrence Dr., Newbury Park, CA 91320, and S.U. Carburetors, Motor Racing Publications Ltd., Unit 6, The Pilton Estate, 46 Pitlake, Croydon, Surrey CR0 3RY England.

Automatic Choke

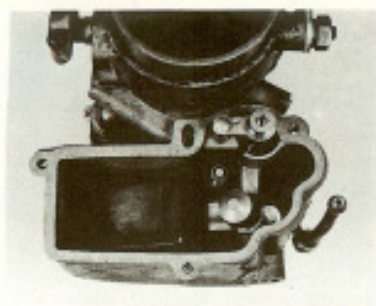
The automatic choke responds to the inter-related workings of the vacuum diaphragm, a bimetallic spring, and an electromagnetic switch which keep the engine on fast idle until certain conditions of vacuum, oil pressure, engine temperature, and under bonnet temperature are met. Examination of the various mechanisms involved fascinated seminar participants.

Depress accelerator pedal only once to set choke. The engine should start in 1/2 to one full revolution. The choke is then pulled open 1/4" for fast idle at 1,800 rpm. At normal operating conditions, the butterfly is flat open. Make certain it has not been bent.

On S Series cars, a flapping choke after start denotes a failed diaphragm, where the vacuum line connects up. Be very careful of the fragile pin when aligning and tightening nut on new diaphragm.

Don't adjust the bimetallic spring more than two notches either direction from the factory mark. If it needs more, you may require a new bimetallic spring.

Do not lube the fast idle cam – even



The gasket on the Zenith carb float bowl must not cover the low speed jet, center top.

WD40 will leave a residue, and a sticky cam will keep the engine on fast idle.

Ignition

Points: Lightly use 600 grit paper on block to remove carbon and re-mate. Set to .020", except Lucas in S3 series – set to .016", and change condenser with points. Condenser not normally replaced when using Delco-Remy points. 6 cylinder – two sets of points, set at .020"; Delco-Remy D110 (one set per box, buy two boxes). Always go back and recheck gap and condition. Watch base thickness. May have to bend Delco-Remy arm to align the points. You can work on the points with the distributor on or off the engine, but if you take the distributor out, make careful note of pointer direction (it will go in more than one way).

Pitting of points is often due to condenser failure – can be tested (e.g., Radio Shack type tester) or replaced. Dale Powers, FL, source for condensers (close but not exact).

Static resistor on the ignition rotor can cause high rpm – 95 mph & up – breakdown (ignition failure).

If Lucas points are to be installed, assure the protective coating is removed first. (Probably a good idea with any make.) Also, make sure the small screw in the baseplate is not too long – it could interfere with the advance weights underneath.

Spark plug wire: Use only solid copper core wire in ignition harness rather than carbon or silicon which break down with the heat of the V-8 and also from oil penetration. Replace wire when it's hard or cracked. Remember the end fittings are not molded on and will thread onto the new wire and thus be re-used. At least twelve feet of wire is needed for a new ignition harness.

An excellent, practical hands-on demonstration of ignition timing was carried out by Roger Ford – the procedure is as detailed in the relevant RR/B Shop Manuals. Note: Set the octane selector fully advanced when setting points.

Timing marks on the flywheel vary from model to model.

Road test for best setting to eliminate ping: on a reasonably straight stretch of road, accelerate so in 4th at 25 mph, then step on it. If no ping, advance timing until it does ping, then take it back a little until it just doesn't. Get as much power from early advance, without ping. If retarding spark/ignition gets rid of ping, but you don't like the power, use octane booster. Roger Ford has seen timing range from 5° late to 15° early and still ping. How you set up your car depends on how you like to drive it.

Shade tree repairs: If the distributor cap is cracked, and you need to 'get home', a visible crack can be scratched across to break the carbon contact which allows the flow to ground (very temporary measure!). If the arcing is across the coil lead, it's possible that the shorting is in the cap cover, especially if the felt washers around the screws are missing. The cover can be removed, and you can still run normally to 'get home'.

Worn distributor drive bushings are a common problem and must be replaced prior to proper adjustment. Worn bushings will affect the idling more than the high speed on these engines. Play of .005" to .006" in the distributor shaft is too much. Bushings are available. Most distributors at this session needed new bushings. When the bushings are replaced, assure that there is a grease hole in the bushing and that it aligns with the grease cup for grease passage.

The drive pin on the distributor shaft can be replaced by drilling and installing a rolled pin.

New Rolls-Royce Part Numbers for Post-War Distributor Points

Item & Qty.	6 cyl	S2	S3
Spring Arms (2)	RF5093	RF5093	-
Fixed base (1)	RH8889	RH8882	-
Movable base (1)	RH8891	RH8887	-
Kit	-	-	CD3047
Gap	.020"	.020"	.016"

Engine

Marvel Mystery Oil!! Roger Hadfield: 'I'd never heard of it. It appears that it will do anything.'

An engine in storage for a long period will develop fungus on an open exhaust valve which will come off and score a cylinder wall when the engine is started. Before starting a stored engine, put Marvel Mystery Oil into the bores.

Through flooding or too rich a mixture, excess fuel can cause wear or erosion of the top piston ring through wash and resultant lack of lubrication. This all happens when recommissioning a stored car. Again, Marvel Mystery Oil to the rescue. It also helps lube exhaust valves.

Piston slap was mentioned as being common to the S2 - less so with the S3 - also common with the earlier post-war sixes, but not with the big bore and S Series due to offset piston pins.

An excellent set of intake valve adjusting tools for 6 cylinder cars is available through John Decker, 8726 Remmet, Canoga Park, CA 91304. \$45 each.

Thermostat: RR thermostat has throttle valve where American units do not. Must have it or else little water will be cooled. S3 thermostat will fit into Silver Wraith (long neck) if rotated 90°.

Water pumps will wiggle. As long as it doesn't whine or leak, don't worry about it.

To check oil pump gear, you have to pull the water pump, both sets of pulleys, camshaft cover top & bottom. It is an essential part of a major rebuild.

The S2 has dished pistons and the S3's are flat-topped, but neither is now available in oversizes from RR. Liners take about 5 tons to extract. You can hone the liner to even it out. From RR, pistons cost \$290, liners \$120, and a set of rings \$210. If you hone the liners, you can buy silicone impregnated pistons to the exact size you want.

If the webs between cylinders are cracked, repair them or replace the block. \$2,500 to reweld block. \$1,700 for oversize bearings if you have to grind the crankshaft. You can polish without going to oversize and get standard bearings for about \$400. Don't rebore the crankshaft holes as this will prevent correct meshing of gears between crank and camshafts.

Slight weep at rear main seal - do



Dave Rogers, VA, had just purchased this 1957 S2, 1SDD198. Below: its handsome picnic tray.

not use American replacement. Use RR part to get a good seal.

Exhaust Systems

Stainless steel may not be the answer due to its higher heat retention and the associated crackling and snapping in the cooling process, as well as an uncomfortable whistle. Possibly, the answer is to replace only the tailpipe in stainless, for the sake of appearance.

Exhaust system must be grounded in three or four places to prevent arcing damage.

The front muffler only is lagged; the others are bare. George McVey, 5040 Antioch, Merriam, KS 66203 913-722-0707, sells an effective modern alternative to asbestos.

The upper silencer, above the axle, contains baffles, but some aftermarket replacements are empty, with the resultant increase in exhaust report. Flanges on RR replacement exhaust systems are welded on wrong and have to be undone and redone (Doug Seibert).

Brakes

Shake back stops operate dry - no lubrication! Tighten to 22 lbs. torque. Their only purpose is to align the brake shoes square to the drum. Do not use stops to adjust brakes in any other way.

To do a proper brake overhaul, always replace the five hoses available from RR at \$120 total.

Low speed judder when brakes applied: Springs weak, allowing the small coil spring to brake drum to float free.

RR says 'Do not use silicone brake fluid.' See FL4207. Also, it will void any warranty from several of the shops that resleeve brake cylinders. The



resleeved cylinders also have some problems with regular brake fluid leaking. Use RR363.

Automatic Transmission

Jumping out of reverse is commonly caused by a worn selector. During transmission rebuild, tell the shop to examine the corner of the mandrel for wear and to file it to rebuild the edge if warranted.

Just prior to engine shut off, select reverse, then switch off the engine. This relieves pressure on the front pump and will help prevent leakage. Then select neutral, and finally select reverse for locking.

Transmission fluid should be changed completely every 20,000 miles, the filter cleaned, and the bands readjusted. The lubricating properties of ATF are important. Be sure to drain the torus also. Watch the torus plug - it's very sensitive and fragile. If it strips out, use a tapered plug. A spread aluminum washer prevents this plug from coming out easily.

Transmission adjusting tools: The

front band tool is in the toolkit. It looks like a plumb bob. The rear band tool is not in the kit. See pic in *Automatic Transmission Service Manual*, Section 6, pp. 8-9, TSD2042, Club Store Item No. 3204.

Tires and Wheels

Radial tires may not be the answer. They are noisier than bias tires, especially over road cracks. The car will sit lower. When radials are changed, always keep them on the same side of the car for constant rotation in the same direction or failure is likely; i.e., rotation of radials means exchanging front with back on the same side. Remember, the Cloud suspension was not designed for radials so they also require realignment. Castor $1\frac{1}{2}$ - 2° positive; camber 0- $\frac{1}{2}$ ° positive; toe-in $\frac{1}{16}$ ". Adjusting camber on Clouds is difficult even for a good front end shop until they know how to do it. Maximum size for radials is 215 x 70R - larger will scrape the wheel well.

RR recommends tire pressures for bias ply of 22 lbs. front, 27 rear; Roger Ford recommends for bias ply 27-30 lbs. front, 30 rear; for radials, 30 lbs. front, 35 rear. Testing of tires on your own car is strongly recommended.

Do not use quick-fix plug for flat tires. They will be outlawed soon; they are very dangerous, especially in radials. Patch tire only. The tire people will know the limits to patching.

Beware of servo drag when balancing the wheels on the car: It will blow the

Louise Newman, NH, investigates the workings of the automatic choke which she expects to repair on her own Silver Cloud II.



This exceptionally clean and wellkept 1964 SCII, LSFU721, belongs to Rick Parker, NJ.

balancing machine's fuse. The paint rings on the wheel discs can shift and cause a slight shudder here or there. Pin them down.

Overtightening of wheel bolts (with an impact wrench) will distort the wheels and make them impossible to balance satisfactorily. Remember: Left side, left thread; right side, right thread. (Old rule for tightening: 'Down in front'.)

Chassis

Low speed vibration, say 5 mph, is often caused by wear in the Detroit coupling. Vibration at 18-20 mph denotes problems with the center support mount. If you pull the mount down by hand, and it doesn't spring back, then remove the mount, dismantle, and clean it, replace the rubber, check the springs, refit the unit, and align it.

If you need to remove the drive shaft, make sure two knuckles are aligned when you put it back.

The steering idler arm is often a prime cause of wander. The pin and bush set is available from John Decker, address above, at \$25 each.

The tapered wheel bearings should be just tightened and then backed off one or two holes. Make sure the split pin is bent to clear the ground strap in the hub cap.

Rear spring re-arching, although not totally successful long term, is being done satisfactorily in California and Toronto. Do *not* retemper the springs - it does not last.

Teflon tape is being tried between the leaves to allow proper slip, but there is a problem getting split pin back into the bolt. Spring Menders in Norfolk, VA, was mentioned as a possible source for new leaf springs.

As front springs grow weary and weaken, the front end starts to sag. Springs have five shims on top from the

factory. You can go up to 16 shims before the spring will fall out of its socket. Shims are in a canvas pack at the top of the spring. Coil springs are available from a California supplier at \$150 per pair.

Standing height must be correct before any other repairs to the suspension can be carried out correctly. Consult the workshop manual. You have to pull the spring out with an RR tool and with much experience. An important fix, but do not undertake it lightly. Springs uncompressing without control have been known to kill people.

A Cloud with air conditioning requires heavier duty front springs. Home market cars have thicker springs; export cars have thinner (softer) springs.

Body mounts are rubber with a bolt through into box, located in front of each door and under the center of the radiator. Usually, the left hand front mount goes first. If the mounts are rotted away, the car will sag in the middle or else the body will move on the chassis, and cause problems opening and closing the doors. The body wobbles - if you attempt to correct it by steering, it looks like a drunk going down the road.

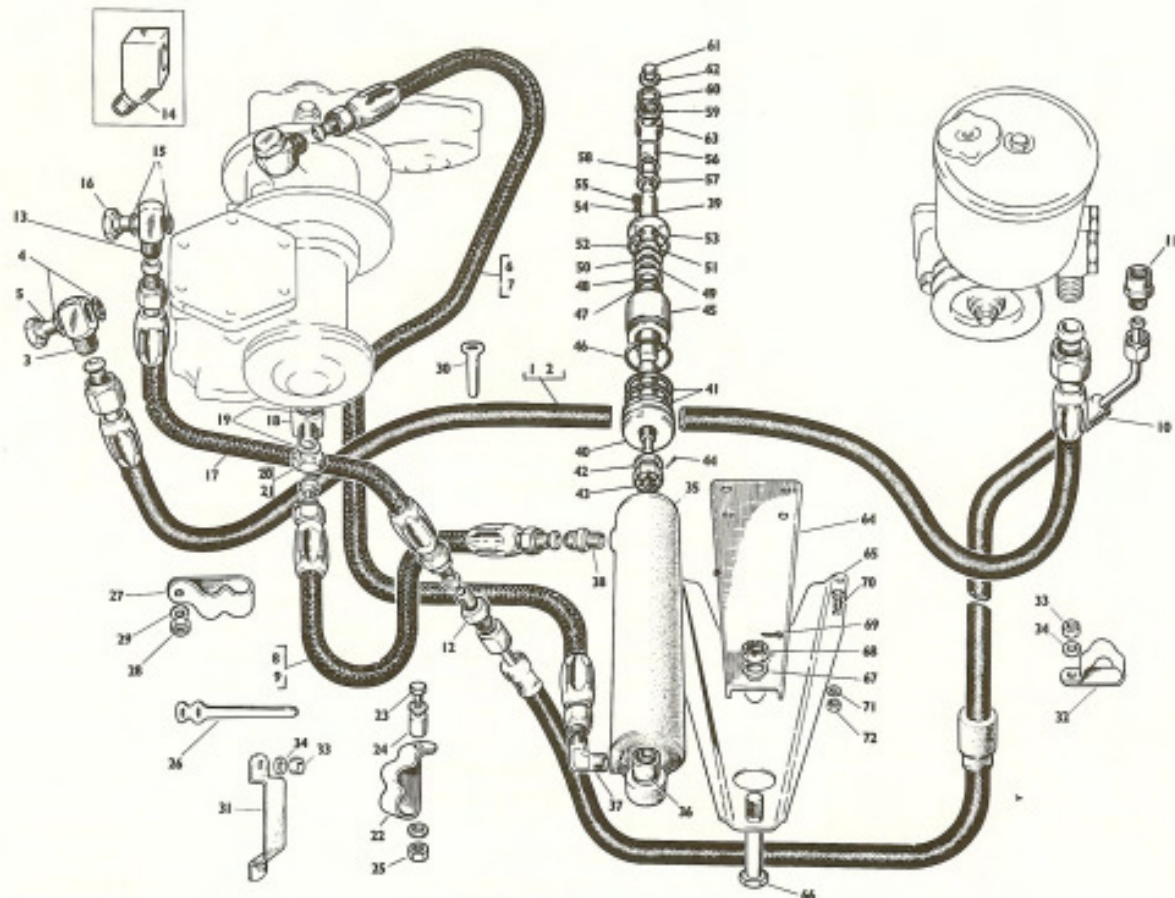
Export cars were undersealed (sheet metal only), a good point to bear in mind for judging. If you underseal your chassis, scrape all rust off first. Trapped rust simply continues to develop.

Lamps

Brake lamps can be improved on Clouds by removing the horizontal baffle, allowing light to the total area.

Cloud instrument board lamps can be upgraded by using Archer 1487 bulbs, E10 base, 14v, 2 amp. You will need seven or eight.

Leak equals big puddle; seep equals small puddle; weep equals few drops.



Herewith the entire power-steering assist system. Part #39 is the ram shaft.

POWER-STEERING REPAIR, S-SERIES AND SILVER WRAITH

Recently encountered was a power-steering ram with a severely pitted ram shaft. After examination it was found that each end of the shaft has the same thread and taper, making reversal somewhat less complicated.

To accomplish this modification, proceed as follows: you may or may not elect to grind off the extra 1/16" on the opposite end. Indeed, you may elect to grind a wrench flat there. Drill a split-pin hole in the opposite end and refit.

You will need the following parts:

- 1 CD666 seal
- 1 CD667 paper back-up washer
- 1 CD671 Scraper
- 1 CD702 O ring
- 1 CD3814 seal expander as fitted to the last series of S-3's

You may also need the following:

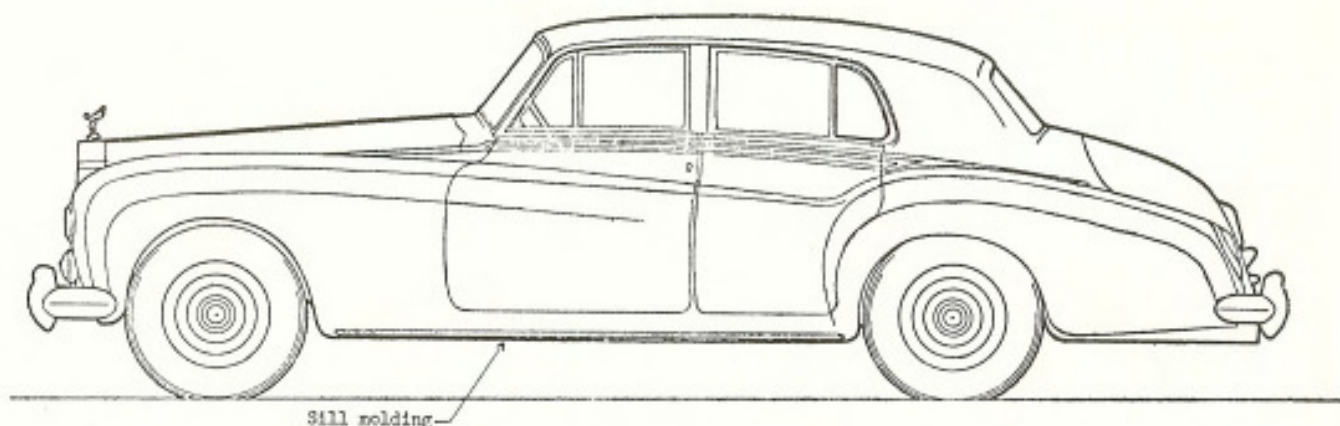
- 2 CD697 Ring
- 1 CD698 Ring

Total cost of parts should run somewhat less than \$50 at present-day prices.

This modification applies to all early and late S-series cars and to E and later series Silver Wraiths with power-steering.

The saving on the ram is \$81.99.

John McCombe, Ohio



SILVER CLOUD III SALOON

STANDING HEIGHT - SILVER CLOUD AND S SERIES BENTLEY

Owners should know that SC and S series cars develop front spring sag in normal service. Left uncorrected, this condition spoils the handling and appearance of the car. It can be the cause of a serious scoring penalty at RROC concours; resale value may also become impaired. The problem is corrected by installing new front springs.

The above side view drawing has been reproduced from an original sales brochure for the R-R SCIII. Side views of the SC I and II plus SI, II, and III Bentley would be similar. The points on this drawing to note particularly are the relationship of bumper centerlines to centers of the hubcaps and the clearance between the top of the front wheel and the wheel opening in the front fender. Also the sill molding along the bottom of the body is parallel to the road surface, i.e., the front end of the molding is not visibly lower than the rear end. In short, the drawing depicts an unloaded new car with correct standing height.

A comparison of this drawing with an actual car will usually reveal a noticeable front end de-elevation. In particular the sill molding will not be parallel to the ground and no space will be visible above the tops of the front wheels. This condition is caused by front spring sag. All R-R SC and Bentley S models are notorious for this weakness. It tends to become evident after about five years' service regardless of mileage. Air conditioned cars suffer more noticeably due to the added weight carried in front.

As a maintenance procedure, provision was made for the periodic addition of shims to the tops of the springs to compensate for sag. The total number of shims that may be added is 18. Each shim is .050" thick and by leverage raises the car .100". However shimming a sagged spring is a short-term remedy because once sag commences the rate

TIRES - CLOUDS AND SHADOWS

Silver Shadow models seem to consume tires at a greater rate than the Cloud series cars. Consensus of dealers seems to favor Michelin X radial cord models in the 205 x 15 size. Latest models provide more comfortable ride than formerly experienced with this steel cord tire. We've heard of but not experienced mileages of up to 50,000. A bit harder ride than some other types and perhaps a little road hum on certain types of road surfaces, a hum we understand diminishes at around 5000 miles.

Konner's Rolls-Royce, Columbus

of continuing sag becomes progressive to the failure point. To properly restore front standing height, new coil springs must be installed.

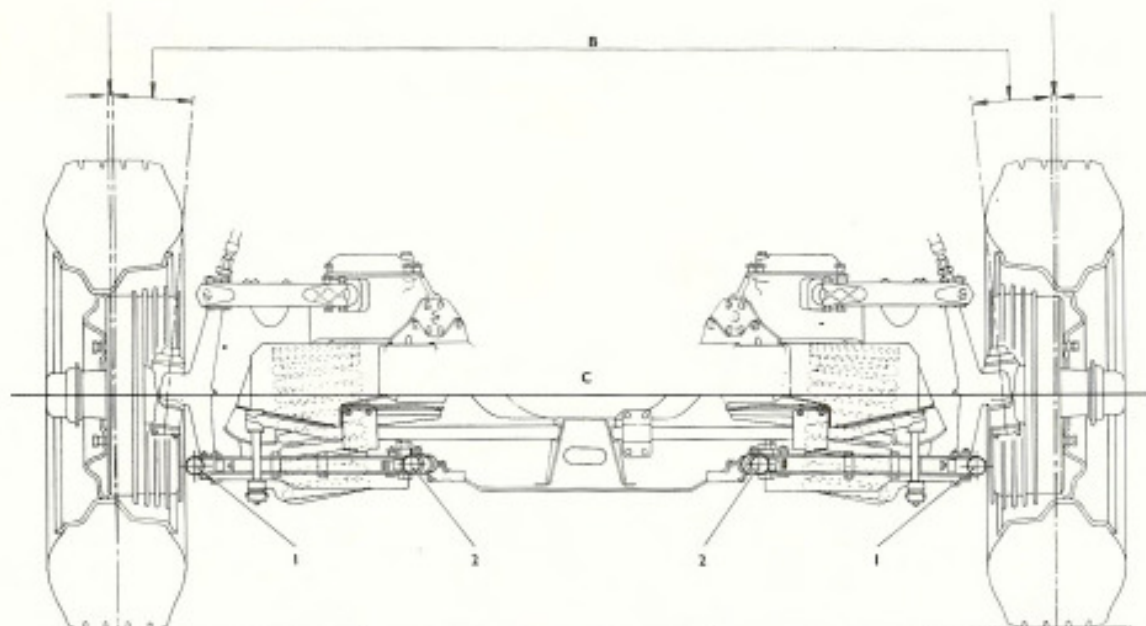
Of course when rear leaf springs sag, they may be re-arched to standard specification and returned to service. With leaf springs this is a common procedure and is usually more economical than installing new ones.

The reason why coil springs cannot be rejuvenated is rather interesting. First of all a coil spring subjects the spring material to a twisting force or torsion load. Torsion is a form of tension, i.e., the twisting force tends to stretch the spring material. A leaf spring is subject to a bending or sheer force. A sagged coil spring has experienced sufficient service for the outer fibers of the spring material to become stretched away from the inner core. This process does not occur dramatically as a result of running over rough roads; instead the spring material "creeps" as it accumulates service through operation near to but not actually in excess of the design yield point. In other words the material gradually becomes tired. A leaf spring on the other hand does not experience a stretching condition in service. It merely loses its bend or camber. Camber can be restored by re-arching the spring and retempering the spring material. In contrast the torsion stretch in an old coil spring is not removable as a practical matter.

Although the visual check mentioned previously is usually effective in detecting spring sag for the practiced eye, there are a few measurements that can be made for a more conclusive determination. A simple test for an unloaded car with properly inflated tires is to measure the ground clearance under each end of the sill molding on both sides of the car. These measurements should be about equal within a range of $\frac{3}{8}$ ". Also the clearance under a front overrider should be about 12" or about the same clearance as under a rear one. These measurements are not precise because friction in the springs and other suspension parts prevents a car from coming to rest at exactly the same standing height after each trip. Of course the R-R shop manual discusses a more elaborate procedure for measuring standing height, but that method will not be described here.

Improper standing height can be a problem for participants at RROC national meets. Judging classes for these cars are always crowded; the judges are keenly aware of spring sag and score accordingly. For instance a car otherwise able to score in the mid-nineties can lose two points for spring sag - enough usually to put it out of award contention.

Aside from concours scoring disappointment, spring



A. CAMBER ANGLE B. ANGLE OF PIVOT PIN INCLINATION C. LEVEL LINE OF CHASSIS

The standing height is the vertical height of point "2" above point "1". The car must be unladen and tires properly inflated when checking this measurement. Tolerances for Standard Car are 0.800" to 1.400". For the Colonial Car, 1.300" to 1.900". Also see page H2 in the Silver Cloud workshop manual for more explicit details.

sag also alters the front suspension geometry thus affecting the general handling of the car. Too, a nose-down attitude mars appearance obviously.

Every one of these cars is a potential collector's piece. Most owners of good examples know that resale values have been trending upward for some time. To encourage this circumstance it is logical to maintain a high standard of condition from both a mechanical and appearance standpoint. Restoring standing height with new front coil springs contributes measurably to that program.

Bruce Hill, Washington

ALIGNMENT SPECS—CLOUDS AND SHADOWS SI CARS

Camber — Vertical 0° to ½° positive
 Castor — 1° negative (manual steering)
 0° (power-assisted steering)
 Toe-in — ⅛ in. to ⅜ in.

SII CARS

Camber — Vertical 0° to ½° positive
 Castor — 0°
 Toe-in — ⅛ in. to ¼ in.

SIII CARS

Camber — Vertical 0° to ½° positive
 Castor — 1° (SCX-1 onwards)
 Toe-in — ⅛ in. to ⅜ in.

SILVER SHADOW

Before SRH 3349 — CRH 3449

Camber 1° negative plus-or-minus ¼°
 Castor — 1½° positive plus-or-minus ¼°
 Toe-in — .062 in. to .141 in.

After SRH 3349 — CRH 3449

Camber — 1° negative plus-or-minus ¼°
 Castor — 3° positive plus-or-minus ¼°
 Toe-in — .062 in. to .141 in.

Hermann Albers, Ind.

A SUGGESTED CHASSIS PAINT

duPont has recently come out with a new poly enamel which they sell under the trade name of IMRON. This paint seems to be ideal for painting chassis and running gear. It has exceptionally high chip-resistance, and needs only to be washed once in a while to be kept at maximum brilliance.

It is so new that it has been released only to selected shops. Your duPont paint dealer should have a way to get it by now.

CAUTION: When mixed with the activator, the paint has a pot life of only 3 hours, so plan your work accordingly. A complete cleaning of spray materials in lacquer retarder is a must or you'll need to blast to get the dry paint out of your spray gun. Use more than adequate ventilation.

Body Beautiful

SERVICE NOTES — CLOUDS AND SHADOWS

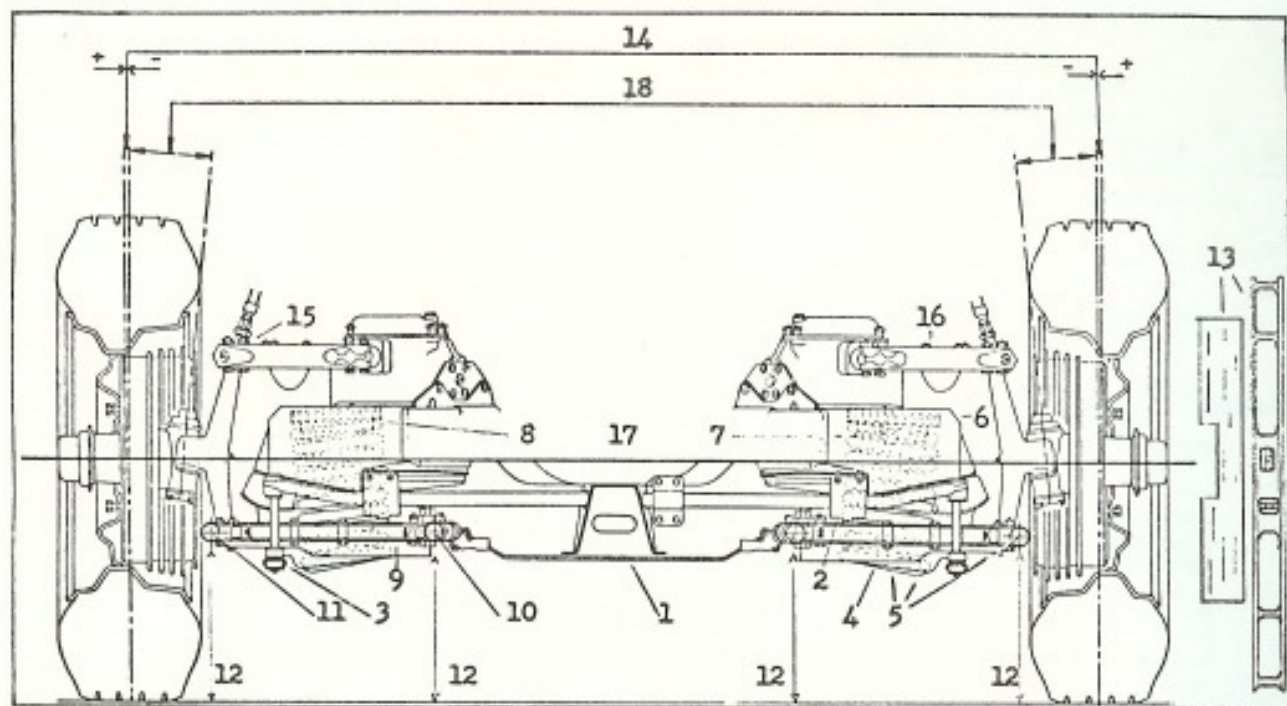
Recommended "life" for thermostats is 24 months, using 88° thermostat year-round. Do not mix stop-leak anti-freeze with other types. If a change to this type is felt desirable, drain and flush the cooling system before filling.

BRAKE FLUID — CLOUDS AND SHADOWS

For brake fluid Konner's Rolls-Royce of Columbus, Ohio urges that only *Girling Fluid* be obtained and used. "Amber" is recommended for Silver Shadow models and "Amber" or "Crimson" for Cloud models. Generally-available U.S.-made fluids can damage seals and can produce expensive service problems.

OVERHEATING — CLOUDS AND SHADOWS

May we again emphasize that should your coolant boil out, STOP your car; shut down your engine! That "short" mile to the next gas station could result in an extensive engine repair. And, again, some R-R temperature gauges "indicate" quite hot. This generally does not indicate a problem. If you are using coolant, then is the time to diagnose for a problem. If your car is not boiling, is not consuming coolant, even though the gauge may read hot, you likely have a normal running situation.



FRONT SUSPENSION SYSTEM - S SERIES CARS

- | | |
|---|--|
| 1 Front cross-member | 10 Inner fulcrum bearing |
| 2 Stabilizer bar chassis mount | 11 Outer fulcrum bearing |
| 3 Stabilizer bar link | 12 Official standing height |
| 4 Lower spring seat | 13 Wood block and carpenter's level |
| 5 Lower spring seat retaining bolts | 14 Camber angle |
| 6 Spring housing | 15 Upper fulcrum bushing |
| 7 Eye for compressor hook | 16 Upper A frame
(Upper triangle lever) |
| 8 Upper spring seat and shims | 17 Level line of chassis |
| 9 Lower A frame
(Lower triangle lever) | 18 Angle of pivot pin inclination |

**STANDING HEIGHT RESTORATION ON
SILVER CLOUD AND S-SERIES BENTLEY**
By Bruce Hill, Wash.

Installation of new front coil springs to restore stand-height on S-series cars is a feasible project for an experienced, enthusiast owner. There are a few hazards to avoid, and a special tool is necessary to compress the springs. Formulation of a plan to replace all worn-out front suspension parts at the same time springs are changed is advisable. New R-R springs are expensive; custom made replacement springs may be an economical alternative.

While replacement of front springs is in the contemplation stage, examine all parts of the front suspension and steering system for evidence of excessive wear. Particularly note the condition of inner, outer, and upper fulcrum bushings. Many suspension parts cannot be replaced unless the springs are removed; there is no point to doing the job twice.

The R-R shop manual recommends a special tool, RH-195 I.F.S. Coil Spring Compressor, to compress the springs. This tool seems to be a scarce item.

If the RH-195 cannot be bought or borrowed, an improvisation will be necessary. Fortunately there are other tools available for compressing suspension springs. At least one is an EY-6800 internal type compressor. This tool is handled by Cornwell Tool Co., 924 E. Pike, Seattle, Wa. 98122; it is quite rugged and intended for use with an impact wrench. Comparative cost of the two tools is as follows:

RH-195	\$65.00 (old quotation)
EY-6800	27.50 (November 1972)

As a first step toward spring removal, measure the stand-height by the sill molding method described in my previous article. These measurements can be used as a standard of comparison when the job is finished.

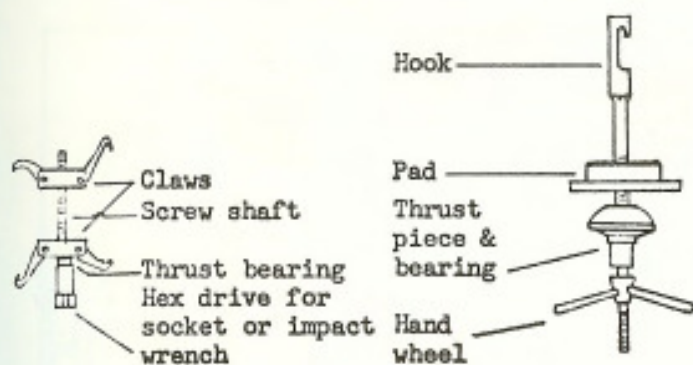
Next, lift the front of the car with a regular 1-1/2 ton garage jack. Place the jack under the center of the front cross-member for this operation. The jack saddle should have a diameter of about 7" to properly distribute the load. Be careful that the jack does not foul the power steering cylinder.

Once the car is elevated, place heavy-duty jack stands under the front stabilizer bar chassis mounts. The stands must be at least 22" tall and resting on level pavement.

After removing the strain from the jack, gently try to shake the car as a test for solid support. Disconnect and remove the stabilizer bar links to the lower spring seats.

If an RH-195 compressor is available for spring removal, the hook must engage the eye attached to the frame at the top of the spring housing. Be absolutely sure the engagement is correct and won't slip.

From the drawing, note that the spring compressor pad has a different shape on either side. Select the side that fits the lower seat best, and run up the hand wheel until the compressor takes the strain from the spring. The A frame



EY-6800 SPRING COMPRESSORS RH-195

will lift a bit at this point.

Loosen the retaining bolts on the lower seat with a 1/2" drive socket and 17" el bar. There are eight bolts on SIs and four on SII's and SIII's. These bolts will be very tight; a foot may be required to move the wrench. Check the car again for solid support before performing this gymnastic.

After the retaining bolts have been removed, run down the compressor hand wheel to within an inch or so of the bottom. Lift the compressor, lower seat, and spring slightly to disengage the frame eye. Withdraw the spring and tool from the spring housing. All of the shims must be removed, too. If they do not come out easily, let them stand for a few hours or overnight. They tend to stick to the rubber composition spring pad at the top of the spring housing.

If an EY-6800 compressor is used, it should grip the spring in the manner described by the instructions furnished with the tool. Compress the spring until it is loose on the spring seat. Remove the spring seat and withdraw the spring. When the spring is out of the car, carefully note the position of the compressor claws and the length of the compressed spring; these conditions must be duplicated when the new spring is installed. As a safety measure, relax the compressor as soon as possible.

While the springs seats are off the car, examine them for evidence of fatigue cracking. An SI owner here in Seattle has reported his experience with these parts giving way under the springs.

If new R-R springs are being installed, examine the attached tags for poundage ratings. These ratings must be equalized in the following manner: Divide the difference in poundage ratings between the two springs by 14. The resultant indicates the number of shims required to equalize the weaker spring i.e., each .050" shim increases the poundage rating by 14 lbs.

When the springs are installed the stronger spring will use two shims (the minimum), and the weaker spring will use two shims plus the equalizing pack for the initial trial.

To install the springs, place the lower spring seat, spring, shims, and upper spring pad over the RH-195 compressor and lift the entire assembly into the spring housing. Engage compressor hook in frame eye as before and check for solid connection. Run up compressor hand wheel a bit to steady parts; be sure shims and upper spring pad are seating properly.

Place two 12" x 1/2" diameter alignment rods through adjacent fore and aft retaining bolt holes on SI cars. On SII and SIII cars use the two outer spring seat retaining bolt holes (the inner ones are threaded). Stretch a large rubber band between the alignment rods to hold them in place.

Run up the hand wheel on the compressor until the lower spring seat settles against the A frame. My experience suggests that engagement will occur at the outer end of the A frame first. If further manipulation of the hand wheel does not effect a suitable contact for the inner retaining bolts, use a large "C" clamp to grip the A frame and spring seat at one of the retaining bolt locations. Adjust the "C" clamp, alignment rods, and compressor hand wheel

until a good contact is effected. Be careful that the "C" clamp does not slip off unexpectedly.

When alignment is correct, insert the retaining bolts and tighten moderately. Remove the "C" clamp and alignment rods. Insert and moderately tighten all other retaining bolts. After all bolts are in place they may be fully tightened. The R-R shop manual recommends 65 lbs. ft. torque on 3/4" A.F. bolts. Finally, remove the spring compressor.

If an EY-6800 compressor is used, the procedure is similar except that the spring is compressed before being placed in the spring housing. I believe the lower spring seat could be bolted on directly without the alignment difficulty discussed under RH-195 procedure. The compressor would be relaxed and removed after the seat was secure.

Following installation of both springs, connect the stabilizer links and lower the car to the ground.

After the car is on the ground, gently rock it from side to side to seat the springs. It might be advisable to drive the car a few miles before checking the standing height to insure a thorough shakedown of all parts.

If the standing height does not check out properly, determine alterations necessary to effect an acceptable trim condition. Remember, one .050" shim raises the car .100".

For desired results, all or part of the job may have to be done again. I had the springs on my car in and out three times before I was satisfied.

Incidentally, Hermann Albers recommends installing eight shims over each new spring. Although my experience showed this method raised the car a little too high, it is a practical technique that obviously saves time. I must mention, too, that Hermann is the author of the sill molding method of standing height measurement. This is another time-saving professional wrinkle.

When I had finished installing the springs on LSCX 729 I had used five shims over the weak spring and two over the strong one.

As an alternative to the sill molding measurement or as a final flourish, there may be some interest in taking the front standing height measurements according to the official R-R method. To do this, park the unloaded car on a level surface with the tires properly inflated and only five gallons in the tank.

Lift the front bumper a bit by hand and gently release it. Crawl under the front of the car and measure the distance to the ground from the center of the inner and outer fulcrum bearing caps for each side of the car. Record all clearances.

Next, depress the bumper by hand and gently release it. Take the measurements again and record them with those taken previously.

Average the clearances for each location and subtract the outer average measurement from the inner average measurement for each side of the car. The resulting values will be the average amount by which the inner fulcrum center stands above the outer fulcrum center.

The R-R shop manual indicates the following amounts for standing height obtained by this method:

	SI	SII & SIII
Standard car	.600" to 1.200"	.800" to 1.400"
Colonial car	1.100" to 1.700"	1.300" to 1.900"

Immediately after changing the springs on my car the "official" standing height was 2 3/16" on both sides. After driving the car 500 miles, however, standing height settled down to 1 5/8" on both sides. The sill molding method indicated a level condition within acceptable tolerances at all times. Subsidence in new springs is due to normal stress relieving.

Due to the natural function of the suspension geometry, spring sag increases positive camber. When standing height is restored, the camber angle returns to normal. By comparison, an impression of negative camber is created.

To insure that the camber angle is nearly correct a simple

test can be made by placing a carpenter's level vertically across the wheel rim. A wood block cut to the shape shown in the diagram is helpful when making this test.

The level should indicate a vertical or very slightly positive condition since standard camber is 0 to 1/2 degree positive. If the camber has been altered to compensate for sagged springs, a new camber adjustment will be required.

To make a temporary adjustment until the car can be set up professionally, raise the front and remove the wheels. On SI cars loosen the four bolts anchoring the upper fulcrum bushing blocks to the upper A frame. Slide the blocks outward for more positive camber or inward for negative.

On SII and SIII cars, bend back the locking washer on the upper fulcrum bushing pinch bolt and loosen the bolt. Turn the bushing nut clockwise slightly to gain positive camber and counter-clockwise to gain negative camber.

In either case only a small adjustment should be necessary. The shop manual describes a number of esoteric problems that can be associated with the need for a large camber adjustment. These problems will not be examined here.

After the adjustment has been completed, the camber angle should be rechecked with the car on the ground. Before checking the camber, always depress the bumper slightly and gently release.

Although front standing height is a chronic problem with S-series cars, rear standing height may become a difficulty on cars with advanced mileages. To complete the discussion of standing height as such, the following values are quoted from the R-R shop manual for the rear standing height:

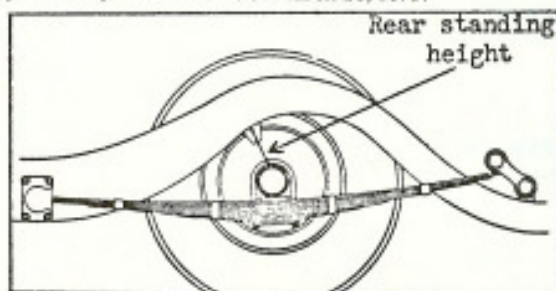
	SI		
	Height	Tolerance	Height Tolerance
Standard car	6.00"	+ .600"	6.000" + .600"
Colonial car	6.500"	- .350"	6.900" - .300"

These measurements are taken from the center of the rear axle rebound pad mount to the nearest point on the

axle housing. The difference between these measurements for each side of the car should not exceed 3/8". If the car has been elevated with rear wheels hanging, the measurements should be postponed until the car has been driven at least 30 miles.

If the measurements indicate need for re-arching the rear springs, pertinent data for spring camber, etc., is recorded on small brass tags fastened to the top of each gaiter about 4" behind the axle mounting.

There are several alternate replacement springs supplied by R-R for S-series cars. The retail price ranges from \$89.76 to \$141.79 each as of March 26, 1973.



REAR SUSPENSION SYSTEM

Although I installed genuine R-R springs in my SIII, I became curious afterward regarding the cost of a custom made set. My investigation revealed a meaningful economy providing a batch of several identical sets is made at one time.

A pair of very high quality, fully guaranteed, custom springs would sell for approximately \$115.00.

If any owners are interested in pursuing this opportunity, I can furnish additional details to any who care to write to me at 8249 16th Avenue North East, Seattle, Wa. 98115.

S-Type Automatic Transmissions

The transmission used in the Silver Cloud/Bentley S type cars is the old GM dual-range design built by Rolls-Royce. This is a very durable unit despite being a little on the rough side at shift points when compared to later designs. To extend service life as far as possible use the following procedure:

1. Check the fluid level every 3,000 miles. The dipstick is located under a large round rubber plug on the right hand floorboard (refer to the owner's manual) and should be checked in "neutral" with engine warm and at idle speed.
2. Drain the transmission pan and torque converter fluid every 12,000 miles. Remove the pan, clean the sump screen, check the front and rear band adjustments, fit a new sump gasket (part no. UG809), remove the torus inspection cover, remove the drain plug (it may be necessary to rotate the crankshaft in order to have the plug downwards to drain), replace the sump and torus drain plugs and refill the transmission with new fluid. The correct type is the GM approved *Dexron*, generally available from oil companies and parts suppliers. **Caution:** Band adjustment should be attempted only by an experienced person with the proper tools.
3. Never operate the car if a high pitched vibration can be felt through the accelerator at 10-40 mph. This is a strong indication that the fluid level is low (usually 2 quarts) and must be topped up at once. Failure to do this will result in total transmission failure in a few short miles.

S. Roach

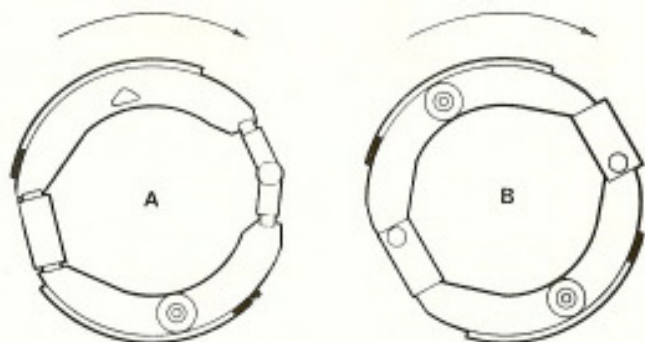


FIG. 1 SHORTENED BRAKE LININGS
A. Rear B. Front
**SHORTENED BRAKE LININGS—
S3 CARS**

APPLICABLE TO: All cars built prior to the following chassis numbers.

Silver Cloud III	SEV.471
Silver Cloud III L.W.B.	CCL.79
Bentley S3	B.92.EC
Bentley S3 L.W.B.	BAL.18
Bentley Continental S3	BC.90.LXC
Phantom V	5.LVB.41

DESCRIPTION

Since October 1963 all new S3 series cars have been fitted with shortened brake linings in an effort to alleviate brake squeal problems which arise in service. The brake linings have been shortened by approximately 0.650 in. on all the leading edges of both front and rear brake assemblies, with the exception of the four shoe Continentals where only the rear assemblies have shortened liners. This shortening has the effect

of increasing the unit loading on the liner and consequently reduces the tendency to squeal.

This Service Bulletin is issued to advise Retailers and Service Personnel that since supplies of linings UG.2071 and UG.1523 have now run out, all brake linings and brake shoe/lining assemblies supplied in the future by the Spares Central Stores will be of the shortened type. The part numbers of the various assemblies are listed in Spares Information Sheet 3.G.4.

It should be noted that complete brake shoe/lining assemblies are interchangeable, but if shortened linings are to be fitted to existing shoes, then two new rivet holes need to be drilled in the brake shoe to allow the shortened lining to fit. This can be done in the following manner.

PROCEDURE

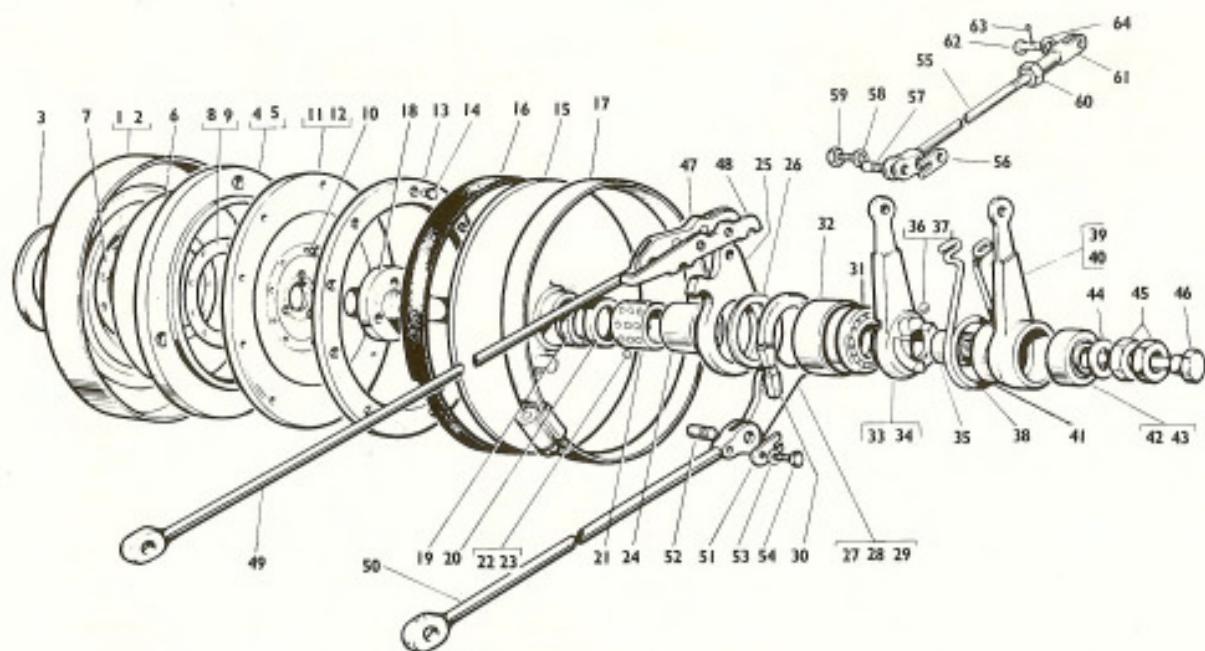
Identify the shortened end of the lining. This can be done by comparing the angular distance between the pairs of rivet holes. The end of the lining which has the two adjacent pairs of rivet holes closest together is the shortened end. Place the lining on the brake shoe in the correct position. As described earlier, the linings have been shortened at the leading edge, this being seen more clearly in Figure 1. The shaded parts of the lining denoting the portions which have been cut off.

Mark the position of the two new holes.

Remove the lining and drill two holes in the brake shoe to 0.187 in. dia.

Rivet the brake lining to the shoe in the normal manner.

from Herman Albers, Ind.



An exploded view of the servo. Lined disc is shown as number 11 and 12. Be certain ball bearings 36/37 are clean and lubricated.

REPAIRS TO S-SERIES BRAKES

While the very early S-series cars only had one master cylinder, the S-series was Rolls-Royce's first attempt at a dual hydraulic braking system. Prior to the S-series, a combination of mechanical rear and hydraulic front systems was used. The accent has always been on having a car which would stop well and under all but the most impossible of conditions (all four wheels off the ground).

The S-series is not without its troubles, but fortunately, they are of a minor nature, requiring little other than patience and small fingers with lots of extra skin on them.

By far the worst job is to remove the dual master cylinders on the later cars. By this time, everything seems to be a mass of rust. Once removed, however, they can be rebuilt in the normal way. The same ease of repair also applies to the slave cylinders. A good brake hone can do wonders to getting the leaks to stop in the system.

One of the most common features on the Rolls-Royce braking systems is the servo. While its operation is quite

basic, it is always considered to be "out of adjustment" and one hears comments about "servo-lag," "slipping servo," etc. All the servo on the S-series needs is to be (a) clean, and (b) properly adjusted. Once the above two criteria are met, it can almost be forgotten, for it is not a source of trouble.

To clean the servo, remove it from the car. This is no serious undertaking and should be accomplished in about an hour (all figures for time are taking into consideration the Rolls-Royce Rule of Three . . . simply multiply by three the amount of time you think a project should take). Once removed, take it apart, and break the glaze on the surface of the linings. I like a piece of 100 grit paper glued to a sheet of plate glass to get everything in one plane to accomplish this "glaze-busting." Replace the seal in the transmission, check the ball bearings, and reassemble, using a new seal for the tin covers. Reinstall the unit.

To set the servo, get the car on jack stands, start the

